

GOVERNMENT OF HIMACHAL PRADESH

FOREST DEPARTMENT



WORKING PLAN FOR THE FORESTS OF

ROHRU FOREST DIVISION



(2025-26 TO 2034-35)

VOLUME-I

N. RAVISANKAR, IFS
WPO-cum-DCF, Rohru

Submitted by:

With Contributions by: Dr¹. Shahnawaz.A. Bhat IFS



Preface

The preparation of the **Working Plan for Rohru Forest Division** marks another important step in strengthening the tradition of **scientific forestry in Himachal Pradesh**. The Working Plan is not merely a statutory requirement but a comprehensive document that integrates field observations, ecological assessments, and socio-economic considerations into a cohesive strategy for managing our forests.

Rohru Division presents a unique mosaic of temperate coniferous forests, broad-leaved stands, alpine pastures, and river catchments that are crucial for both biodiversity conservation and local livelihoods. The present Plan has attempted to balance **timber and non-timber needs, soil and water conservation measures, and climate resilience interventions**, while ensuring that the ecological functions of these forests remain intact.

Particular emphasis has been laid on **inventory-based planning, silvicultural prescriptions suited to each forest type, and participatory approaches** to bring local communities into the management framework. Modern tools such as GIS mapping, remote sensing, and digital data management have been integrated to enhance accuracy and monitoring.

I am confident that this Working Plan will serve as a **practical field manual** for the staff of the Division and as a **long-term vision document** for the sustainable management of Rohru forests. Its effective implementation will depend on the collective commitment of all functionaries, from field guards to senior officers.

I congratulate the Working Plan Officer and the Divisional Forest Officer, Rohru, for their dedicated efforts in bringing out this Plan.

Upasana Patial IFS,
Additional Principal Chief Conservator of Forests (Working Plan),
Himachal Pradesh



Message

It gives me great pleasure to learn that the **Working Plan of Rohru Forest Division** has been revised and prepared in accordance with the guidelines of the Government of India and the Himachal Pradesh Forest Department. This document is of immense significance, as it lays down the framework for the scientific management of forests in one of the most ecologically sensitive and socio-economically important regions of our State.

The forests of Rohru Division, located in the upper reaches of the Pabbar and Tons river catchments, are endowed with rich biodiversity comprising conifers, oaks, broad-leaved species, alpine pastures, and a variety of medicinal plants. These forests not only meet the basic needs of the local communities but also play a vital role in regulating water regimes, conserving soil, mitigating climate change, and sustaining the overall ecological balance of the region.

At the same time, these forests face multiple challenges arising from **climate variability, rising biotic pressure, and developmental demands**. In this backdrop, the Working Plan assumes even greater importance as a guiding instrument that prescribes management strategies focusing on regeneration, sustainable harvest, biodiversity conservation, soil and water conservation, and active participation of local people through Joint Forest Management and allied initiatives.

I am confident that the implementation of the prescriptions made in this Working Plan will ensure the long-term sustainability, resilience, and productivity of these forests while securing the livelihood and ecological needs of the present as well as future generations.

I place on record my appreciation for the efforts of the Working Plan Officer and the Divisional Forest Officer, Rohru, in preparing this scientifically sound and comprehensive document. I also urge all field functionaries to implement the Plan with utmost sincerity, professionalism, and dedication.

Sanjay Sood IFS
Principal Chief Conservator of Forests (Head of Forest Force),
Himachal Pradesh



Message



It gives me immense satisfaction to note that the **Working Plan of Rohru Forest Division** has been prepared in accordance with the prescribed guidelines of the Himachal Pradesh Forest Department and the Government of India. The Working Plan is not merely a statutory document but also a guiding framework for the scientific management, conservation, and sustainable utilization of our invaluable forest resources.

Rohru Forest Division, situated in the upper catchments of the Pabbar and Tons rivers, holds rich and diverse forests comprising conifers, broad-leaved species, alpine pastures, and a variety of medicinal and aromatic plants. These forests are the lifeline of the local communities, providing them with timber, fuelwood, fodder, and other ecosystem services such as soil and water conservation, climate moderation, and biodiversity conservation.

In recent years, the challenges of **climate change, grazing pressure, illegal extraction, and anthropogenic disturbances** have put increasing stress on these fragile ecosystems. It is therefore imperative that the Division is managed with a judicious blend of conservation, protection, and sustainable development. The Working Plan provides a clear strategy for regeneration, silvicultural interventions, nursery development, soil and water conservation, wildlife habitat improvement, and active involvement of local communities through Joint Forest Management and other participatory approaches.

I am confident that the prescriptions contained in this Plan, if implemented in true spirit, will not only enhance the productivity and resilience of these forests but also ensure sustained benefits to the people of Rohru and beyond. I urge all officers and field staff of the Division to take inspiration from this Plan and work with commitment and dedication towards conserving our forest wealth for future generations.

I convey my best wishes to the Divisional Forest Officer and the Working Plan Officer for their sincere efforts in preparing this important document.

K Thirumal IFS,
Chief Conservator of Forests,
Shimla Circle



ACKNOWLEDGEMENTS



The drafting of a working plan is a meticulous and time taking exercise which no doubt requires the guidance of senior officers and the support of subordinate field staff and data compilation personnel who provide the robust team for the writing of the plan. As I come to close of the drafting of this plan, I would like to thank PCCF(HoFF) Sh. Sanjay Sood IFS for his enlightening guidance, vision and support in drafting of this plan. My gratitude is also due to Smt. Upasana Patial, APCCF (Working Plan) for her unwavering support and guidance in the preparation of this plan. The solid support and guidance of CCF Shimla K Thirumal is duly noted and acknowledged without which this plan could not have taken shape. I would like to thank my predecessor Dr. Shahnawaz Ahmed Bhat who had laid the foundation on which this plan was materialized. His efforts in data collection and compilation deserves special acknowledgement. The efforts of Range Officers, ministerial staff of the office and all field functionaries in terms of data collection, compilation and submission also deserve due acknowledgement. Special mention and acknowledgement is due to Sh. Avinash Kashyap, Forest Guard who has been instrumental and meticulous in preparation of this plan. His effort in data compilation, analysis, geo-spatial representation and visualization has been extraordinary deserving great appreciation and acknowledgement. Further, Smt. Prabha Devi, Forest Guard and Ankush Chauhan, Forest Guard for their contribution to data digitization and representation deserves acknowledgement.

N Ravisankar IFS,
DCF cum WPO,
Rohru Forest Division

TABLE OF CONTENTS

Chapter	Title	Page
I	Executive Summary	9-27
II	Glossary of Terms	28-48
III	Lists of Flora	49-66
IV	List of Fauna	66-77
Part I: Summary of Facts on Which Proposals are Made		
1.	The Tract Dealt with	78-87
2.	Maintenance/Increase In The Extent Of Forest and Tree Cover	88-172
3.	Maintenance, Conservation and Enhancement of Biodiversity	173-191
4.	Maintenance And Enhancement Of Forest Health And Vitality	192-206
5.	Conservation and Maintenance of Soil and Water Resources	207-224
6.	Maintenance and Enhancement of Forest Resource Productivity	225-235
7.	Optimization of Forest Resource Utilization	236-265
8.	Maintenance and Enhancement of Social, Economic, Cultural and Spiritual Benefits	266-283
9.	Adequacy of Policy, Legal and Institutional Framework	284-297
10.	Five Years Plan	298-300
11.	Past Systems of Management	301-331
12.	Statistics of Growth and Yield	332-341

Part-II: Future Management		
1.	Basis of Proposals	343-351
2.	Deodar-Kail Working Circle (Normal)	352-411
3.	Fir-Spruce Working Circle (Normal)	412-433
4.	Chil Working Circle (Normal)	434-454
5.	High Altitude Broad Leaved Working Circle (Normal)	455-467
6.	Forest Protection (Overlapping) Working Circle	468-509
7.	Grassland Conservation (Overlapping) Working Circle	510-522
8.	Plantation (Overlapping) Working Circle	523-564
9.	Evicted Area Rehabilitation (Overlapping) Working Circle	565-591
10.	Ecotourism (Overlapping) Working Circle	592-612
11.	Biodiversity Management and Conservation (Overlapping) Working Circle	613-636
12.	Participatory and Joint Forest Management (Overlapping) Working Circle	637-657
13.	Wildlife Protection (Overlapping) Working Circle	658-677
14.	Soil Conservation And Water Resource Management (Overlapping) Working Circle	678-705
15.	Infrastructure development and maintenance working circle (Overlapping) Working Circle	706-722
16.	General Financial Forecast and Financial Plan of Operation	723-731

17.	Science and Research	732-734
18.	Miscellaneous Regulations	735-740
19.	Monitoring, Assessment & Reporting	741-744
20.	Summary of Prescription	745-750
21.	Signature of Officers	751

I. EXECUTIVE SUMMARY

The working plan for Rohru Forest Division, Himachal Pradesh, for the period 2025-26 to 2034-2035 has been prepared as per National Working Plan Code-2014. The previous Working Plan was written by Sh. Ajay Srivastava (1994-95 TO 2008-2009 and further extended). The plan was for a period of 15 years beginning from 1994-95 to 2008-2009. It is also noteworthy that the current Working Plan is the first being written exclusively for Rohru Forest Division after its integration with the Jubbal Forest Division.

The present Working Plan of Rohru is prepared on the basis of sustainable management of ecosystem services in accordance with NWPC 2014 considering the core principles of inter generational equity and sustainable development. The focus of the plan is to better the forests in terms of both quality and quantity and to retain forest land to improve green cover and ecosystem services. The working plan in its Part I section details and documents elaborately the floristic attributes, fauna, biodiversity, soil and water resources, changing land use patterns over the years, the socio-economic dependence and profile of villagers, the law enforcement profile of the division and various other aspects which are crucial to forming the foundation of prescriptions in Part 2. The detailed data based documentation and spatial representation of these aspects in Part 1 serve as a benchmark reference for prescriptions and for future managers of the division.

The working plan for Rohru Forest Division is written for the geographical area situated between 30°57'55" and 31°32'20" North Latitude and 77°29'40" and 78°18'42 East Longitude. The total forest area covered by this working plan is 130569.241 ha which consists of 3 Reserve Forest, 443 Demarcated Protected Forest, 187 Undemarcated Protected Forest, Alpine Pasture and Panwis. The administrative classification of division involves 7 forest ranges further divided into 63 forest beats for management and law enforcement. The division is head quartered in the main town of Rohru in the Pabbar river valley.

The Rohru Forest Division encompasses a key geographical entity starting from Kharapathar bordering Theog Forest Division in the South West to the remote village and forests of Dodra-Kwar bordering Uttarakhand in the North East. Towards the North, the division borders Rampur Forest Division along the forests of Summerkot Block and further towards the east on the Northern Side borders the forests of Kinnaur Forest Division and the Rakcham

Chitkul Wildlife Sanctuary along the forests of Khashdhar Range. The geographical location of the division has an interstate character and multiple borders with several forest divisions. The working plan seeks to address the inter state character and multiple bordering forest divisions integrating administrative aspects for better natural resource management. Further, the massive area of the division entails that there is a humungous diversity of forests, biodiversity and demography in which site specific prescriptions are detailed taking into account the current status of forests and socio-economic profile of the region.

The forests of Rohru Forest Division have historically faced adverse pressures of encroachment on account of it falling in the apple belt of Himachal Pradesh with horticulture being the sole backbone of the local economy. The encroachments happened unhindered over the years have drastically altered the land use pattern of the division and led to significant destruction of forest wealth which will take generations to reclaim. Apart from encroachments, more than 500 cases of diversions under Forest Rights Act, 2006 have been approved in the division which has also greatly altered land use. The continued depletion of forests with impunity in the past is a historical mistake which needs to be corrected and fought tooth and nail. In this context, the working plan is a visionary document to right the historical wrongs and enable ecological justice to not just the forests but also for coming generations. The overarching objective of this working plan is hence to rejuvenate forests of division, reclaim lost forest patches and provide a path for sustainable management of these forests in line with the prevailing socio-economic profile to ensure they continue to provide sustained eco system services of biodiversity, climate regulation, timber, water, soil replenishment, cultural and aesthetic services.

A) Vision Statement

Sustainable Management of Forests for continued provision of eco system services on twin foundations of community participation and robust law enforcement protection system for data driven natural resource governance using feasible modern technology.

B) GOALS & OBJECTIVES OF MANAGEMENT

The objectives of working plan are based on the Sustainable Forest Management Principles and Ecosystem Approach to Forest Management principles:

1. To enhance forest/ tree cover in the division through various forestry interventions especially utilizing the reclaimed/retained areas mentioned in above point and keeping in mind the relevance of different landscapes and climatic zones
2. To reclaim and retain lost forest areas to encroachments and build a robust protection system to prevent further illicit changes of land use
3. To enhance forest productivity through operation of suitable silviculture systems for sustainable yield regulation
4. To document, quantify and ensure the continued provision of various eco system services viz. timber, fuelwood, water, soil replenishment, biodiversity, cultural and aesthetic services
5. To develop forests as carbon sink for climate regulation in line with the INDC goals of Paris Climate Agreement framework at the national level
6. To eco restore forest landscapes and biotic zones which are affected by degradation owing to biotic pressure and anthropogenic disturbance
7. To devise a model of community participation leveraging community based institutions of VFDS/ JFMCs/EDCs for forest protection, wildlife conservation and eco tourism
8. To promote community based eco tourism in regulated and streamlined manner for visitors taking into account considerations of carrying capacity and scope for nature awareness and education with minimal ecological footprint
9. To forecast further diversions of forest land and provide a model for cost benefit based analysis for diversions of forest land to serve as reference for future managers
10. To identify, map spring shed, water shed and drainage lines and offer a path for planned outcome based soil moisture conservation efforts for ensuring sustained provision of water services from forests
11. To conserve wildlife and faunal assemblages by ensuring compact forests and wildlife corridors, regular monitoring of wildlife in forests and strictly enforcing ban on hunting
12. To preserve Pabbar river valley and its banks by strictly enforcing mining ban and utilizing modern technology to detect and combat mining
13. To document the changing climate and changing glacial patterns by taking Chanshal Pass as reference

14. To safeguard and preserve alpine pastures and panwis considering their rich biodiversity and pollination services from illicit land use, overgrazing and unwanted plantation
15. To document the rich reservoir of Non Timber Forest Produce and the traditional knowledge associated with such NTFP and to provide for sustainable collection of NTFPs achieving the twin objectives of forest conservation and livelihood development

C) SWOT ANALYSIS OF THE DIVISION

STRENGTHS • Rich biodiversity and wide variation in forest types • Potential for forest based livelihoods considering scope for NTFP and medicinal plants and eco tourism potential in the tract • Backing of judiciary for law enforcement drives eg: SIT constituted for encroachment eviction	WEAKNESS • Compartment boundaries yet to be fully demarcated and digitized • Poor state of Boundary Pillars in Forest Areas rendering it vulnerable to encroachment • Heavily fragmented forest patches owing to large number of roads • Low Staff capacity in terms of forest protection and low enforcement • Lack of patrolling vehicles and other resources for effective protection
OPPORTUNITIES • Huge potential for eco tourism and sustainable livelihood generation • Potential for spring shed and water shed management for water conservation	THREATS • Threat of encroachments from apple orchards expansions • Increased forest diversions for road construction • Illegal mining along Pabbar river bed

• Enthusiastic people's participation for enhancing green cover • Generation of forest based community livelihoods leveraging VFDS institutions under JICA	• Illegal extraction and transport of timber and other forest produce • Increasing forest fires due to changing climate • Risk of soil erosion and landslides due to heavy precipitation and climatic disasters

The expected outcomes of the working plan include the following:

1. Qualitative and quantitative improvement of existing forest and also in terms of forest and tree cover in line with the National Policy and INDC goals
2. Enhancing community led and community owned participation of forest leveraging on CBOs like EDC/VFDS/JFMC and other NGOs in the field of forest and environmental conservation
3. Bettering soil moisture conservation regime and health of water shed for better round the year provision of water as an eco system service
4. Streamlined and regulated eco tourism enabling local livelihood generation, minimal ecological footprint and conservation education for visitors
5. Conservation of wildlife corridors and habitat management for bettering faunal diversity and data collection with regard to wildlife presence in forests
6. Conservation and sustainable utilization of biological resources including NTFPs in accordance with the principles of equitable benefit sharing (Access and Benefit Sharing)
7. Removal of forest encroachments and retention of large patches of forest land lost to encroachments over the years along with strengthening the boundaries of existing forest patches to prevent their encroachment
8. The provision of sustainable timber yield from the forests of division to provide for the increasing demands and needs of timber for the local right holders
9. Conservation of Pabbar river valley and its protection from illegal mining along the river bank
10. Regulate and streamline forest diversions and ensure protection of compact and consolidated forest patches from fragmentation

BRIEF ON THE WORKING PLAN & FORMAT

The present Working Plan of Rohru Forest Division is therefore prepared on the basis of sustainable management of ecosystem services as accordance with NWPC 2014. The preparation of NWPC 2014 Working Plan is done with collection of field data from more than 430 grid points based on Grid Map of Rohru Forest Division provided by GIS Cell. The field inventory data were collected in forms (Form 1: Plot Approach Form; Form 2: Plot Description Form; Form 3: Plot Enumeration Form etc.) in line with the NWPC 2014. The following Chapters are prepared for Rohru Forest Division working plan according to NWPC. The elements of the working plan are summarized in the following chapters:

PART-I:

Chapter-1: The extent of forest area, forest cover, forest types, land use patterns, supply of water sources, types of soils, rocks, topography, altitudinal variation and climate and threats to the forests are covered with spatial representation made through GIS based maps. The numbers of forest ranges in Rohru forest division are 7. The field data were collected from the compartments of the forest ranges.

Chapter 1 discusses in detail the boundary of the tract with western boundaries of Theog, Chopal Division, Northern and Eastern Boundary with Kinnaur and Rampur Division, Southern and Eastern Boundary with Uttarakhand State. Further, the configuration on ground, geology, rock and soil of the tract is discussed along with climate trends and water source data.

Chapter 2: This chapter discusses comprehensively the legal classification of forests with reference to Recorded Forest Area (RFA) and also lists out 125 newly notified Demarcated Protected Forests (DPF). The chapter also reconciles the area of Panwis utilizing satellite technology and ground trothing to avoid duplication.

The Boundary pillar description range wise picture is presented in the chapter which details several missing and boundary pillars in need of repair. The LULUCF details the diversion of forest and the detail of encroachment cases along with the decadal change of forest cover.

The miscellaneous threats to forest in terms of illicit felling, encroachment, mining, forest fires are elaborated based on data. At the end of this chapter,

there is a consolidated reference to forest type and elaboration on each forest type present in the tract.

Chapter 3: The assessment and conservation efforts of biological diversity of Rohru division are made in this chapter. In order to quantify the diversity, indices like importance value index, Shannon Weiner Index etc. are computed and described for each working circle. It is noted that the diversity index is maximum for high altitude broad leaved forests considering the wide variety of species supported in this ecosystem. A list of important medicinal plants of economic importance, rare and threatened plants, endemic flora is documented using existing scientific literature.

The wildlife of the tract is detailed out in this chapter with regard to key species like the Himalayan Black Bear, Common Leopard, Himalayan Musk Deer, Himalayan Ghoral. The threats and challenges of wildlife management with regard to habitat fragmentation, hunting, human-wildlife conflict, forest fires are touched upon in the chapter.

Chapter 4: Methods and techniques of protection of forest health from natural hazards (flood, soil erosion, drought etc.) and biotic pressure (grazing, lopping, forest fires, illicit felling, encroachment, invasive species and insects –pests). The chapter also described the status of regeneration of forests in different forest ranges. It is noted the regeneration is better off in Deodar-Kail forests, deficient in Spruce-Fir and Broad Leaved forests with the low regeneration in RET species like *Taxus contorta* a key concern in the plan.

Chapter 5: Soil and water conservation of the division. The areas treated under soil and water conservation in different ranges have shown in the chapter. The chapter highlights the importance of wetlands, water tables and water harvesting in Rohru forest division mapping the existing spring sheds, water sheds and hence revealing the true potential of water provisioning services in the division.

A comprehensive documentation of all springs, streams, drainage line treatments undertaken and interventions is given out in the plan. The various methods of treatment in form of Dry Stone Check Dams, Crate Wire Structures, Water Harvesting Structures are listed out. The list of wetlands in the tract are detailed and elaborated.

Chapter 6: The wealth of the forest is assessed through growing stock. The management of growing stock has given rise to the concept of sustained yield which envisages that during a period the cut from a forest should not exceed its

growth. The growing stock of forests of Rohru is assessed in this chapter with species wise growing stock and n-D curves plotted. The detail of all plantation efforts done in last 10 years is touched upon. Carbon stock of Rohru is estimated as per IPCC guideline and formula and it is estimated that a total of 40 million tonnes of carbon dioxide is sequestered by the forests in the tract.

Chapter 7: Utilization of forest resources of Rohru division by the people living in close proximity to forests. The existing traditional, cultural and socio economic practices associated with non timber and timber resources are described and quantified here.

The recorded removal of timber in this chapter discusses in detail the timber distribution (for right holders and dead body), salvage removal by HPSFDC. The detail of important NTFPs and MAPs is given along with detail of saw mill and imported timber depot.

Chapter 8: Participation of local communities in protection and conservation of forests through existing institutions of VFDS described. All VFDS operating in the tract under JICA project is listed out. The extent of sacred groves is documented with the detail of Devta Forests. The various eco tourism activities in the form of trekking, hiking, camping are documented along with the eco tourism development works undertaken.

Chapter 9: Forest policies, acts, rules and guidelines implemented by the State Forest departments help in making various decisions of forest protection and management. The implementation of policies, acts and rules for management of Rohru forests are highlighted in the chapter. The acts and rules of central as well HPFD level are addressed in the chapter.

Chapter 10: Five years planning of forest working plan of Rohru division are highlighted in the chapter.

Chapter 11: The chapter revealed the past system of management and their implication on the forests of Rohru forest division. This chapter also guides the improvement of works and constitution of working circles for PART-II of the working plan.

Chapter 12: The chapter highlighted the growth and yield of forest products and important commercial tree species of Rohru forest division.

Besides these, GIS maps of different layers of the resources of Rohru forest division are prepared and presented in the working plan.

The new approach of sustainable management of ecosystem services approach has been incorporated in this Working Plan to manage forests based on the application of appropriate modern scientific methodologies of remote sensing, GIS and using other tools focused on equitable sharing of resources and sustainable forest management of Rohru forest division.

PART-II: Part-II of the working plan as prescribed in the National Working Plan Code of 2014 discusses in detail the future management prescriptions with reasoning and logic along with expected outcomes and budgeting framework.

(i) Object of Management:

The object of management for the working plan has been covered in detail. The foremost objective of this plan is to counter the encroachment ravaged tract with forest consolidation and demarcation which shall be the foremost objective of management along with forest land reclamation and eco restoration. The objective to improve forest and tree cover along with improving forest productivity, sustainable yield, climate change mitigation shall constitute a key objective of this plan.

Apart from this, the plan shall focus on biodiversity conservation and management with a view to document, protect and sustainably utilize the rich biodiversity of the tract. The promotion of sustainable community based eco tourism with a view to improve local livelihood and participation shall be a vital objective of management. Apart from this, the conservation of soil and moisture through water shed management, documentation of traditional knowledge and tapping into forest based livelihoods and PFM shall be miscellaneous objectives of management.

(ii) Management Strategy: The key strategy of management is to create foundations of natural resource governance in a combined paradigm of law enforcement mechanism and modern natural resource management insights and tools. The management strategy is based on landscape approach to forest management and ecosystem services oriented approach in which the continued provision of ecosystem services becomes the overarching goal of management which is achieved through creating a streamlined system of administration backed by a potent well trained and well motivated workforce to implement the natural resource governance framework.

The management strategy involves the implementation of silvicultural system for light demanding species of Deodar, Himalayan Blue Pine, Spruce, Fir, Chil Pine by conserving shelterwood and facilitating regeneration through opening

up of the canopy. In case of other forest types, the predominant strategy of management is to conserve and preserve the natural eco system as such whether it be high altitude broad leaved forests, alpine pasture or panwis.

Regarding, improvement of forest and tree cover, the strategy involves a targeted effort to reclaim encroached forest landscapes and avoiding unnecessary plantation in fire prone, dense and refractory landscapes. The strategy regarding eco tourism outlines a vision for sustainable eco tourism involving local participation through EDCs. Along similar lines, the biodiversity conservation is proposed to be strengthened through revitalizing and streamlining function of local BMCs along with comprehensive documentation of faunal and floral orders and preparation of People's Biodiversity Register (PBR).

(iii) Constitution of Working Circles: The management is a continuum as are ecosystems. Applying adaptive management principles, the working circles of the previous working plan (by Ajay Srivastava) are readjusted and new WCs are also included in view of new facts and new evolving management approaches. The following Working Circles are proposed:

Sr. No.	Working Circles
1.	Deodar-Kail Working Circle (Normal)
2.	Fir-Spruce Working Circle (Normal)
3.	Chil Working Circle (Normal)
4.	High Altitude Broad Leaved Working Circle (Normal)
5.	Forest Protection (Overlapping) Working Circle
6.	Grassland Conservation (Overlapping) Working Circle
7.	Plantation (Overlapping) Working Circle
8.	Evicted Area Rehabilitation (Overlapping) Working Circle
9.	Ecotourism (Overlapping) Working Circle
10.	Biodiversity Management and Conservation (Overlapping) Working Circle
11.	Participatory and Joint Forest Management

	(Overlapping) Working Circle
12.	Wildlife Protection (Overlapping) Working Circle
13.	Soil Conservation And Water Resource Management (Overlapping) Working Circle
14.	Infrastructure Development And Maintenance Working Circle (Overlapping) Working Circle

- **Deodar-Kail Working Circle:** This working circle will include all compartments in which Deodar and Kail forests are found as dominant species either as pure crop or mixed crop. The total area prescribed to be allotted under this working circle is 28008.2729 Ha constituted by a total of 216 DPFs, 112 UPFs and 61 newly notified Demarcated Protected Forests under Indian Forest Act, 1927. The previous working plan also had the same working circle. The main justification for constitution of this working circle is that Deodar-Kail forest types are the predominant commercially valuable timber species in the tract enabling their consolidated management. Further, the object of such management is to enable sustainable yield and adequate regeneration for forest productivity, health and vitality.

The crop composition is dominated by 2 principal species with an inverse J curve indicating mimicking of natural forest in this working circle. On the basis of previous plan, the current proposed plan seeks to continue with the system of Irregular Shelterwood Silvicultural system merging PB II and PB III into PB (Unallotted) grouping the middle aged crop and constituting PBI and PB IV blocks to cover the mature and young crop respectively. The rotation period fixed at 120 years and regeneration period is fixed at 30 years accordingly.

The method of executing felling is to fell trees above harvestable diameter in PBI retaining advance crop of class IV and class V trees, mother trees and avoiding fell in riparian, stream side, steep terrain and in landslide risk zones. A similar method of final felling is prescribed in PB IV where mother tree standing over regenerated crop is retained along with standard felling avoidance measures in ecologically vulnerable zones.

The total annual yield from this working circle prescribed is 1,40,590 m³ based on the above silvicultural system. The detailed felling series over 10 year period is given in the plan. The associated measures of closure and ANR are prescribed in the plan.

- **Spruce/ Fir Working Circle:** This working circle will include all forest compartments which are predominantly dominated by Spruce and Fir which are conifer species found associated above the tree line dominated by Deodar and Kail. The total area prescribed to be allotted under this working circle is 39135.126 Ha constituting 3 Reserve Forests, 80 DPF, 60 UPF and 50 newly notified DPFs. The main justification for constitution of the working circle is the fact there are several altitudinal elevations where these forests are found associated in the tract enabling their consolidated and uniform management. Similar to Deodar and Kail, these are also light demanding species and although the timber is not so valuable in comparison to Cedar and Blue Pine, the management here is with a view to ensure sustainable yield placing more emphasis on adequate regeneration given that it is discernably noticed that regeneration is much more deficient in these forests compared to Deodar-Kail forests.

The crop composition of this working circle is dominated by Spruce and Fir. Interestingly, this forest type in the tract gives a bell shaped n-D curve indicating normal forest rather than natural forest. It is also indicative of non working of forest and need to remove mature and over mature stock. Accordingly, Irregular Shelterwood System is prescribed with a single periodic block constituted by comparatively mature and overmature stock and all other compartments bracketed into PB(Unallotted). The method of felling is similar to the previous working circle. The total annual yield prescribed in the plan is 1,21,900 m³. A host of measures including closure, ANR and soil moisture conservation measures are prescribed to enhance and sustain regeneration of the principal species in this working circle.

- **Chil Working Circle:** This working circle includes all forest compartments with Chil Pine (*Pinus roxburghii*) being the dominant species accounting for 90 % of growing stock. In majority of forests, the crop is middle aged and ground cover is very thin because of heavy grazing. The total area of the working circle as prescribed in this plan comes to 3745.887 Ha constituted by 1 Reserve Forest, 22 DPFs, 11 UPFs and 3 newly notified DPFs.

The main justification for management is the presence of a consolidated forest type which is having unique ecological characteristics necessitating a typical management or working. The crop composition in this working circle is totally dominated by Chil Pine which accounts for close to 90% of total growing stock. The age distribution is largely close to natural forest.

In order to ensure optimum sustainable yield of Pine Timber, the irregular shelterwood system with 100-year rotation and 25-year regeneration period is suggested. The middle aged crop is put in PB unallotted and mature and young crop are put into PB I and PB IV respectively. The total annual yield from this working circle is 5000 m³ which shall be executed through prescribed felling series during the 10 year period.

The main concern in this working circle is with regard to forest fires and in order to achieve adequate regeneration, forest fire protection measures including subsidiary silvicultural operations are given. Plantation is completely prohibited in this working circle considering the fire prone nature of these forests.

This working circle shall also include the sustainable extraction of resin based on rill method of extraction, removal of salvage timber and fire protection efforts given the heightened sensitivity of the working circle to forest fires.

- **High Altitude Broadleaved WC:** The tract above the Spruce-Fir conifer tree line supports a wide variety of broad leaved vegetation and oak species. These include species like *Aesculus indica*, *Taxus contorta*, *Alnus nitida*, *Betula utilis*, *Juglans regia* which are often found as mixed crop on the basis of elevation. Among Oak species, *Quercus semicarpifolia* (*Kharshu Oak*) is found at the highest elevations as climax species whereas *Quercus dilatata* is found in lower elevations. Rhododendrons

are found mixed with coniferous species.

This working circle is constituted with a view to manage the high altitude broad leaved and Oak species considering their importance in sustenance of wildlife and maintaining ecological integrity. These high altitude species are also under threat of climate change with increasing tendencies of declining regeneration leaving them on threatened category (e.g. Rakhal or *Taxus contorta*). The regeneration of these species are also badly affected due to biotic pressure of lopping and grazing. The main object of management in this working circle will be the conservation of the RET species and floral biodiversity and initiating ex situ conservation efforts wherever required.

- **Forest Protection (Overlapping) Working Circle:** This working circle is constituted with a view to promote forest protection, eco restoration and rehabilitation particularly of degraded, denuded, eroded, deforested landscapes. The working circle covers in detail the major threats to tract during the plan period and threat wise prescriptions are provided to counter each of the threat and conserve forests.

The standout threat to the tract is from encroachment. The plan details the issues associated in terms of boundary mismanagement, re-encroachment, absence of consolidated digital data, lack of revenue staff and unimplemented eviction orders. A detailed SoP has been given in the plan with respect to procedure for challaning of the cases. Preventive prescription in the form of boundary pillar perambulation and digitizing evicted lands are suggested. The plan strongly prescribes the felling of apple or fruit trees from evicted lands, restoring native forest trees in the landscape along with fencing and ANR of evicted area to prevent re-encroachment and in interest of biodiversity and eco system services.

The threat of illicit felling and multiple prescriptions to protect tract from illicit felling and timber smuggling is given along with road network detailed. The threat of forest fire along with fire prevention and control measures viz. control burning, fire line maintenance and utilizing fire blower are suggested as major prescriptions. The threat of mining along Pabbar river is dealt in detail in the plan along with prescription of constitution of anti mining squad, targeted patrolling, drone based monitoring to counter illegal mining.

Apart from this, the plan is covering in detail the various prescriptions to counter muck, debris dumping, biological resources smuggling, wildlife crime with major focus on improving offence detection and bettering forest prosecution. The plan seeks to correct the trend of police investigation of forest offences prescribing detailed procedure of investigation, evidence collection and forest prosecution of forest offences and wildlife crimes.

➤ **Grassland Conservation and Management (Overlapping) Working Circle:**

This working circle shall cover all forest land under Alpine pasture and Panwis totaling to an area of 52,728 Ha apart from sporadic grasslands in other parts of the tract. This new Working Circle is proposed with objective of protection and improvement of valuable grasslands ecosystem and preserves the grassland suitably for right holders/local people as laid down in Faisla-e-Janglat. Various medicinal and aromatic plants are also found distributed in these areas which are rare and threatened species, the conservation of which needs to be taken up. The main object of management of this highly biodiverse landscapes will be the conservation of the alpine pasture eco system, regulation of grazing based on carrying capacity assessment, soil moisture conservation efforts using innovative methods to ensure the key eco system services provided by these forest compartments in the form of water provisioning, fodder, biodiversity conservation are ensured to be provided.

The detail of alpine pasture and panwis in tract is covered comprehensively in the plan. The major prescription is to conserve eco system and total prohibition of plantation in the grassland ecosystem area. Apart from this, efforts of fire prevention in panwis is also suggested as is soil moisture conservation in pasture areas. The regulation on migratory grazing and implementation of rotational grazing is discussed.

➤ **Plantation (Overlapping) working Circle:** This working circle is constituted with the objective of improving stocking of under stocked forest areas, improving forest cover specially focusing on sparsely stocked forest and encroachment evicted areas achieving the national objective of increasing carbon stocks and forest cover.

The plan makes a clear differentiation between all forest compartments where plantation shall be strictly avoided considering fire vulnerability, low soil depth, dense forest and other factors and understocked forest

compartments where plantation scope exists. In the latter section, potential plantation areas in evicted forest landscapes are also included separately with a view to prevent re-encroachment and restore forest landscape. The plan also gives an outline of nursery management with a view to have central modern nursery at Bashla and Deodar nursery at Shashan as the major 2 nurseries in the division.

- **Evicted Area Rehabilitation (Overlapping) Working Circle:** This is a crucial working circle constituted considering the specific conditions in the tract which is ravaged by forest land encroachments for raising fruit orchards. Many of the encroachment areas have been evicted and these areas need to be taken up for consolidation and raising of native tree plantations.

In this context, the constitution of this working circle is important to ensure there is no re encroachment and to restore the ecological integrity of this evicted area to status pre encroachment. The main object of management shall be reclaiming of the area and its rehabilitation in accordance with the adjacent forest landscapes. The major prescription in this working circle

- **Ecotourism (overlapping) WC:** This working circle is constituted recognizing the immense potential for eco tourism in the tract in terms of hiking trails, trekking paths, scenic sites and pilgrimage destinations immersed in nature. This offers a huge scope for creating complimentary linkages of economic opportunities through development of tourism and spreading the message of nature and biodiversity conservation. The landscape offers great potential for integrating ecotourism and rural tourism with spiritual and cultural tourism. This in-turn would provide alternative livelihood opportunities for people living in forest fringe villages and reduce anthropogenic dependence on forests also motivating people towards the cause of conservation.

This chapter shall detail and list out the various trekking routes in the tract and touch upon the eco tourism policy of the state elaborating the site wise potential of each trail, trek route or any other eco tourism site. 13 new eco tourism sites are proposed to be added and developed during the plan period including nature trail, eco parks and camping sites.

The major prescriptions concerning eco tourism include formation and functioning of EDCs, levying permit fees for entry and camping, collection of environmental preservation fees to offset environmental damage and

footprint and carrying capacity based regulation of eco tourism along with skill development and solid waste amangement prescriptions.

➤ **Biodiversity Management and Conservation (Overlapping) Working Circle:**

The Working Circle encompasses rich biodiversity which is spread over the tract especially the relatively higher altitude areas comprising trees, herds, shrubs, climbers, lichens, algae and fungi and other micro flora. The efforts in this working circle include the documentation and biodiversity assessment of the landscapes with larger objective of declaring Biodiversity Heritage Sites. Further, the NTFPs in the region shall be sustainably harvested and benefits equally shared in accordance with Access and Benefit Sharing Framework defined in Nagoya Protocol and Biodiversity Act, 2002. The summary justification for this working circle is to link biodiversity conservation with sustainable harvest of NTFPs galvanizing local stakeholder support through the institution of BMCs. In terms of research, monitoring and documentation, the plan details and gives out the need to prepare comprehensive register of biodiversity in the tract and institution of permanent preservation plots for Long Term Ecological Monitoring. The plan gives a special emphasis on RET species of biodiversity in the tract.

➤ **Participatory and Joint Forest Management (Overlapping) WC:**

Joint Forest Management has been implemented by Govt of India after implementation of National Forest Policy, 1988 wherein policy emphasized on participation of local people in conservation and management of forests. The primary objective of JFM is to provide a visible role to the local communities in planning, management and protection of forests and to give them a share in the benefits from these forests. The WC shall also make a note of informal social groups/ communities that are voluntarily conserving natural resources by way of practicing rotational lopping / grazing, protecting, regenerating forests etc. The VFDS societies formed under JICA project shall be strengthened and institutionalized for long term forest conservation.

The plan lists the various CBOs/NGOs interested in forest conservation and seeks to galvanize their role in various domains linked to afforestation, forest protection, livelihood improvement, fire protection and water conservation. The formal partnership between such organizations and forest department is advised in the plan.

- **Wildlife Protection (Overlapping) WC:** The working circle constituted with the idea to conserve and protect Wildlife which are protected under Wildlife Protection Act, 1972. The tract given its altitudinal shifts is crucial for being a key wildlife habitat of fauna of all orders. The main object of management here would be the enforcement of Wildlife Protection Act, 1972 and the strict ban on hunting/ poaching apart from wildlife monitoring and habitat management.

The plan lists out flagship and keystone species of the tract focusing on threatened species and delves into species specific conservation programmes. This include conservations measures for Himalayan Musk Deer, Himalayan Black Bear, Himalayan Ghoral, Common Leopard, Western Tragopan and Vulture species. The multifarious prescriptions in this chapter largely focus on population estimation, habitat mapping, habitat augmentation and conservation. The plan also details the methods of human wildlife conflict mitigation with focus on capacity building and training of staff. It is proposed to declare community/ conservation reserve in the tract suggesting some indicative areas.

- **Soil Conservation and Water Resource Management (Overlapping) Working Circle**

This will be overlapping Working Circle comprising areas of 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 and ensure the permanence of water resources and soil replenishment.

The main justification for constitution of this working circle is the inseparable link between water and forest health and the need to rejuvenate dying springs to sustain the most important eco system service i.e. provisioning of water resources. This working circle has prescriptions made on the model of UN REDD Plus Action Plan which is to reduce emissions due to deforestation and degradation. The justification for constituting this working circle is to take steps to restore and rejuvenate landscapes which are degraded due to reasons like forest fire, soil erosion, heavy rainfall, overgrazing and other such aspects.

➤ **Infrastructure Development and Maintenance (overlapping)
Working Circle:**

This working circle is overlapping over the entire division. Under this Working circle, inventory of all existing buildings, huts, roads, footpaths, bridges and other construction and infrastructure activities going in entire division will be made and shall suggest newsites for carrying out construction activities related to forestry operations. The construction of new buildings, rest houses, roads and paths etc. are addressed in which priority is given to remote forest blocks and beats and to meet residential requirements.

II Glossary of Technical Terms

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 have established forests.
Agroforestry	The practice of raising trees and agriculture products such as forage and or livestock on the same area at the same time.
Angiosperms	Angiosperms are vascular plants. They have stems, roots, and leaves. Unlike gymnosperms such as conifers and cycads, angiosperm's seeds are found in a flower. Angiosperm eggs are fertilized and develop into a seed in an ovary that is usually in a flower.
ANR	Assisted Natural Regeneration
Aquifer	An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt). Ground water 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.
Below-ground Biomass	The BGB carbon pool consists of the biomass contained within live roots
Bench Terraces	Level or slightly sloping platforms constructed for soil conservation along the contours of a slope, separated from one another by a much steeper slope, and with a bank, usually covered with a vegetation, on their outer edges.

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.
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.
Clone	A group of individuals derived from a common parent by asexual reproduction.
Compartment	A territorial unit of a forest permanently defined for the purposes of administration, description and record. (Preferably designated by Name of Compartments along with alpha numeric description).
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	A crop of coppice shoots.

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
Culm	The characteristic hollow and jointed stem of a bamboo or grass.
Culturable Non Forest Area (CNFA)	It is the net geographical area, lying outside recorded forest and forest cover, which can support tree vegetation (thus, excluding areas under wetlands, riverbeds, perennial snow covered mountains, etc.). CNFA is the area over which the sample data on tree cover is aggregated for the assessment.
Deciduous	(a) Shed naturally applied to any plant organ or group of organs. (b) Also applied to such perennial plants as are normally leafless for some time during the year.
Defoliators	An adult or larval insect which strips all the leaves from a tree or shrub.
Deforestation	The clearing of trees and other vegetation from a forest to clear the land for human activities, such as agriculture, logging, urbanization, and infrastructure development
Dense Forest	All lands with a forest cover having a canopy density of 40 percent and above.
DGPS	Differential Global Positioning System (DGPS) is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations.
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.
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.
EDC	Eco-development Committee of villagers under Joint Forest Management for protection and improvement of forests in National Parks and Sanctuaries under the Societies' Registration Act
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: where is the total number of species, “ ” is the number of individuals, and “ ” is the natural logarithm.
Felling Cycle	Felling cycle is defined as the time that elapses between successive fellings
Felling Series	Felling series is designated as forest area within a larger "working circle" used in forestry to manage timber harvesting and ensure a sustainable distribution of age classes in a forest
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 Area	The area recorded as a forest in the Government records. It is also referred to as “Recorded Forest Area”.
Forest Cover	An area of over one hectare with a tree canopy density of 10% or more, including forests, orchards, bamboo, and palm
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 ecology	The relationships between forest organisms and their environment.
Forest Fire Danger Rating	It is a system for rating the risk of forest fires on the basis of qualitative or numeric indices of fire potential. It is used as a guide in a wide variety of fire management activities.
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) 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.
Gneiss	Coarsely crystalline rock, the product of high grade metamorphosis of both igneous and sedimentary rocks.
Granite	A coarsely crystalline, banded metamorphic rock of granitic composition.
Grassland	A community in which grasses predominate; trees are either altogether absent or present in relatively small number.
Grazing	The consumption of any kind of standing vegetation by domestic livestock or wild animals. Sometimes limited to the consumption of herbage in contrast with browsing.
Grazing Incidence	The amount of grazing in an area expressed as number of animals or equivalent cow units per acre.
Green India Mission	The Green India Mission, aimed at “protecting, restoring and enhancing India’s diminishing forest cover and responding to climate change”
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.
Gymnosperms	Gymnosperms are flowerless plants that produce cones and seeds. The term gymnosperm literally means "naked seed," as gymnosperm seeds are not

	encased within an ovary. Rather, they sit exposed on the surface of leaf-like structures called bracts.
Habitat	The place where an organism lives and/or the conditions of that environment including the soil, vegetation, water, and food.
Hardwoods	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 removal of forest, Non-Forest or agricultural Produce.
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 soil
Invasive Species	The species not native to a specific location (an introduced species) and has a tendency 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.
Linear plantation	These are avenues of trees planted along roadside, canal side and rail side.
Litter	Woody material of trees having diameter <5cm which is not decomposed.
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.
Maltreated Forests	Un-managed forests.
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.
Meanders	A meander is one of a series of regular sinuous curves, bends, loops, turns, or windings in the channel of a river, stream, or other watercourse.
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.
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 recorded as forest in any Government Records.
Non-Timber Forest Produces (NTFPs)	It is defined as produce 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.
Other Traditional Forest Dwellers (OTFD)	OTFD means any member or community who has for at least three generations prior to the 13th day of December, 2005 primarily resided in and who depend on the forest or forests land for bona fide livelihood needs
Overlapping Working Circle	Overlap in all Working Circles of Forest Division
Palaeozoic	The Paleozoic was a time of dramatic geological, climatic, and evolutionary change.

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
Phyllite	A fine-grained metamorphic rock with a well-developed laminar structure, intermediate between slate and schist
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.
Poaching	When an animal is killed illegally. It usually occurs when an animal possesses something that is considered valuable (i.e. the animal's fur or ivory).
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.
Porphyritic	Porphyritic is an adjective used in geology, specifically for igneous rocks, for a rock that has a distinct difference in the size of the crystals, with at least one group of crystals obviously larger than another group.
Precambrian rocks	The oldest rocks with recognizable fossils in them.

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.
Proteozoic	Relating to or denoting the aeon that constitutes the later part of the Precambrian, between the Archaean aeon and the Cambrian period, in which the earliest forms of life evolved.
Provenance	Local or regional origin of a tree species
Pteridophytes	A pteridophyte is a vascular plant (with xylem and phloem) that disperses spores. Because pteridophytes produce neither flowers nor seeds, they are sometimes referred to as "cryptogams", meaning that their means of reproduction is hidden.
Quadrat	Each of a number of small areas of habitat, typically of one square metre, selected at random to act as samples for assessing the local distribution of plants or animals.
Quartz	The most abundant rock forming mineral, with a glassy lusture, consisting of Silicon Dioxide.
Quaternary sediments	Quaternary geology is the branch of geology that study developments from 2.6 million years ago onwards. In particular Quaternary geology study the process and deposits that developed during the Quaternary, a period characterized by glacial-interglacial cycles.
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.
Sacred Grove	A sacred grove or sacred woods are any grove of trees that are of special religious importance
Salinization	Salinization refers to a build up of salts in soil, eventually to toxic levels for plants. (3,000 - 6,000 ppm salt results in trouble for most cultivated plants.)

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
Schist	A coarse-grained metamorphic rock which consists of layers of different minerals and can be split into thin irregular plates.
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.
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.
Silvipastoral	Cultivation of grasses with trees generally fodder value.
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
Spur	It is one of any number of projecting ridges that extend alternately from the opposite sides of the wall of a young, V-shaped valley down which a river with a winding course flows. ... As a result, the ridges are truncated to form truncated spurs.
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.
Sub-Alpine	The subalpine zone is the zone of plants just below tree line in Himalaya

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 Forest Management	Preservation and protection of diverse ecosystems—the soil, plants, animals, insects and fungi while maintaining the forest's productivity
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.
Tissue Culture	Tissue culture is the growth of tissues or cells in an artificial medium separate from the parent organism. This technique is also called micropropagation. This is typically facilitated via use of a liquid, semi-solid, or solid growth medium, such as broth or agar.
Tree	A woody perennial with a single main stem or, in the case of coppice, with several stems, having a more or less definite crown.
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.
Turbulent	Turbulent flow, type of fluid (gas or liquid) flow in which the fluid undergoes irregular fluctuations, or mixing, in contrast to laminar flow, in which the fluid moves in smooth paths or layers
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.
Undulating track	An area/ ground having a shape like a wave or moving up and down like a wave.
Veneer	A thin sheet of wood material either peeled or sliced from a length of log
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.
Wildlife Management	The conservation and control of wildlife in accordance with scientific principles.

Working Plan	A written scheme of management aiming at continuity of policy and action and controlling the treatment of a forest. The instrument of forest management.
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.
Zircon	A mineral occurring as prismatic crystals, typically brown but sometimes in translucent forms of gem quality. It consists of zirconium silicate and is the chief ore of zirconium.

III List of Flora and Fauna of Rohru Forest Division

FLORA

Trees		
Sl.No.	Botanical name	Local name
1.	<i>Abies pindrow</i>	Tosh
2.	<i>Acer oblongum</i>	Parang
3.	<i>Acer pictum</i>	Rikhandlu
4.	<i>Acer caudatum</i> / <i>Acer villosum</i>	Rikhandlu
5.	<i>Acer caesium</i>	Chirandru, Manderang
6.	<i>Aesculus indica</i>	Khanoor, Poo
7.	<i>Albizia lebbek</i>	Siris
8.	<i>Alnus nitida</i>	Kosh, Kunish, Nyum
9.	<i>Betula utilis</i>	Bhojpatra, Pad
10.	<i>Betula alnoides</i>	Sheori, Kathbhoj, Shagra.
11.	<i>Buxus wallichiana</i> (Syn. <i>Buxus empervirens</i>)	Shamshad
12.	<i>Carpinus viminea</i>	Khirkii, Lolti
13.	<i>Castanea sativa</i>	Mitha Khanor, Poo
14.	<i>Cedrela serrata</i>	Darb, Krishing
15.	<i>Cedrus deodara</i>	Deodar, Kelo, Diar, Kialmang
16.	<i>Celtis australis</i>	Khirak, Koo

17.	<i>Corylus colurna</i>	Sharol, Banshari, Ge bija
18.	<i>Cornus capitata</i>	Kareeva, Khagsha, Sak taquas
19.	<i>Cornus oblonga</i>	Kareeva
20.	<i>Cupressus sempervirens</i>	Saru
21.	<i>Cupressus torulosa</i>	Devidiar
22.	<i>Euonymus tingens</i>	Barmelui, Kalachindwara
23.	<i>Engelhardita colebrookiana</i>	Samma
24.	<i>Fraxinus xanthozyloides</i>	Thum
25.	<i>Fraxinus micrantha</i>	Angu
26.	<i>Ficus palmate</i>	Phedu
27.	<i>Ilex dipyrena</i>	Kandru
28.	<i>Kydia calycina</i>	Pula
29.	<i>Juglans regia</i>	Akhrot, Khor, ka
30.	<i>Juniperus macropoda</i>	Guggal, Dhup, Shur
31.	<i>Litsaea umbrosa</i>	Paror, Chirindi
32.	<i>Litsea consimilis</i>	Paror, Chirindi
33.	<i>Machilus duthiei</i>	Chan, Chirindi
34.	<i>Melia azedarach</i>	Bakain, Drek
35.	<i>Olea cuspidata</i>	Kahu, Vee
36.	<i>Picea smithiana</i>	Spruce, Rai, Rayang

37.	<i>Pinus wallichiana</i>	Kail, Lim
38.	<i>Pinus roxburghii</i>	Chil
39.	<i>Pinus gerardiana</i>	Neoza, Chilgoza, Ri
40.	<i>Pieris ovalifolia</i>	Ayar, Yarta
41.	<i>Pistacia integerrima</i>	Kakkar, Kakrian
42.	<i>Populus alba</i>	Safeda, Mal
43.	<i>Populus ciliata</i>	Poplar, Pahari Pipal, Chalun, Karamal, Mangal
44.	<i>Prunus armeniaca</i>	Chulli, chul
45.	<i>Prunus cerasoides</i>	Paja
46.	<i>Prunus persica</i>	Aaroo, Behmi, Reg
47.	<i>Pyrus foliolosa</i>	Ranreg
48.	<i>Pyrus lanata</i>	Ban Palti, Marpol
49.	<i>Pyrus pashia</i>	Shagal, Batangi, Kainth, Lee
50.	<i>Quercus ilex</i>	Breh
51.	<i>Quercus leucotricophora</i>	Ban, Bani
52.	<i>Quercus semecarpifolia</i>	Kharshu, Kor
53.	<i>Rhododendron arborium</i>	Baras, Parag
54.	<i>Rhus wallichii</i>	Hurku, Shush
55.	<i>Robinia pseudoacacia</i>	Pahari kikar
56.	<i>Salix babylonica</i>	Majnun, Shon

57.	<i>Salix daphnoides</i> / <i>Salix alba</i>	Beuns
58.	<i>Salix elegans</i>	Bhashal, Beuns, Shon
59.	<i>Salix tetrasperma</i>	Beau, Shon
60.	<i>Symplocos crataegoides</i>	Lodar, Logh
61.	<i>Taxus baccata</i>	Rakhal, Barmi, Neyamdal
62.	<i>Ulmus wallichiana</i>	Marn, Maldung
63.	<i>Ulmus laevigata</i>	Maral, Maldung

Shrubs		
Sl. no	Botanical Name	Local Name
1.	<i>Abelia triflora</i>	Indian Abelia
2.	<i>Andrachne cordifolia.</i>	Durlu, Bharti, Karkan
3.	<i>Artemisia maritime</i>	Seski, Buer
4.	<i>Artemisia vestita</i>	Seski
5.	<i>Artemisia vulgaris</i>	Charmer (Khadar)
6.	<i>Astragalus candolleanus</i>	Rudravanti
7.	<i>Astragalus rhizanthus</i>	Root-Flower Milk-Vetch
8.	<i>Berberis chitria</i>	Kashmal, Chutrum
9.	<i>Berberis aristata</i>	Kashmal, Khepacho
10.	<i>Berberis lyceum</i>	Kashmal, chutrum
11.	<i>Berberis kunawurensis</i>	Kashmal, chutrum

12.	<i>Bosia amherstiana</i>	Khasbar
13.	<i>Buddleia paniculata</i>	Safed chindwa
14.	<i>Caragana gerardiana</i>	Chhepat
15.	<i>Caragana brevispina</i>	Shameh
16.	<i>Colebrookia oppositifolia</i>	Bhamber
17.	<i>Coriaria neplensis</i>	Masuri, lit zaklo
18.	<i>Colutea nepalensis</i>	Chum raonsh, banang
19.	<i>Cotoneaster acuminata</i>	Chum, Raonsh, banang
20.	<i>Cotoneaster bacillaris</i>	Reuns, Raonsh, banang
21.	<i>Cotoneaster microphylla</i>	Raonsh
22.	<i>Crataegus oxyacantha</i>	Bat sangli
23.	<i>Daphne oleoides</i>	Jiko
24.	<i>Daphne papyracea</i>	Kaula, gandiri
25.	<i>Daphne retusa</i>	Agru
26.	<i>Desmodium sambuense</i>	Safed kathi
27.	<i>Desmodium tiliaefolium</i>	Mortoi, mus
28.	<i>Deutzia staminea</i>	Ghugtai
29.	<i>Deutzia corymbosa</i>	Philru, chururu, kakhu
30.	<i>Elaeagnus umbellate</i>	Geai, gehain, surch

31.	<i>Elsholtzia polystachya</i>	Pothi jaunkra
32.	<i>Eurotia ceratoides</i>	Gyabshen
33.	<i>Ficus foveolata (Climbing Shrub)</i>	Bel
34.	<i>Flemingia fruticulosa</i>	Chopru
35.	<i>Flemingia prostrata</i>	Hapse
36.	<i>Gaultheria nummularioides</i>	Bhuin kafal
37.	<i>Hypericum lysimachioides</i>	Yellow flower
38.	<i>Indigofera dosua</i>	Kathi, Kanthi
39.	<i>Indigofera hebeptala</i>	Kathi, Kanthi, Kastiarang
40.	<i>Indigofera gerardiana</i>	Kathi, Kanthi
41.	<i>Indigofera heterantha</i>	Kathi
42.	<i>Indigofera pulchella</i>	Kathi
43.	<i>Inula cappa</i>	Bakhrakaane
44.	<i>Inula grandiflora</i>	Poshkar
45.	<i>Juniperus recurva</i>	Thaily, Guggal, Thailu
46.	<i>Jasminum humile</i>	Chameli, Kurang
47.	<i>Lepidagathis cuspidata</i>	
48.	<i>Lepidagathis lanceolata</i>	Choti Frodari
49.	<i>Loranthus elatus</i>	Banda, Pand
50.	<i>Loranthus vestitus</i>	Banda, Pand

51.	<i>Lonicera angustifolia</i>	Kantias, Pirlu
52.	<i>Lonicera quinquelocularis</i>	Kantias, Pirlu
53.	<i>Myrsine Africana</i>	Banwa, Chhota Mehndru, Chitring
54.	<i>Piptanthus nepalensis</i>	Chamboa
55.	<i>Plectranthus rugosus</i>	Chhichhri, Piyag
56.	<i>Plactranthus coetsa</i>	Bangra
57.	<i>Porana racemosa</i>	Snow creeper
58.	<i>Prinsepia utilis</i>	Bhekal Bekhlang
59.	<i>Perowskia atrplicifolia</i>	Salvia
60.	<i>Rhus cotinus</i>	Rikhal, Tung, Tugang
61.	<i>Rhus semialata</i>	Titar, Titry
62.	<i>Reinwardtia trigyna</i>	Basant
63.	<i>Ribes grossularia</i>	Ghoose berry
64.	<i>Ribes orientale</i>	Ghoose berry
65.	<i>Rhododendron campanulatum</i>	Kashimiri patha, Sirmang
66.	<i>Rhododendron lepidotum</i>	Sumral
67.	<i>Rhamnus virgatus</i>	Chedula
68.	<i>Roylea calycina</i>	Karnol titpati
69.	<i>Rubus biflorous</i>	Anchu
70.	<i>Rubus ellipticus</i>	Hinsar, Kala, Chosho

71.	<i>Rubus lasiocarpus</i>	Kalaksha, Swating
72.	<i>Rubus purpureos</i>	Kalaksha, Swating
73.	<i>Salix hastate</i>	Buins
74.	<i>Salix denticulate</i>	Beun
75.	<i>Salix daphnoides</i>	Buinus, Bhainsala
76.	<i>Sarcococca saligana</i>	Taliary, Charabara
77.	<i>Skimmia laureola</i>	Shashra, Kedar patti, Shuru
78.	<i>Spiraea canescens</i>	Takol, Chaku, Taku
79.	<i>Spiraea bella</i>	Kujin
80.	<i>Spiraea lindleyana</i> Syn. <i>S. Sorbifolia</i> <i>spirea vestita</i>	Kaltiri, Kueht
81.	<i>Solanum dulcamar</i>	Snake berry
82.	<i>Staphylea emodi</i>	Nag Daun
83.	<i>Smilax vaginata</i>	Peepal Satta
84.	<i>Syringa emodi</i>	Bhatrasee
85.	<i>Saussurea lappa</i>	Kuth
86.	<i>Viburnum coriaceum</i>	Rohini
87.	<i>Viburnum cotinifolium</i>	Taliana, Bhutool, Tustus
88.	<i>Viburnum Stellulatum</i>	Richhoi
89.	<i>Viburnum nervosum</i>	Tilenal, Talkha, Thalin

90.	<i>Viscum album</i>	Bhangra
91.	<i>Wikstroemia canescens</i>	Chambat, Tilak
92.	<i>Woodfordia floribunda</i> (Syn <i>W. fruticosa</i>)	Dhan, Dawe
93.	<i>Zanthoxylum alatum</i>	Timber, Tirmira, Timri

Herbs		
Sr.No ..	Botanical Name	Local Name
1.	<i>Aconitum heterophyllum</i>	Patish, Mohra
2.	<i>Agrimonia eupatorium</i>	Kanaula
3.	<i>Ainsliaea aptera</i>	Durwa, kalighati
4.	<i>Anaphalis arvensis</i>	Bhujnu
5.	<i>Anaphalis nubigena</i>	Bhujnu
6.	<i>Androsace lanuginosa</i>	Rock jasmine
7.	<i>Androsace rotundifolia</i>	Rock jasmine
8.	<i>Androsace sarmentosa</i>	Rock jasmine
9.	<i>Anemone obiusilosa</i>	Ageli
10.	<i>Anemone rivularis</i>	Ageli, Carbini, maruiri
11.	<i>Aquilegia pubiflora</i>	Thandi Buti
12.	<i>Asparagus filicinus</i>	Sahasimuli

13.	<i>Atropa belladonna</i>	Saagngur
14.	<i>Bidens wallichii</i>	Pink Ball
15.	<i>Boenninghausenia albiflora</i>	Pesmmar
16.	<i>Caltha palustris</i>	Phool
17.	<i>Campanula argyrotricha</i>	Bell Flower
18.	<i>Campanula cashmiriana</i>	Bell Flower
19.	<i>Campamula latifolia</i>	Bell Flower
20.	<i>Campanula colorata</i>	Bell Flower
21.	<i>Cannabis sativa</i>	Bhag, kus
22.	<i>Capsella bursa-pastoris</i>	Shershni
23.	<i>Carum carvi</i>	Zira
24.	<i>Chenopodium album</i>	Tulsi, Dankhar
25.	<i>Cimicifuga foetida</i>	Snake root
26.	<i>Crepis japonica</i>	Dudhli
27.	<i>Cynoglossum micranthum</i>	kheerpate
28.	<i>Cynoglossum wallichii</i>	lichkura
29.	<i>Datura stramonium</i>	Datura
30.	<i>Delphinium denudatum</i>	Nirvisi
31.	<i>Delphinium vestitum</i>	Kalulu
32.	<i>Digitalis purpurea</i>	foxglove
33.	<i>Dipsacus inermis</i>	Tori

34.	<i>Echinops cornigerus</i>	kandara
35.	<i>Echinops niveus</i>	kandara
36.	<i>Ephedra gerardiana</i>	Somlata, Khanta
37.	<i>Erigeron multiradiatus</i>	Fleabane
38.	<i>Erythimum hieracifolium</i>	Wallflower
39.	<i>Fagopyrum cymosum</i>	Ban ogal
40.	<i>Fragaria vesca</i>	Balbalsho
41.	<i>Foenieuhum vulzare</i>	Saunf
42.	<i>Gallium spp.</i>	Goose grass
43.	<i>Gentian argented</i>	Nili sarnal
44.	<i>Gentian kurroo</i>	Karu, Kore
45.	<i>Geranium nepalense</i>	Tirrahani
46.	<i>Geranium ocellatum</i>	Lal Chari
47.	<i>Geranium robertianum</i>	Lal Chari
48.	<i>Geranium wallichianum</i>	Chowhri
49.	<i>Gerbera lanuginose</i>	Kopra
50.	<i>Geum urbanum</i>	Chandana
51.	<i>Geraradiana heterophylla</i>	Bechu buti
52.	<i>Gnaphalium luteo-album</i>	Gulsham
53.	<i>Gynura angulosa</i>	Kasiunga
54.	<i>Halenia elliptica</i>	Pitpapa

55.	<i>Hypericum cernuum</i>	Banj wakra
56.	<i>Hyoscyamus niger</i>	Ajwain
57.	<i>Impatiens amphorata</i>	Chui mui
58.	<i>Impatiens roylei</i>	Chui mui
59.	<i>Impatiens thomsoni</i>	Chui mui
60.	<i>Impatiens scabrida</i>	Chui mui
61.	<i>Jurinea macrocephalla</i>	Dhup
62.	<i>Mentha sylvestris</i>	Podina
63.	<i>Morina persica</i>	Whorlflower
64.	<i>Myosotis caespitosa</i>	Bichhu ghass
65.	<i>Myosotis sylvatica</i>	Bichu /ghass
66.	<i>Nepeta ciliaris</i>	Brun
67.	<i>Nepeta elliptica</i>	Brun
68.	<i>Pedicularis pectinata</i>	Mohak jad
69.	<i>Phlomis bracteosa</i>	Lampwick plant
70.	<i>Picrorhiza kurrooa</i>	Karu, kardi, karwi
71.	<i>Podophyllum hexandrum</i>	Bankakri, Papri
72.	<i>Polygonatum cirrifolium</i>	MahMeda
73.	<i>Polygonatum verticillatum</i>	Salam mishri
74.	<i>Polygonum alatum</i>	Malora
75.	<i>Potentilla argyrophylla</i>	Malora

76.	<i>Potentilla atrosanguinea</i>	Malora
77.	<i>Potentilla nepalensis</i>	Dora
78.	<i>Potentilla sibbaldi</i>	Dora
79.	<i>Plantago tibetica</i>	Dora
80.	<i>Primula denticulate</i>	Hantingoo
81.	<i>Primula petiolaris</i>	Kouri, Phantingoo
82.	<i>Ranunculus arvensis</i>	Phantingoo
83.	<i>Rumex hastatus</i>	Malora, Bhilmora
84.	<i>Rumex nepalensis</i>	Malora, Bhilmora
85.	<i>Salvia glutinosa</i>	Gwadra
86.	<i>Salvia lanata</i>	Gwadra
87.	<i>Salvia lappa</i>	Kuth, Koot
88.	<i>Saxifrage diversifolia</i>	rockfoil
89.	<i>Scrophularia himalensis</i>	figwort
90.	<i>Senecio chrysanthemoides</i>	Diyar
91.	<i>Sisymbrium alliarea</i>	Mustard
92.	<i>Stroilanthes atropurpureus</i>	Mashna, Mashain
93.	<i>Strobilanthes daldousianus</i>	Machine Mashian
94.	<i>Strobilanthes alatus</i>	Mashna, Machin, Nashain
95.	<i>Sambucus ebulus</i>	Gandala

96.	<i>Swertia chirata</i>	Charaita
97.	<i>Swertia cordata</i>	Charaita
98.	<i>Swertia paniculata</i>	Charaita
99.	<i>Tanacetum nubigenum</i>	Charaita
100.	<i>Tanacetum longifolium</i>	Bhut keri
101.	<i>Taraxacum officinale</i>	Bhut keri
102.	<i>Thalictrum pedunculatum</i>	Gabini Mamiri
103.	<i>Thalictrum javanucum</i>	Gabini Mamiri
104.	<i>Thalictrum neurocarpum</i>	Barmod
105.	<i>Trifolium repens</i>	Kuth
106.	<i>Thymus serpyllum</i>	Banajawain
107.	<i>Smilax vaginata</i>	Ban jewain
108.	<i>Valeriana hardwickii</i>	Balchhari
109.	<i>Valeriana pyrolaefolia</i>	Nlhani, Nakh
110.	<i>Veleriana wallichii</i>	Tagar
111.	<i>Verbascum Thapsus</i>	Mushkbala
112.	<i>Veronica serpyllifolia</i>	Mushkbala
113.	<i>Viola serpens</i>	Banafsha
114.	<i>Viola patrinii</i>	Banafsha
115.	<i>Wulfenia amherstiana</i>	Banafsha

Climbers		
Sr. No.	Botanical Name	Local Name
1.	<i>Cuscula reflexa (parasite)</i>	Akashabel
2.	<i>Clematis connate</i>	Garol, Wantah
3.	<i>Clematis grata</i>	Garol, Wantah
4.	<i>Clematis barbellata</i>	Belkangu, Chabru, Wantah
5.	<i>Clematis Montana</i>	Garol, Wantah
6.	<i>Dioscorea deltoidea</i>	Kunj Calendi, Singlimingli, Baniatakari
7.	<i>Hedera helix</i>	Grumru
8.	<i>Jasminum officinale</i>	Malti, Bammalti
9.	<i>Jasminum dispernum</i>	Malti
10.	<i>Rosa macrophylla</i>	Pahari gulab, Kuja, Benyal
11.	<i>Rosa moschala</i>	Kuja, Yal
12.	<i>Schizandra grandiflora</i>	Angeli
13.	<i>Smilax vaginata</i>	Chob Chini
14.	<i>Smilax parvifolia</i>	Chob Chini
15.	<i>Vitis semi-cordata</i>	Miaza
16.	<i>Vitis trifolia</i>	Pola
17.	<i>Vitis parvifolia</i>	Panibel

Grasses and Bamboos		
Sr. No.	Botanical Name	Local Name
1.	<i>Andropogon ischaemum</i>	Blue Stem Grass
2.	<i>Agropyron longearistatum</i>	Wheat grass
3.	<i>Agropyron semicostatum</i>	Grass
4.	<i>Agrostis alba</i>	Grass
5.	<i>Agrostis royleana</i>	Chhun
6.	<i>Arthraxon lanceolatus</i>	Liain
7.	<i>Arundinaria falcata</i>	Ringal, Nirgal, Poo
8.	<i>Arundinaria spathiflora</i>	Ringal
9.	<i>Arundinella brasiliensis</i>	Ringal
10.	<i>Arundinella setosa</i>	Ringal
11	<i>Arundo donax</i>	Nal, Naldura, Rajal
12	<i>Avena aspera</i>	Nal
13	<i>Avena fatua</i>	Nal
14	<i>Bromus asper</i>	Nal
15	<i>Bromus patulus</i>	Nal
16	<i>Cynodon dactylon</i>	Dub, Drub
17	<i>Calamagrostis littorea</i>	Grass
18	<i>Dactylis glomerata</i>	Grass

19	<i>Danthonia cachemyriana</i>	Wire grass
20	<i>Deyeuxia scabrescens</i>	Grass
21	<i>Eragrostis nigra</i>	Love Grass
22	<i>Erianthus fulvus</i>	Kahio
23	<i>Erianthus ravennae</i>	Ravena Grass
24	<i>Festuca gigantea</i>	Giga Grass
25	<i>Festuca kashmiriana</i>	Rozen
26	<i>Festuca modesta</i>	Grass
27	<i>Ischaemum notatum</i>	Hack
28	<i>Muehlenbergia himalayensis</i>	Himalaya Grass
29	<i>Neyraudia madagascariensis</i>	Grass
30	<i>Oplismenus compositus</i>	Grass
31	<i>Oryzopsis aequifolium</i>	Simoli Grass
32	<i>Panicum plicatum</i>	Gobar Grass
33	<i>Paspalum ambiguum</i>	Grass
34	<i>Pennisetum flaccidum</i>	Grass
35	<i>Poa pratensis</i>	Grass
36	<i>Pogonatherum saccharoides</i>	Nigal
37	<i>Pollinia mollis</i>	Soft Grass
38	<i>Pollinia quadrinervis</i>	Grass
39	<i>Setaria glauca</i>	Siun

40	<i>Setaria viridis</i>	Kangni
41	<i>Sporobolus piliferus</i>	Spora
42	<i>Stipa sibirica</i>	Gur Ghas
43	<i>Tripogon filiformis</i>	Ghass

IV FAUNA

Sr. No.	English Name	Scientific Name	Local Name
Mammals			
1.	Common Leopard	<i>Panthera pardus</i> , Linnaeus	Bagh, baghera
2.	Leopard cat, jungle cat	<i>Felis bengalensis</i> ,	Ban bilao, Jangli billi
3.	Himalayan black bear	<i>Syn. Ursus thibetanus</i> , G.Cuvier.	Bhalu
4.	Himalayan fox	<i>Vulpes bengalensis</i> , Shaw	Lomri Siar
5.	Himalayan jackal	<i>Canis aureus</i>	Golden Jackal
6.	Common mongoose	<i>Herpestes edwardsi</i> ,	Neola
7.	Jungle Cat	<i>Felis chaus</i>	Jungli Billi
8.	Goral	<i>Naemorhedus goral</i>	Goral, Ghurar
9.	Serow	<i>Capricornis sumatraensis</i>	Serow (Blue- Black Sheep)
10.	Barking deer	<i>Muntiacus muntjak</i>	Kakar

11.	Musk deer	<i>Moschus moschiferus</i>	Kastura
12.	Sambhar	<i>Cervus unicolor, nigar</i>	Jarao
13.	Common Indian Hare	<i>Lepus nigricollis</i>	Khargosh
14.	Large red flying Squirrel	<i>Petaurista petaurista</i>	Koryal
15.	Indian crested porcupine	<i>Hystrix indica</i>	Sehi
16.	Himalayan langur	<i>Presbytis entellus</i>	Guni
17.	Himalayan yellow throated marten	<i>Martes flavigula, boddaert</i>	Chitrالا

Birds

Sl No	Scientific Name	Common Name
1	Anser indicus	Bar-headed Goose
2	Anser anser	Graylag Goose
3	Tadorna ferruginea	Ruddy Shelduck
4	Spatula clypeata	Northern Shoveler
5	Anas acuta	Northern Pintail
6	Anas crecca	Green-winged Teal
7	Netta rufina	Red-crested Pochard
8	Aythya ferina	Common Pochard
9	Arborophila torqueola	Hill Partridge
10	Lerwa lerwa	Snow Partridge
11	Tragopan melanocephalus	Western Tragopan
12	Lophophorus impejanus	Himalayan Monal

13	<i>Pucrasia macrolopha</i>	<i>Koklass Pheasant</i>
14	<i>Catreus wallichii</i>	<i>Cheer Pheasant</i>
15	<i>Lophura leucomelanos</i>	<i>Kalij Pheasant</i>
16	<i>Pavo cristatus</i>	<i>Indian Peafowl</i>
17	<i>Gallus gallus</i>	<i>Red Junglefowl</i>
18	<i>Francolinus francolinus</i>	<i>Black Francolin</i>
19	<i>Tetraogallus himalayensis</i>	<i>Himalayan Snowcock</i>
20	<i>Alectoris chukar</i>	<i>Chukar</i>
21	<i>Columba livia</i>	<i>Rock Pigeon</i>
22	<i>Columba leuconota</i>	<i>Snow Pigeon</i>
23	<i>Columba palumbus</i>	<i>Common Wood-Pigeon</i>
24	<i>Columba hodgsonii</i>	<i>Speckled Wood-Pigeon</i>
25	<i>Streptopelia orientalis</i>	<i>Oriental Turtle-Dove</i>
26	<i>Streptopelia decaocto</i>	<i>Eurasian Collared-Dove</i>
27	<i>Spilopelia chinensis</i>	<i>Spotted Dove</i>
28	<i>Chalcophaps indica</i>	<i>Asian Emerald Dove</i>
29	<i>Treron phoenicopterus</i>	<i>Yellow-footed Green-Pigeon</i>
30	<i>Treron sphenurus</i>	<i>Wedge-tailed Green-Pigeon</i>
31	<i>Centropus sinensis</i>	<i>Greater Coucal</i>
32	<i>Eudynamys scolopaceus</i>	<i>Asian Koel</i>
33	<i>Cacomantis passerinus</i>	<i>Gray-bellied Cuckoo</i>
34	<i>Hierococcyx</i>	<i>Large Hawk-Cuckoo</i>

	sparverioides	
35	Cuculus poliocephalus	<i>Lesser Cuckoo</i>
36	Cuculus micropterus	<i>Indian Cuckoo</i>
37	Cuculus saturatus	<i>Himalayan Cuckoo</i>
38	Cuculus canorus	<i>Common Cuckoo</i>
39	Caprimulgus jotaka	<i>Gray Nightjar</i>
40	Caprimulgus macrurus	<i>Large-tailed Nightjar</i>
41	Hirundapus caudacutus	<i>White-throated Needletail</i>
42	Aerodramus brevirostris	<i>Himalayan Swiftlet</i>
43	Tachymarptis melba	<i>Alpine Swift</i>
44	Apus leuconyx	<i>Blyth's Swift</i>
45	Apus affinis	<i>Little Swift</i>
46	Amaurornis phoenicurus	<i>White-breasted Waterhen</i>
47	Zapornia pusilla	<i>Baillon's Crake</i>
48	Vanellus duvaucelii	<i>River Lapwing</i>
49	Vanellus indicus	<i>Red-wattled Lapwing</i>
50	Scolopax rusticola	<i>Eurasian Woodcock</i>
51	Gallinago gallinago	<i>Common Snipe</i>
52	Actitis hypoleucos	<i>Common Sandpiper</i>
53	Tringa ochropus	<i>Green Sandpiper</i>
54	Ciconia nigra	<i>Black Stork</i>
55	Microcarbo niger	<i>Little Cormorant</i>

56	Phalacrocorax carbo	<i>Great Cormorant</i>
57	Egretta garzetta	<i>Little Egret</i>
58	Ardeola grayii	<i>Indian Pond-Heron</i>
59	Ardea coromanda	<i>Eastern Cattle-Egret</i>
60	Ardea cinerea	<i>Gray Heron</i>
61	Ardea purpurea	<i>Purple Heron</i>
62	Elanus caeruleus	<i>Black-winged Kite</i>
63	Gypaetus barbatus	<i>Bearded Vulture</i>
64	Neophron percnopterus	<i>Egyptian Vulture</i>
65	Pernis ptilorhynchus	<i>Oriental Honey-buzzard</i>
66	Sarcogyps calvus	<i>Red-headed Vulture</i>
67	Aegypius monachus	<i>Cinereous Vulture</i>
68	Gyps himalayensis	<i>Himalayan Griffon</i>
69	Gyps bengalensis	<i>White-rumped Vulture</i>
70	Gyps tenuirostris	<i>Slender-billed Vulture</i>
71	Gyps fulvus	<i>Eurasian Griffon</i>
72	Spilornis cheela	<i>Crested Serpent-Eagle</i>
73	Circaetus gallicus	<i>Short-toed Snake-Eagle</i>
74	Nisaetus nipalensis	<i>Mountain Hawk-Eagle</i>
75	Ictinaetus malaiensis	<i>Black Eagle</i>
76	Hieraaetus pennatus	<i>Booted Eagle</i>
77	Aquila nipalensis	<i>Steppe Eagle</i>
78	Aquila heliaca	<i>Imperial Eagle</i>

79	<i>Aquila chrysaetos</i>	<i>Golden Eagle</i>
80	<i>Aquila fasciata</i>	<i>Bonelli's Eagle</i>
81	<i>Tachyspiza virgata</i>	<i>Besra</i>
82	<i>Tachyspiza badia</i>	<i>Shikra</i>
83	<i>Accipiter nisus</i>	<i>Eurasian Sparrowhawk</i>
84	<i>Astur gentilis</i>	<i>Eurasian Goshawk</i>
85	<i>Milvus migrans</i>	<i>Black Kite</i>
86	<i>Haliastur indus</i>	<i>Brahminy Kite</i>
87	<i>Buteo buteo</i>	<i>Common Buzzard</i>
88	<i>Buteo refectus</i>	<i>Himalayan Buzzard</i>
89	<i>Otus spilocephalus</i>	<i>Mountain Scops-Owl</i>
90	<i>Ketupa zeylonensis</i>	<i>Brown Fish-Owl</i>
91	<i>Glaucidium cuculoides</i>	<i>Asian Barred Owlet</i>
92	<i>Taenioptynx brodiei</i>	<i>Collared Owlet</i>
93	<i>Strix leptogrammica</i>	<i>Brown Wood-Owl</i>
94	<i>Strix niviculum</i>	<i>Himalayan Owl</i>
95	<i>Asio otus</i>	<i>Long-eared Owl</i>
96	<i>Upupa epops</i>	<i>Eurasian Hoopoe</i>
97	<i>Ocyeros birostris</i>	<i>Indian Gray Hornbill</i>
98	<i>Merops orientalis</i>	<i>Asian Green Bee-eater</i>
99	<i>Alcedo atthis</i>	<i>Common Kingfisher</i>
100	<i>Halcyon smyrnensis</i>	<i>White-throated Kingfisher</i>
101	<i>Megaceryle lugubris</i>	<i>Crested Kingfisher</i>

102	<i>Psilopogon virens</i>	<i>Great Barbet</i>
103	<i>Psilopogon asiaticus</i>	<i>Blue-throated Barbet</i>
104	<i>Indicator xanthonotus</i>	<i>Yellow-rumped Honeyguide</i>
105	<i>Picumnus innominatus</i>	<i>Speckled Piculet</i>
106	<i>Yungipicus canicapillus</i>	<i>Gray-capped Pygmy Woodpecker</i>
107	<i>Dendrocoptes auriceps</i>	<i>Brown-fronted Woodpecker</i>
108	<i>Dendrocopos hyperythrus</i>	<i>Rufous-bellied Woodpecker</i>
109	<i>Dendrocopos macei</i>	<i>Fulvous-breasted Woodpecker</i>
110	<i>Dendrocopos himalayensis</i>	<i>Himalayan Woodpecker</i>
111	<i>Picus chlorolophus</i>	<i>Lesser Yellownape</i>
112	<i>Picus squamatus</i>	<i>Scaly-bellied Woodpecker</i>
113	<i>Picus canus</i>	<i>Gray-headed Woodpecker</i>
114	<i>Falco tinnunculus</i>	<i>Eurasian Kestrel</i>
115	<i>Falco subbuteo</i>	<i>Eurasian Hobby</i>
116	<i>Falco peregrinus</i>	<i>Peregrine Falcon</i>
117	<i>Psittacula eupatria</i>	<i>Alexandrine Parakeet</i>
118	<i>Psittacula krameri</i>	<i>Rose-ringed Parakeet</i>
119	<i>Psittacula himalayana</i>	<i>Slaty-headed Parakeet</i>
120	<i>Psittacula cyanocephala</i>	<i>Plum-headed Parakeet</i>
121	<i>Psarisomus dalhousiae</i>	<i>Long-tailed Broadbill</i>

122	<i>Pericrocotus ethologus</i>	<i>Long-tailed Minivet</i>
123	<i>Pericrocotus speciosus</i>	<i>Scarlet Minivet</i>
124	<i>Pteruthius aeralatus</i>	<i>White-browed Shrike-Babbler</i>
125	<i>Pteruthius xanthochlorus</i>	<i>Green Shrike-Babbler</i>
126	<i>Oriolus kundoo</i>	<i>Indian Golden Oriole</i>
127	<i>Oriolus traillii</i>	<i>Maroon Oriole</i>
128	<i>Hemipus picatus</i>	<i>Bar-winged Flycatcher-shrike</i>
129	<i>Rhipidura albicollis</i>	<i>White-throated Fantail</i>
130	<i>Dicrurus leucophaeus</i>	<i>Ashy Drongo</i>
131	<i>Terpsiphone paradisi</i>	<i>Indian Paradise-Flycatcher</i>
132	<i>Lanius schach</i>	<i>Long-tailed Shrike</i>
133	<i>Lanius tephronotus</i>	<i>Gray-backed Shrike</i>
134	<i>Garrulus glandarius</i>	<i>Eurasian Jay</i>
135	<i>Garrulus lanceolatus</i>	<i>Black-headed Jay</i>
136	<i>Urocissa flavirostris</i>	<i>Yellow-billed Blue-Magpie</i>
137	<i>Urocissa erythroryncha</i>	<i>Red-billed Blue-Magpie</i>
138	<i>Dendrocitta vagabunda</i>	<i>Rufous Treepie</i>
139	<i>Dendrocitta formosae</i>	<i>Gray Treepie</i>
140	<i>Nucifraga hemispila</i>	<i>Southern Nutcracker</i>
141	<i>Pyrrhocorax pyrrhocorax</i>	<i>Red-billed Chough</i>
142	<i>Pyrrhocorax graculus</i>	<i>Yellow-billed Chough</i>

143	Corvus splendens	<i>House Crow</i>
144	Corvus macrorhynchos	<i>Large-billed Crow</i>
145	Chelidorhynx hypoxanthus	<i>Yellow-bellied Fairy-Fantail</i>
146	Culicicapa ceylonensis	<i>Gray-headed Canary-Flycatcher</i>
147	Cephalopyrus flammiceps	<i>Fire-capped Tit</i>
148	Sylviparus modestus	<i>Yellow-browed Tit</i>
149	Periparus ater	<i>Coal Tit</i>
150	Periparus rufonuchalis	<i>Rufous-naped Tit</i>
151	Lophophanes dichrous	<i>Gray-crested Tit</i>
152	Parus monticolus	<i>Green-backed Tit</i>
153	Parus cinereus	<i>Asian Tit</i>
154	Machlolophus xanthogenys	<i>Himalayan Black-lored Tit</i>
155	Orthotomus sutorius	<i>Common Tailorbird</i>
156	Prinia crinigera	<i>Himalayan Prinia</i>
157	Prinia hodgsonii	<i>Gray-breasted Prinia</i>
158	Locustella kashmirensis	<i>West Himalayan Bush Warbler</i>
159	Pnoepyga albiventer	<i>Scaly-breasted Cupwing</i>
160	Ptyonoprogne rupestris	<i>Eurasian Crag-Martin</i>
161	Hirundo rustica	<i>Barn Swallow</i>
162	Delichon dasypus	<i>Asian House-Martin</i>

163	Delichon nipalense	<i>Nepal House-Martin</i>
164	Cecropis daurica	<i>Eastern Red-rumped Swallow</i>
165	Hypsipetes leucocephalus	<i>Black Bulbul</i>
166	Pycnonotus cafer	<i>Red-vented Bulbul</i>
167	Pycnonotus leucogenys	<i>Himalayan Bulbul</i>
168	Prunella collaris	<i>Alpine Accentor</i>
169	Prunella himalayana	<i>Prunella collaris</i>
170	Prunella strophciata	<i>Rufous-breasted Accentor</i>
171	Prunella atrogularis	<i>Black-throated Accentor</i>
172	Passer domesticus	<i>House Sparrow</i>
173	Passer cinnamomeus	<i>Russet Sparrow</i>
174	Motacilla cinerea	<i>Gray Wagtail</i>
175	Motacilla alba	<i>White Wagtail</i>
176	Anthus sylvanus	<i>Upland Pipit</i>
177	Anthus roseatus	<i>Rosy Pipit</i>
178	Anthus hodgson	<i>Olive-backed Pipit</i>
179	Fringilla coelebs	<i>Common Chaffinch</i>
180	Fringilla montifringilla	<i>Brambling</i>
181	Mycerobas icterioides	<i>Black-and-yellow Grosbeak</i>
182	Mycerobas affinis	<i>Collared Grosbeak</i>
183	Mycerobas melanozanthos	<i>Spot-winged Grosbeak</i>

184	Carpodacus erythrinus	<i>Common Rosefinch</i>
185	Carpodacus grandis	<i>Blyth's Rosefinch</i>
186	Carpodacus pulcherrimus	<i>Himalayan Beautiful Rosefinch</i>
187	Carpodacus rodochroa	<i>Pink-browed Rosefinch</i>
188	Carpodacus rubicilla	<i>Great Rosefinch</i>
189	Carpodacus puniceus	<i>Red-fronted Rosefinch</i>
190	Pyrrhula nipalensis	<i>Brown Bullfinch</i>
191	Pyrrhula erythrocephala	<i>Red-headed Bullfinch</i>
192	Callacanthus burtoni	<i>Spectacled Finch</i>
193	Procarduelis nipalensis	<i>Dark-breasted Rosefinch</i>
194	Leucosticte nemoricola	<i>Plain Mountain Finch</i>
195	Chloris spinoides	<i>Yellow-breasted Greenfinch</i>
196	Carduelis caniceps	<i>Gray-crowned Goldfinch</i>
197	Serinus pusillus	<i>Fire-fronted Serin</i>
198	Emberiza lathamii	<i>Crested Bunting</i>
199	Emberiza fucata	<i>Chestnut-eared Bunting</i>
200	Emberiza cia	<i>Rock Bunting</i>
201	Emberiza stewarti	<i>White-capped Bunting</i>

Reptile		
Sr.No.	Common Name	Scientific Name
1	Common Indian Krait	Bungarus caeruleus
2	Common Wolf Snake	Lycodon capucinus
3	Checkered Keelback	Xenochrophis piscator
4	Himalayan Trinket	Orthriophis hodgsoni
5	Indian Rat Snake	Ptyas mucosa
6	Russel's Viper	Vipera russelli
7	Northern White Lipped Pit Viper	Trimeresurus septentrionalis
8	Himalayan Pit Viper	Gloydius himalayanus
9	Monitor Lizard	Varanus griseus

CHAPTER - 1

THE TRACT DEALT WITH

1.1: NAME AND SITUATION

The tract lies in Shimla District consisting the revenue sub divisions of Rohru, Jubbal and Dodra Kwar. The geographical area situated between 30°57'55" and 31°32'20" North Latitude and 77°29'40" and 78°18'42 East Longitude presents the total jurisdiction of the division and the area covered in this working plan. The forest division is headquartered at Rohru Town which lies at a distance of 110km. south of Shimla at an elevation of 1554 meters.

The entire forest area of the Rohru Forest Division is 130569.241 ha consisting of a multiplicity of legal classifications i.e. 3 Reserve Forest, 630 Protected Forests (Demarcated and Undemarcated), Alpine Pastures and Panwis. The entire area has been divided into 7 ranges – Jubbal, Saraswati Nagar, Tikker, Rohru, Bashla, Khashdhar and DodraKwar.

The division borders several forest divisions and also shares interstate borders with Uttarakhand state. The boundaries of the division are described as follows:

North	Rampur Forest Divison along the forests of Summer Kot Block and further east the forests of Chirgaon Forest Block of Khashdhar Forest Range.Daranghati Wildlife Sanctuary bordering the northern forest beats of Khashdhar Forest Range
North-East	Bordering the Wildlife sanctuary of Rakcham Chitkul along the forests of Manjheevan in DodraKwar Forest Range.
East and South-East	Garhwal and Chakrata hills (Uttarakhand) separated by spurs originated from BhatalaiTiba in north and TikkarDhar in South. The Eastward boundary starting from Manjheevan forests of DodraKwar Range up till the Kuddu block of Sawara Range which form the Southern most point of the division.

South and Souh west	Bordering the state of Uttarakhand and further transitioning into boundary with Talra Wildlife Sanctuary on the west ward side along the Reserved Forests of Chhajpur
West and North West	Proceeding Northwards from Chhajpur brings the boundaries of Chopal Forest Division in case of forests of Jubbal block and proceeding further northwards from Kharapathar in Jubbal and then along the borders of Tikker Forest Range and block brings up the forests of Theog Forest Division separated by Sarahru Dhar in south and Gartolanala in north starting from HattuDhar.

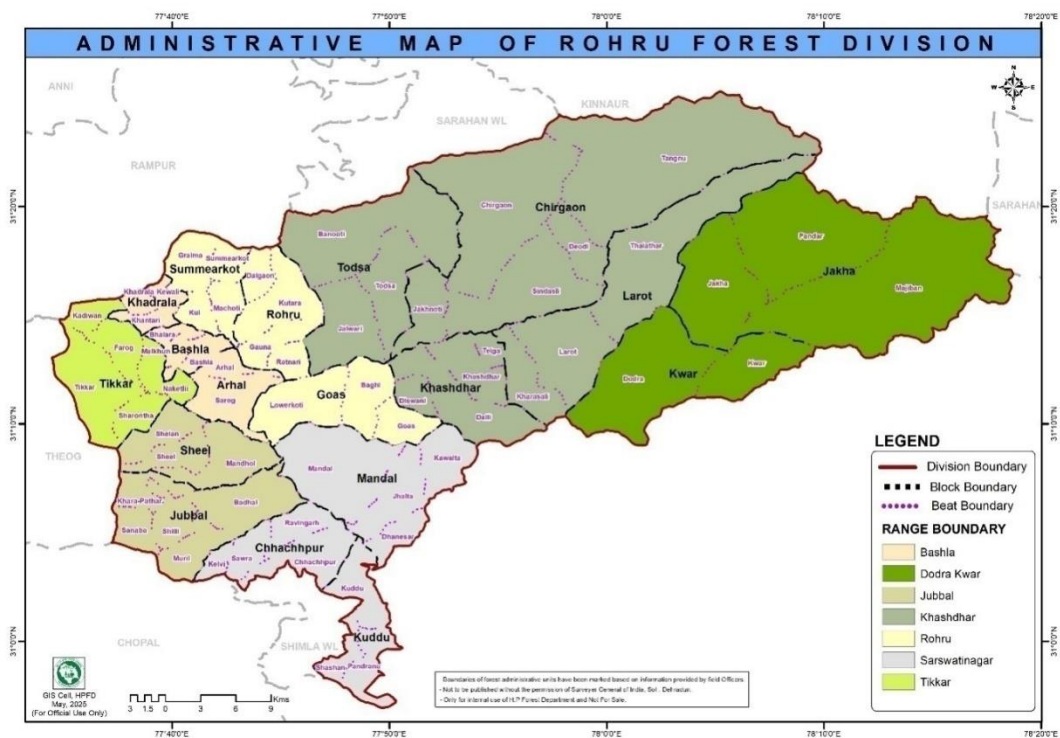
Table 1.1: Boundaries of Rohru Forest Division

1.2: CONFIGURATION OF THE GROUND

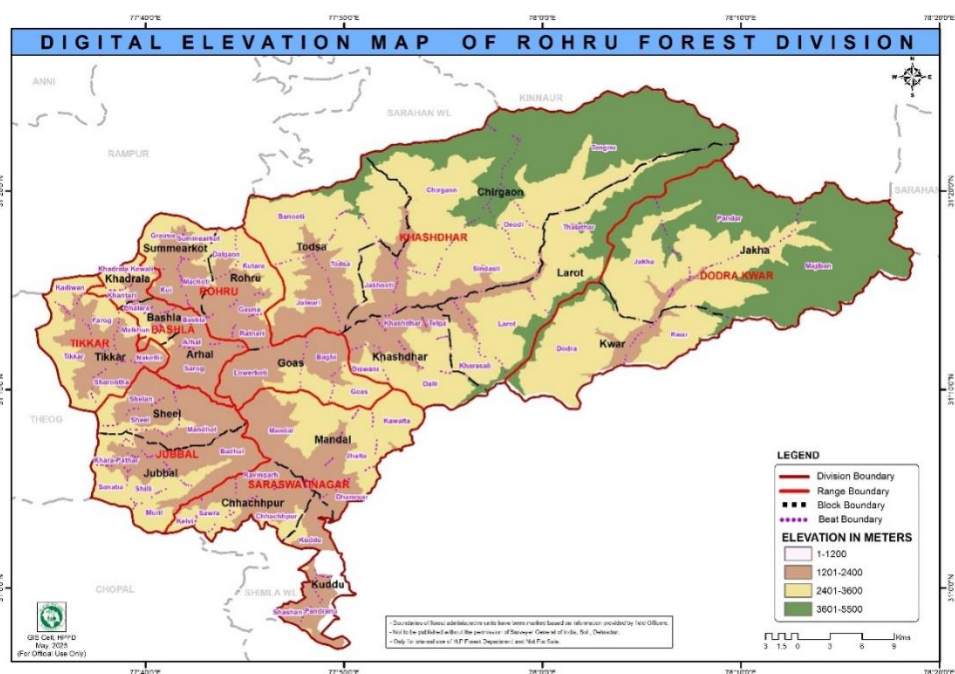
The broad character of tract is hilly/mountainous with moderate to steep and steep to precipitous slope. The vast area of the tract means that there is significant altitudinal variation from 1300m to 5700m above from the mean sea level (MSL) with the tract lying prominently in the lesser Himalaya ranges.

The tract has numerous steep ridges and deep V shaped valleys with the Pabbar river flowing through the valley right from the highest point of the division at Chanshal towards the southern most tip at Kuddu being the striking geographical feature. The general trend of the valley is NE to SW and NW to SE.

Apart from the steep ridges and slopes with high gradient, the forest division also has open alpine pastures above tree line in the peaks of Chanshal, ChanderNahan, Buran Ghatti, Moral Danda etc. which is another prominent feature of the forests of the division. There are also the steep panwis consisting of subtropical to temperate grasslands which were once important for local diurnal grazing, but over the years have become less important owing to the decrease in cattle population.



Map 1.1: Administrative Map of Rohru Forest Division



Map 1.2: Digital Elevation Map of Rohru Forest Division

1.3 Geology, Rock & Soil

The geological formation of the area under the Rohru Forest Division has been well studied and documented. The Jutogh formation is the most revealing geological formation and striking feature of the forests of Rohru Forest Division including Jubbal and Pubber River Valley as documented in the District Survey Document of Shimla District. The rocks of the area belong to Jutogh formation of Archean Age. Important geological formations and rocks met within the area are Quartz-muscovite Schist with minerals like quartz, cerucite, chlorite, talc, granite, magnetite and hematite.

The following table summarizes the lithostratigraphic classification of the Jutogh group depicted in the Rohru Forest Division:

Formation	Lithology
Jankoti	Schist, Garnetiferous, gneiss, quartzite, local amphibolite and marble
Chirgaon	Quartzite, quartz Schist, Sporadic, Schist. Local amphibolite and marble
Rohru	Garnetiferous biotite schist, quartzite, local amphibolites.
Badrol	Quartzite, Quartz schist

Table 1.2: Geological Formations in Rohru Forest Division

In the upper reaches of the Pabbar Valley the Jutoghmetasediments especially of the Jankoti formation are associated with granitoid gneisses. It comprises light grey, crudely foliated to non-foliated granitoid in the core, with prophyroblastic gneiss, minor augen and streaky gneiss along the peripheral zone

The Pabbar River in most of its course flows through high mountainous terrain to moderate low hills and intervening valleys of the Jutogh Group of rocks. The carrying capacity of the said river is good enough as different khadNallah joins the river at different spots. Two major khads i.e. Andrakhad and Gummakhad joins the river at Chirgaon and both the tributaries having a good carrying capacity. The Pabbar river system is a rich source of boulders, bajri and sand which are vital mineral resources utilized in development works. However, large portions of the river bed come under the definition of Protected Forests under Indian Forest Act, 1927 due to a notification of the state government dated 15/1/1952 and 25/2/1952 notifying all wasteland as forest land. Hence, there is no legal extraction of mineral resources from the river bed. As per the District Survey document of the Geology Wing, the Pabbar river system has total mineral potential of 54,02,880 tonnes of boulders, bajri and sand whereas the annual replenishment potential stands at 2,70,144 tonnes elucidating the potential of river system with regard to minerals.

The soils are derived from the river and stream alluvium, containing sediments derived both from Tertiary and Pre-tertiary rocks of the Himalayan origin. Forest Soil is mainly of two types (a) Acidic Soil with low base status and (b) Neutral Soil with high base status.

Forest soils are by and large rich in humus. At very few places in this tract, alluvium type of soil are found, mostly along the river. In areas, having adequate forest cover, especially of Deodar, Kail, Fir and Spruce, the soils are generally deep to very deep. In Deodar and Kail forest, the soil has adequate organic matter, whereas, in Fir and Spruce forests humus layer is thick with soils generally having loamy clayey character. However, soil, in Chil forest is poor in organic matter due to repeated fire and thus, vulnerable to erosion. In such forests, there is also high iron content in soil which has sandy and shallow character. Oak forests are generally accompanied by mature soils of good depth and possess high water holding capacity and acidic in reaction with black colour. The profile is well developed in higher locations under dense forest. Lower down, it suffers from erosion and has no scope to develop. Soil over most of the area is formed in situ, and is more or less loam to clay-loam. Generally speaking, on ridges, spurs, precipitous slopes and southern slopes the soil is shallow. On the other hand, it is moderately deep on the cooler aspects and on gentle slopes.

1.4 Climatic Parameters

1.4.1 Climate

By virtue of elevation, the tract has a temperate zone climate with winter from November to April, and summer from May to October, which includes the rainy season from July to September. However, the area along the streams and in the valley up to 1500m is very hot in summer and cold in winter. The transition period falls from April to May and from September to October. Broadly speaking, four season viz. winter, spring, summer and rainy are discernible in the tract. Precipitation occurs both in the form of snowfall and rain. Major part of precipitation, however is received from South west monsoons during July to mid September.

It is also to be mentioned here that owing to global warming and climate change, there is a discernible increase in temperatures and substantial reduction in snowfall quantum apart from late onset of snowfall which reduces the glacial volume and water retention in forests. Further, as in other parts of the world, there is significant increase in extreme events like cloudburst, flash floods and landslides as evidenced by the floods and landslides that occurred in the year 2023 across the state which also affected many parts of Rohru Forest Division.

1.4.2 Temperature

The temperature in the different parts of the tracts varies according to the elevation. The maximum and minimum temperature of the division shows wide variations. The maximum average temperature was experienced around 30°C in summer and minimum temperature is below -3°C in winter.

Year	Jan Max	Jan Min	Feb Max	Feb Min	Mar Max	Mar Min	Apr Max	Apr Min	May Max	May Min	Jun Max	Jun Min	Jul Max	Jul Min	Sep Max	Sep Min	Oct Max	Oct Min	Nov Max	Nov Min	Dec Max	Dec Min
2024	19.4	2.2	17.8	-0.6	24.8	-0.1	26.6	9.0	31.7	10.0	31.0	11.4	26.6	22.4	28.4	12.8	26.0	11.2	23.2	7.0	20.0	1.0
2023	19.3	0.6	23.2	1.4	20.4	4.2	25.9	4.7	28.8	8.4	27.5	9.6	25.5	15.4	26.6	14.0	25.6	8.0	21.5	5.8	19.6	3.2
2022	15.4	-0.3	18.1	-2.1	26.3	5.8	28.0	12.0	30.5	9.7	29.6	11.0	26.0	16.0	25.2	11.8	25.3	10.0	21.8	5.2	20.0	1.0
2021	18.9	2.1	20.9	-1.0	24.4	6.0	27.0	4.0	27.8	9.1	28.3	10.9	28.6	12.9	26.4	13.7	26.8	6.4	20.6	5.4	17.0	-0.2
2020	15.7	-3.7	19.7	-1.4	19.7	0.4	25.5	6.6	29.0	8.3	27.5	10.4	26.0	13.0	26.9	14.6	26.1	9.6	20.9	2.8	19.8	-1.1
2019	15.7	-1.3	20.2	-2.4	24.2	1.2	27.9	6.7	30.2	10.1	30.5	11.7	27.5	15.2	25.6	12.7	23.0	8.6	20.9	4.2	17.4	-0.5
2018	20.6	-0.4	21.6	0.0	24.2	5.0	26.7	8.0	29.4	5.8	28.1	11.4	26.3	14.0	26.4	12.3	24.4	8.7	20.4	3.3	17.1	-0.6
2017	17.4	-3.2	20.4	2.0	25.6	-0.9	28.6	6.3	28.3	10.3	30.1	11.6	25.7	15.6	26.0	6.8	25.4	8.8	21.1	5.5	21.3	2.0
2016	16.5	-0.2	21.8	1.3	24.0	2.1	27.5	8.2	29.8	10.3	29.4	12.0	27.0	14.9	25.2	13.0	24.8	9.4	23.6	7.0	22.3	3.8
2015	18.5	-2.0	20.5	0.7	24.1	0.8	26.9	6.4	29.3	10.6	29.1	12.5	25.3	14.6	25.7	12.0	25.4	5.3	22.0	4.3	20.0	-0.8

Table 1.3: Reocrded temperature of Shimla District in last 10 years (in degree Celsius)
(Reference: IMD Shimla)

Though, the duration of winter season depends on the altitude, it generally last from November to April, in most parts of the tracts. It is characterized by heavy frost in the lower areas and fairly heavy snowfall at higher elevation. Rain and snow during winter season come from northwestern air currents, and snowfall starts at higher elevation toward the end of the November or early in December. The snow comes down to 1300 m. elevation, but it seldom lies long below 2000 m. In normal year, snow disappears before the middle of April. Temperature begins to rise rapidly from the end of February, till June which is the warmest month. The weather is cool and pleasant in the summer season, except in the deep valleys. With the onset of the Southwest monsoon by the end of the June, the temperature begins to decrease gradually.

1.4.3 Rainfall

Heavy rainfall is received in the Pabbar valley resulting in very good conditions for the plant growth. The monsoon, which generally breaks at the end of June, continues up to the middle or last of September. The higher elevations generally experience greater precipitation viz. forests of Giri Ganga, Moral Danda, Chanshal, Kharshali etc. whereas the moderate and lower elevations experience comparatively lower levels of precipitation with greater number of dry days. The weather remains dry afterward; with occasional rains.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2024	2.8	80.3	93.0	42.4	22.6	142.7	345.0	367.2	205.9	0.0	0.0	10.1
2023	67.1	31.4	101.8	154.1	177.4	325.1	474.7	591.9	31.5	37.7	11.0	10.1
2022	152.1	85.3	3.2	0.0	142.8	100.0	357.5	427.7	291.0	37.0	4.5	2.4
2021	23.2	69.0	46.0	116.5	91.5	186.0	281.4	247.7	286.1	40.0	2.0	13.0
2020	150.9	40.4	154.5	93.7	124.0	183.2	245.6	168.6	18.7	0.0	42.4	18.9
2019	89.6	170.8	67.6	60.4	71.2	84.7	360.1	499.0	126.6	37.9	35.9	39.1
2018	16.3	41.8	28.5	65.6	84.6	192.4	419.0	378.6	295.6	2.0	33.9	7.7
2017	148.1	19.6	51.6	85.2	124.6	151.5	216.1	326.6	182.5	0.0	2.6	25.3
2016	35.0	53.7	125.3	26.5	104.8	193.6	416.8	402.6	39.9	2.3	0.0	5.5
2015	72.1	106.1	196.4	116.5	16.1	110.5	409.2	265.5	62.9	23.0	9.4	37.5

Table 1.4: Recorded Precipitation of last 10 years (in ml) Shimla District

(Reference: IMD Shimla)

Large parts of the tract receive snow fall during the winters with lower elevations of Rohru, Sawra forest ranges experiencing minimal or zero snowfall which characteristically fall in late winters if at all it does. The higher elevations of tract receive good amount of snowfall with maximum snow fall occurring in

higher reaches of Khashdhar Forest Range with Chanshal peak receiving as much as 10 feet of snow. Large parts of Khashdhar Forest Range, DodraKwar Forest Range, Summer Kot Forest Block and higher elevations of Jubbal Forest Range remain covered under snow from December to April with varying depths. Over the years, the discernable trend across the divisions is that the first snowfall of winter is being delayed and the elevations at which snowfall occurs are moving upwards.

1.4.4 Relative Humidity

The climate of the tract remains quite humid during rainy season and in other seasons there is a general dry nature that pervades the atmosphere across. The dry nature of climate is more prominent and significant during the winters especially at its onset during the months of November and December in comparison to the summers of May and June which are also becoming increasingly dry leading to twin forest fire seasons.

1.4.5 Winds & Storms

The prevailing winds are from the western direction and are generally of moderate velocity, except when the severe storms occur during the summers. Data reveal that damage to forest stands by severe thunderstorms during the months of April-May-June has been caused. In the evening there is always a light cool breeze coming down the hills generally from the north.

1.4.6 Frost

Frost occurs during the winter months in the entire deep valley. Severe Frost occurs in the months of January and February. Damage to young plants in forest nurseries are common in these winter months owing to frost. The conditions of frost are more prevalent in higher elevation forests of Khashdhar, DodraKwar Ranges and parts of Rohru, Bashla and Jubbal Forest Ranges.

1.5 Effects of Climate on Forest Growth

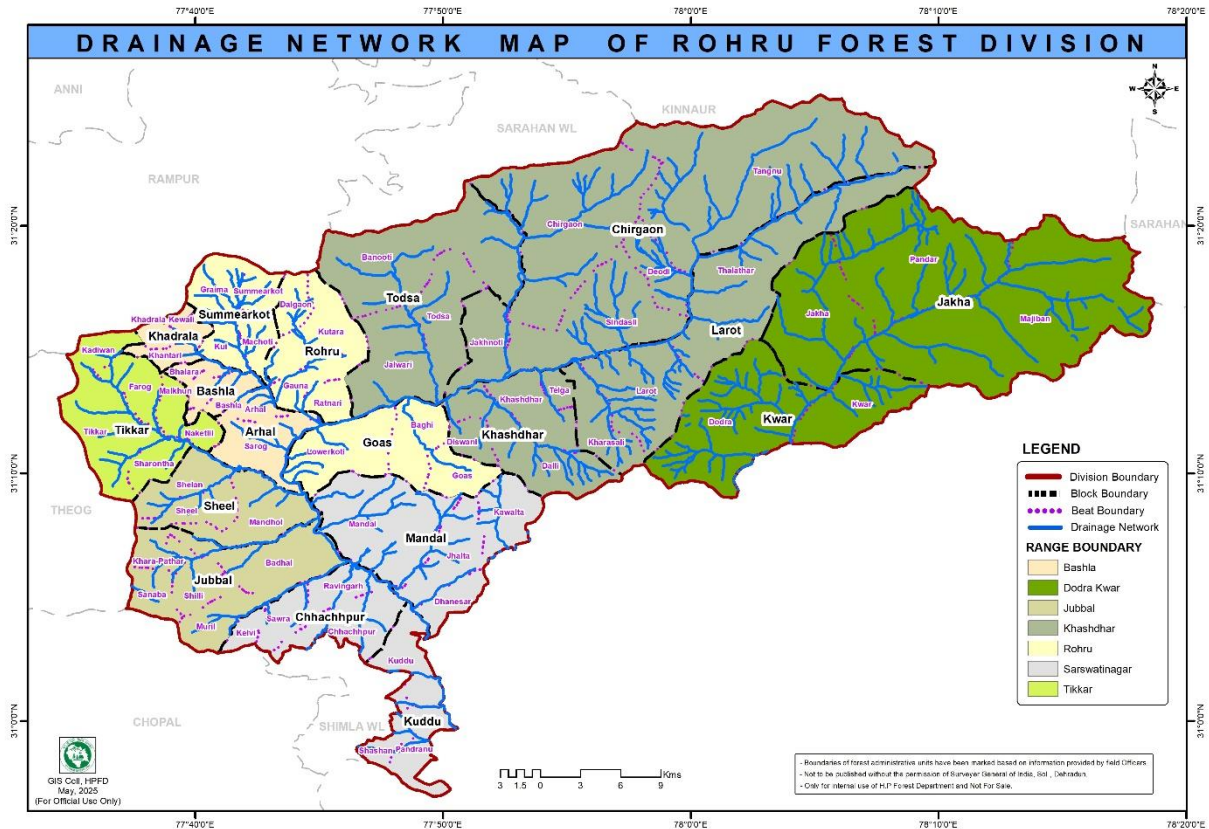
- a) Heavy rains in monsoon or pre- monsoon, sometimes, cause havoc to trees growth which result in soil erosion, landslides and floods.
- b) From October to November, when climate is dry, the probability of forest fires is very high. Young plants in the nurseries and plantations suffer from persistent drought and large scale mortality is noticed in areas with sandy and dry soils. The natural springs run dry, thus, causing a problem of water for raising nurseries.

- c) Autumn (October- November) are relatively dry months.
- d) All the areas above 1000 m, experience severe frost, especially in the depressions during winter.
- e) High hill areas experience snow, during November to February; many plants are uprooted or broken. In young regeneration areas, roots lifting due to frost are also noticed. However, snow is very helpful for augmenting ground water and is also utilized by the plants.ung plants are observed during this period.

1.6 Water Supply

Pabbar is the main river of the area and all its tributaries and streams are snowfed and perennial. The origin of the Pabbar is from the glacial lake and snow from Chandernahan in Khashdhar Range. The major tributaries of Pabbar river include Rupin, Shupin which meets the Pabbar at Tiuni in Uttarakhand boundary, Dogra Khad which descends from Nawar Valley in Tikker Range meeting the Pabbar at Patsari, Bishkalti Khad which descends from Kharapathar and meets with Pabbar at Pharat near Hatkoti.

There are numerous springs, streams and other natural source of water in the tract and no scarcity of water. Water supply is ample due to the continuous vast stretches of forests except in localities denuded of vegetation. The map of water sources, streams and other water channels in the region is shown in the map below.



Map 1.3: Drainage Network Map of Rohru Forest Division

Horticulture lands are mostly rain fed. The Jal Shakti Vibhag is operating a variety of Water Supply schemes, lift irrigation schemes and flow irrigation schemes throughout the tract utilizing water from Pabbar river, Perrinial and non perineal streams the comprehensive detail of which is given in volume II of this plan as Appendix –XXVIII.

Chapter -2

MAINTENANCE/INCREASE IN THE EXTENT OF FOREST AND TREE COVER

2.1 Area of forests under different legal classes

Sl No	Type of forest	Number of Forests as per Ajay Srivastava's Working Plan	Number of Forests as on date	Total area as per working plan of Ajay Srivastava (in Ha)	Total Area as on date (In Ha)	Percent age of total area
1	Reserve Forest	4	3	263	201.91	0.15
2	Demarcated Protected Forests	329	443	24934	49219.73	35.87
3	Un-demarcated Protected Forests	288	187	51708	28419.26	23.29
4	Alpine Pasture			38670	38670	29.83
5	Panwis	160	173	27848	14058	10.84

Table 2.1: Legal classification of area under Rohru Forest Division

It is pertinent to mention here that a total of 125 DPFs were notified after the period of previous working plan. As a result of which, an additional forest area of 25322.11 Ha came into demarcated protected forests. An area of 356.77 ha. was transferred to Theog Divison and 585.98 Ha. area transferred to Talra Wildlife Sanctuary respectively. Consequentially, a total of 49219.73 Ha area of 443 forests in the tract stands notified as demarcated protected forests after issue of final notification. A total of 187 forests still fall in undemarcated category extending to 28419.26 Ha. which requires to be settled after completing process of rights inquiry and issue of final notification. The complete detail of legal classification of forests under different categories is annexed as Appendix-I in Volume-II of this Working Plan.

With regard to Panwis, they were identified and delineated across the tract through field verification, ground truthing and satalite image analysis. It was

observed that in comparison to previous Plan the total area of panwis extends to 14,058 ha. instead of 27,848.06 ha.

List of Newly Notified DPFs in Tract

Sr No.	Name of Range	Name of Forests	Area in Hectares	HP Notification No.	Notification Date
1.	Dodra Kawar	Dodwaltigad	222.8883	FFE-B-F(14)-171/2014	04-11-2018
2.		Tangankhai	167.906		
3.		Manjhiwan	541.9602		
4.		Amrich gad	1236.7558		
5.		Moryantu	293.0856		
6.		Kai Baltu	194.3116		
7.		Moti Dhar	20.6754		
8.		Nirgani Gad	44.4288		
9.		Radkithui	244.7236		
10.		Kala Pani	212.5506		
11.		Kandarthach Gad	45.9708		
12.		Jakha	41.516		
13.		Pandar	251.6738		
14.		Kalyan thach	21.5942		
15.		Khaitu tach	352.285		
16.		Dodu	391.2268		
17.		Miyan	119.8779		
18.		Kawar III	42.4464		
19.		Butari Gad	198.5836		
20.		Gajyani thach	566.5988		
21.		Bhajor gad	628.1002		
22.		Pawa	122.6508		
23.		Pisar gad	813.8272		
24.		Kharshuwala	126.7854		
25.		Jawan gad	507.8456	FFE-B-F(14)-2/2021	07-01-2021

26.	Khashdhar	Pokhar	63.8842	FFE-B-F(14)-196/2014	29-01-2018
27.		Pokhtu thach	527.5845		
28.		Charagli	15.4631		
29.		BeliMel	42.0062		
30.		Moila	19.3383		
31.		Chuhagad	482.0299		
32.		Jangla	11.4348		
33.		Kunjwani	2.5826		
34.		Gaonsari	2.842		
35.		Bosari	1.6513		
36.		Dhagoli	1.9659	FFE-B-F(14)-207/2014	29/01/2018
37.		Nandla	67.8908		
38.		Banoti Urdu	686.8981		
39.		Shangli- I	7.6022		
40.		Kolsa	45.9016		
41.		Diyar thach	2121.7876		
42.		Chiwari	2.01		
43.		Goskwari	285.1943		
44.		Ghorikoti	546.8318		
45.		Gawas	919.6383		
46.		Kaloti	3.1921		
47.		Jhatwari	1.0966		
48.		Varshil	163.8682	FFE-B-F(14)-86/2020	23-09-2020
49.		Khabal	93.745		
50.		Dogda	26.8582		
51.		Jatata	5.8798		
52.		Dhak	79.7393		
53.		Damrera	708.2163		
54.		Mathla	336.0374		
55.		Sharoli	28.4056		
56.		Dalli	32.1212		
57.		Satyani	120.9666		
58.		Darigad	54.889		
59.		Chirgaon	32.8574		

60.	Mandli	88.6054		
61.	Devidhar-II	185.5911		
62.	Dev van	352.6818		
63.	Jailot	31.1222		
64.	Telga I	15.4917		
65.	Sharali	31.3635		
66.	Snadasu- I	13.9747		
67.	Sandasu-II	32.4047		
68.	Nalti thach	1369.9937		
69.	Thati dhar	104.525		
70.	Raktugar	481.1626		
71.	Koti	5.1128		
72.	Denvari	15.6859		
73.	Lambathach	185.345		
74.	Kshouli dhar	182.2424		
75.	Dali dhar	32.2574		
76.	Peshku khech	75.4053		
77.	Topi dhar	190.0996		
78.	Jina power	690.2778		
79.	Belimel dhar	604.299		
80.	Katal Gad	539.21		
81.	Ghat Dhar	273.2465		
82.	Kutra -II	30.9312		
83.	Dasoti	6.286		
84.	Tangnu	44.102		
85.	Douljan	28.3912		
86.	Rikhran	36.5585		
87.	Sundha Bhaura	36.1059		
88.	Diudi	78.288		
89.	Karkot Tibba	552.2722		
90.	Larot- I	45.8025		
91.	Larot- II	119.0693		
92.	Baghi	73.9351		
93.	Maghyari	325.3116		
94.	Jhajwani	257.7454		
95.	Janglikh	1599.79		
96.	Kutra- I	299.5724		

97.	Tikkar	Dogra	4.3087		
98.		Shalni Ganasi	102.7083		
99.		Naldi gad	1.3666		
100.		Dador gad	7.5495		
101.		Bara	153.0573		
102.		Soldu gad	112.2262		
103.	Saraswati Nagar	Malog I	76.271	FFE-B-F(14) -170/2014	02-02-2019
104.		Dharmana	40.4001		
105.		Dhiyan	28.5829		
106.		Malog II	47.2111		
107.		Kuddu	28.1217		
108.		Kharshal	153.0269		
109.		Jhalta I	17.7714		
110.		Khouni	12.5508		
111.	Jubbal	Kyari	6.8747		
112.		Giri II	20.7584		
113.		Kohlara	21.2754		
114.		Jharag	11.8141		
115.		Shari	6.6241		
116.		Ori	113.5748		
117.		Sanaba	54.1158		
118.		Sundli	11.7634		
119.	Saraswati Nagar	Kawalta	33.0827	FFE-B-F(14) -254/2014	07-04-2019
120.		Shiroli I	87.2863	FFE-B-F(14) -87/2020	23-09-2020
121.		Shiroli II	13.9429		
122.		Shiroli III	91.4854		
123.		Shiroli IV	8.1052		
124.		Shiroli V	8.3731		
125.		Shiroli VI	60.9577		

Table 2.2: List of Newly Notified Forests under Rohru Forest Division

It is pertinent to note that the area of Panwis is reduced in the revised working plan due to the fact that some area of Panwis are now falling in UPF and newly notified DPFs. Considering these are already part of different

forest categories, these panwis are now omitted from the list to prevent duplication and clearly arrive at the total forest area in the tract. Further, in some cases, the list of panwis on conducting field truthing was noted to have lesser area which was verified through satellite image also. Accordingly, the revised list of panwis is tabulated below:

Khashdhar Range					
Sr.No.	Range	Name of Panwi	Geo Coordinates (Centre Point of Panwi)	Area (in Ha.)	Area in previous WP (in Ha.)
1	Khashdhar	Tului,Dhank	31°15'18.65"N 77°56'35.94"E	63	50.59
2		Mishni,Sheethra upto Katoch Dhank	31°14'27.68"N 77°54'34.39"E	75	101.17
3		Phundiani,Dhimi Dhank	31°15'29.57"N 77°57'55.58"E	325	101.17
4		Bara Panoo	31°16'11.78"N 77°52'46.36"E	75	80.94
5		Jabbal &Khatholigad	31°18'42.66"N 77°53'18.75"E	25	15.44
6		Kasholi Panoo	31°14'21.66"N 77°53'08.92"E	250	40.47
7		Baghi Panoo	31°15'35.32"N 77°52'54.16"E	88	60.70
8		Sawni	31.2349259N 77.8513951E	500	141.64
9		Chanti Panoo	31.2372685N 77.8736119E	43	80.94
10		Garbu and Panwi	31.3001386N 77.8685640E	475	202.34
11		Pottuki Dhar	31.208747N 77.807733E	313	161.87
12		Anchishala	31.183702N 77.825098E	50	40.47
13		Jakhlinu	31.201420N 77.840902E	50	101.17
14		Tolga	31.201523N 77.826049E	3	80.94
15		Dhantaty	31.206798N 77.832368E	38	80.84
16		Topi tir okheti	31.174006N 77.839021E	50	40.47

17		Khashdhar Panwi	31°12'55"N 77°52'30"E	13	80.94
18		Pamshlu	31°12'13"N 77°51'25"E	15	20.24
19		Telga Khun Sandara	31°13'28"N 77°54'09"E	8	101.17
20		Gumausu	31°14'11.4"N 77°54'50.4"E	15	80.94
21		Sawani	31°13'27.24"N 77°50'28.07"E	313	141. 64
22		Udru	31°18'18.87"N 77°48'15.96"E	88	40.47
23		Jalwari 1	31.249954° 77.808154°	50	Not mentioned
24	Khashdhar	Jalwari 2	31.240725° 77.812855°	44	Not mentioned
25		Jalwari 3	31.266761° 77.808551°	13	Not mentioned
26		Jalwari 4	31.221413° 77.825131°	13	Not mentioned
27		Banoti 1	31.286907° 77.789743°	50	Not mentioned
28		Banoti 2	31.294219° 77.795103°	25	Not mentioned
29		Banoti 3	31.302222° 77.783339°	19	Not mentioned
30		Banoti 4	31.308357° 77.790216°	13	Not mentioned
31		Todsa 1	31.277964° 77.838670°	56	Not mentioned
32		Todsa 2	31.241045° 77.835488°	38	Not mentioned
33		Jakhnoti 1	31.235033° 77.863403°	150	Not mentioned
34		Jakhnoti 2	31.287734° 77.850728°	75	Not mentioned
35		Jakhnoti 3	31.297979° 77.865842°	63	Not mentioned

36		Jakhnoti 4	31.301760° 77.880216°	13	Not mentioned
37		Jakhnoti 5	31.324633° 77.883888°	25	Not mentioned
38		Jakhnoti 6	31.330964° 77.880803°	13	Not mentioned
39		Chirgaon 1	31.241460° 77.889174°	75	Not mentioned
40		Sindasli 1	31.242557° 77.898650°	50	Not mentioned
41		Sindasli 2	31.244578° 77.902791°	15	Not mentioned
42		Sindasli 3	31.240888° 77.909853°	44	Not mentioned
43		sindasli 4	31.248551° 77.919832°	94	Not mentioned
44		Sindasli 5	31.255361° 77.941854°	88	Not mentioned
45		sindasli 6	31.258859° 77.956036°	44	Not mentioned
46		Diudi 1	31.256295° 77.966773°	188	Not mentioned
47		Diudi 2	31.268898° 77.997710°	25	Not mentioned
48		Khashdhar	31.210362° 77.877265°	13	Not mentioned
49		Dalli	31.208963° 77.845115°	6	Not mentioned
50		Diswani 1	31.202016° 77.814898°	25	Not mentioned
				4191	
Rohru Range					
Sr.No.	Range	Name of Panwi	Geo Coordinates(Centre Point of Panwi)	Area (in Ha.)	Area in previous WP
1		Jhorla Panwi	31°15'01"N 77°45'31"E	150	80.94

2		Kutu Panwi	31°13'38"N 77°45'34"E	313	173
3		Mawi Panwi	31°14'22"N 77°46'54"E	649	518
4		Kothil Panwi	31°14'12"N 77°44'10"E	38	80.94
5		Buthara Kupa Ponoo Sortand	31°15'05"N 77°45'04"E	75	80.94
6		Hati Panwi	31°16'05"N 77°44'13"E	38	50.70
7		Samthi	31°15'41"N 77°45'17"E	233.8	40.47
8		Sathali	31°15'44"N 77°44'43"E	63	40.47
9		Lamma andBulta	31°17'09"N 77°44'33"E	25	0.94
10		Bammala and Dalgaon	31°14'32"N 77°43'50"E	43	80.94
12		Sara Panwi	31°31'47.23"N 77°68'03.69"E	150	40.47
13		Sanal Panwi	31°15'02"N 77°40'15"E	25	Not mentioned
14		Khilargi (Mardi)	31°15'12"N 77°42'59"E	75	40.47
15		Khilargi (Duna Dhank)	31°26'04.77"N 77°07'18.754"E	13	40.94
16		Khanola(Banri Kar Dhank)	31°16'18"N 77°42'56"E	78	40.47
17		Bari (Mardi)	31°25'25.40"N 77°07'18.860"E	6	40.47
18		Noi (Pandli)	31°14'06"N 77°43'00.6"E	10	20.24
19		Noi (Pattnal Rarralgori Dhank)	31°13'57"N 77°42'31"E	15	40.46
20		Agai	31°10'55.52"N 77°49'00.72"E	5	40.47

21		Pijori Panoo	31°10'48.73"N 77°44'56.55"E	25	101.17
22		Danda& Sackle	31°10'48.88"N 77°44'01.13"E	75	40.47
23		Shilla Panoo	31°10'42.89"N 77°44'00.10"E	50	60.70
24		Bari & Tikuri	31°10'26.27"N 77°45'53.0 0"E	25	80.94
25		Kamli Dhar Panoo	31°09'43.38"N 77°46'24.45"E	325	20.24
26		Thamti & khaljun Panoo	31°10'04.43.38"N 77°46'12.04"E	25	202.34
27		Baggi	31°10'52.51"N 77°46'41.32"E	25	121.40
28		Goripith	31°09'59.94"N 77°43'41.30"E	188	60.80
29		Bahli Panoo	31°11'23.92"N 77°45'14.24"E	75	80.94
30		Khopru Panoo	31°11'32.60"N 77°44'41.96"E	25	80.94
31		Shaddar Panoo	31°11'14.91"N 77°45.06.91"E	20	80.94
32		Chhahal & Khashadhar Panoo	31°11'41.29"N 77°45'00.52"E	13	121.40
33		Kalini Panoo	31°11'58.27"N 77°46'24.04"E	38	121.40
33		Sirman & Koima Panoo	31°11'14.84"N 77°44'01.69"E	65	101.17
34		Sangrot ohar Nagadhar Sharmal & Dol Panoo	31°10'06.99"N 77°44'43.96"E	63	101.17
36		Gauri Panoo	31°10'01.82"N 77°44'20.46"E	30	40.47

37		Dagoli Panoo	31°11'49.88"N 77°46'44.20"E	50	80.94
38		Birhul Panoo	31°11'34.15"N 77°46'48.23"E	25	80.94
39		Lop letee	31°10'35.20"N 77°45'21.45"E	50	40.47
40		Rantari 1	31.224578° 77.763822°	75	Not mentioned
41		Rantari 2	31.217712° 77.770495°	100	Not mentioned
42	Rohru	Dashalni Panwi	31.207079° 77.764088°	19	Not mentioned
43		Samoli Panwi	31.212492° 77.781741°	38	Not mentioned
44		Bijori Panwi	31.216734° 77.784528°	38	Not mentioned
45		Samoli2	31.208412° 77.773682°	13	Not mentioned
46		Rantari 6	31.214805° 77.763980°	13	Not mentioned
47		Parsa	31.190647° 77.754516°	19	Not mentioned
48		Lowerkoti 1	31.175513° 77.745392°	13	Not mentioned
49		Shekhal	31.160953° 77.743295°	63	Not mentioned
50		Sandour dhank and Panwi	31.151562° 77.747925°	75	Not mentioned
51		Lowerkoti 1	31.161744° 77.752345°	50	Not mentioned
				5808	
Bashla Range					
Sr. No.	Range	Name of Panwi	Geo-Coordinates (Centre Point of Panwi)	Area (in Ha.)	

1		Tharoo Panoo	31.189936 N 77.713381E	100	161..87
2		Phatoo Panoo	31.195621 N 77.703031E	13	202.34
3		Manghoo Dhar	31.199339 N 77.698573E	38	823.28
4		Rohal	31.186731 N 77.720779E	88	121.40
5		Patrooni Panoo	31.192045N 77.730773E	38	121.40
6		Guttu ki Dhar	31.193084N 77.732806E	25	202.34
7		Mankla, Belti Suar	31.198369N 77.729360E	50	121.40
8		Bagor ki Dhar	31.199260N 77.736819E	38	60.70
9		Darkoti Dhar	31.156814N 77.728670E	63	40.54
10		Panpanoo	31.170332N 77.703542E	100	60.78
11		Karali Dhank	31.164989N 77.716528E	63	40.47
12		Shagar Panoo	31.178372N 77.705711E	100	40.47
13		Kala Kupa	31.170664N 77.712459E	63	60.70
14		Thinta Ka Dhank	31.176007N 77.718193E	38	40.47
15		Jamraski Panoo		63	161.87
16		Sharog 1	31.188201° 77.685825°	13	Not mentioned
				888	
Jubbal Range					
Sr. No	Name of Range	Name of Panwi	GPS Location	Area (in Ha.)	Area in previous WP
1	Jubbal	Methi, Kalgaon & Ganga Nagar (Bangi Teer)	31°08'19" N77°37'44" E	5	259
2		Kot Dher	31°16'02" N 77°41'20" E	50	40.47

3		Mandhol & Cheewa	31.121320 N 77.694725 E	25	80.94
4		Matasa & Nakroari	31.135882 N 77.742004 E	38	121.41
5		Kala Dhank	31.150766 N 77.709453 E	30	40.47
6		Toni Jathan & Jhorki Dhar	31.134826 N 77.726721 E	163	121.46
7	Jubbal	Naktara Salawkra	31.111176° 77.656969°	31	Not mentioned
8		Kaina	31.122947° 77.678912°	31	Not mentioned
9		astandli	31.119059° 77.696055°	38	Not mentioned
10		Astandli 2	31.120913° 77.714830°	13	Not mentioned
11		Sari	31.125581° 77.724507°	50	Not mentioned
12		Johta	31.137375° 77.722916°	6	Not mentioned
13		thali	31.140861° 77.732507°	13	Not mentioned
14		Sari	31.134407° 77.741430°	13	Not mentioned
15		Badrol mandhol	31.135861° 77.700445°	13	Not mentioned
16		Jharag		13	Not mentioned
17		Shallan		6	Not mentioned
18		Ganganagar		25	Not mentioned
				560	
Tikkar Range					
Sr. No	Name of Range	Name of Panwi	GPS Location	Area (in Ha.)	
1		Dhula Dhank	31°12'94"N, 77°46'68"E	202	80.94

2		Dhale Bathoch	31°14'13"N, 77°37'42"E	152	40.54
3		Chambi + Pannu	31°13'16"N, 77°36'43"E	192	76.99
4		Sharsoo	31°13'38"N, 77°38'22"E	152	60.70
5		Khala Dhank	31°14'01"N, 77°38'20"E	152	60.70
6		Kausar Panu	31°13'66"N, 77°37'09"E	101	Not mentioned
7		Nawaga Panu	31°13'09"N, 77°3	152	Not mentioned
8		Naksetli 1	31.199345° 77.679424°	50	Not mentioned
9		Kuthari	31.244800° 77.629073°	13	Not mentioned
			Total	1165	
S Nagar Range					
Sr. No	Name of Range	Name of Panwi	GPS Location	Area (in Ha.)	
	S Nagar	Mandal 1	31.145436° 77.750827°	25	Not mentioned
1		Hatkoti	31.138586° 77.752949°	19	Not mentioned
2		Mandal 2	31.135297° 77.761075°	188	Not mentioned
3		Mandal 3	31.123586° 77.761340°	25	Not mentioned
4		Mandal 4	31.139310° 77.785084°	13	Not mentioned
5		Mandal 5	31.108168° 77.774715°	13	Not mentioned
6		Mandal 6	31.108248° 77.787677°	50	Not mentioned
7		Mandal 7	31.104688° 77.782613°	50	Not mentioned
8		Mandal 8	31.097562° 77.807381°	50	Not mentioned

9		Mandal 9	31.126048° 77.804952°	63	Not mentioned
10		Kothu Panwi	31.096571° 77.795805°	150	Not mentioned
11		Giltari Panwi	31.109793° 77.816441°	25	Not mentioned
12		Giltari panwi 2	31.114533° 77.819688°	31	Not mentioned
13		Jhalta Panwi	31.087435° 77.825722°	125	Not mentioned
14		Chaunri	31.072089° 77.824594°	50	Not mentioned
15		Dhanser 1	31.083814° 77.831511°	88	Not mentioned
16		Mugra	31.060990° 77.805708°	100	Not mentioned
17		Kuddu	31.089774° 77.794943°	13	Not mentioned
18		Salna 1	31.036045° 77.814198°	88	Not mentioned
19		Salna 2	31.042114° 77.799636°	100	Not mentioned
20		shashan	30.983404° 77.802305°	25	Not mentioned
21		Malog	31.093064° 77.764446°	88	Not mentioned
22		Ghyan Panwi	31.102803° 77.757836°	50	Not mentioned
23		Sawra 1	31.093867° 77.738950°	21	Not mentioned
Sub Total				1446	
Grand Total				14058	

Table 2.3: List of Panwis in Rohru Forest Division

Sr No.	Range	Name of Panwi	Name of Forest	Area in previous WP (in Ha.)
1.	Khashdhar	Bara Panoo	UPF Andhra	80.94
2.		Jabbal &Khatholigad	UPF Jabbal	15.44
3.		Kasholi Panoo	UPF Chirgaon	40.47
4.		Baghi Panoo	UPF Baghi	60.70
5.		Chanti Panoo	UPF Pujarli	80.94
6.		Garbu and Panwi	UPF Goskwari	202.34
7.		Khashdhar Panwi	C.No.74(a) Khashdhar	80.94
8.		Telga Khun Sandara	UPF Telga	101.17
9.		Sawani	UPF Thali	141.64
10.		Udru	UPF udru	40.47
11.	Rohru	Jhorla Panwi	C.No.54a	80.94
12.		Saun Panwi	21b Katmori	121.40
13.		Mawi Panwi	C.No.55a	518.00
14.		Samthi	UPF Kutara	40.47
15.		Lamma andBulta	C.No51a	0.94
16.		Bammala and Dalgaon	UPF Bhamnala	80.94
17.		Noi (Pandli)	UPF Bari	20.24
18.		Noi (Pattnal Rarralgori Dhank)	UPF Bari	40.46
19.		Pijori Panoo	C.No.84 (a)	101.17
20.		Thamti & khaljun Panoo	C.No.84 c(i)	202.34
21.		Baggi	UPF Baggi	121.40
22.	Dodra kawar	Pandhar	Pandar 69 b	20.24
23.		Pandarwala	UPF Paba	80.94
24.		Mangar and Kholi	Pandar 69a	72.84
25.		Rohl Panoo	UPF Rohrl panu	161.94
26.		Kawar Panoo	DPF Dodwaltigad	518.00
27.			Total	3027.30 ha.

Table 2.4: List of Panwis of previous plan currently part of DPF/UPF in the tract

It is submitted that 80 number of new Panwis totalling to an area of 4509 Ha were traced out in the tract as a result of ground trothing and satellite image analysis. Further, it was noticed that there is difference in area of Panwis as reported in previous working plan vis-à-vis the revised panwis identified through field truthing and satellite based analysis. It is noticed that whereas in some cases, there is an increase in area of panwis from previous working plan while in several panwis, the actual area in field is much lesser compared to that

reported in previous plan. In summary, it was noticed that there is a net reduction of 13790.06 Ha of panwi area when it comes to listed Panwis. With respect to range Saraswati Nagar, it was observed that the previous working plan listed total area of 9,806 Ha in the main plan but detailed list of Panwis for the range were completely missing in the appendix. The field truthing in this range alone has led to the actual area of Panwis to be identified as 1446 Ha marking a significant reduction in total Panwi area of the tract. On account of the above mentioned facts, an overall reduction of 13790.06 Ha from previous working plan is reported when it comes to Panwis making a total area of 14,058 Ha instead of 27,848.06 Ha which was reported in previous working plan. Considering this represents the actual situation in field as on date, the revised area and list of Panwis as mentioned above is taken into account for management of the tract.

Apart from the legal classification, it is also to be noted that the tract covered by this plan of 130569.241 Ha constitutes close to 76.5 % of the total geographic area of the division 1,70,705.91 Ha which includes all types of land including private land, government common land and land owned by public sector institutions. This highlights that majority portion of the geographic area is forest land clearly elucidating the significant dependence on forest land for the local population.

2.1.1 Distribution of area:

The total area of the tract i.e. 130569.241 Ha comprises seven territorial ranges namely Rohru, Bashla, Tikkar, Saraswatinagar, DodraKwar, Khashdhar and Jubbal. All the forests and waste land were declared as protected forests by the Himachal Pradesh Government vide Notification No. Ft. 29-241/49 dated Shimla-4, the 25th February, 1952. Subsequently, the Government through notification No. Ft. 774-1/63 (M) dated 24-2-1964 ordered that these forests be demarcated, and surveyed, and rights be determined. At present, undemarcated protected forests, throughout the tract, have not defined boundaries on the grounds.

Thus, the Himachal Pradesh Government declared, in general, all such lands as 'Protected Forests' vide notification dated 25th February, 1952. All trees are declared to be reserved in these forests under Section 30 (a) of IFA, 1927 w.e.f. 1st January, 1964, vide Himachal Pradesh Government notification No. Ft. 29-24-BB/49 dated 13-11-1963. This general notification of the protected forests is of great legal significance for the authorities engaged in the task of forest management. The individual forests under this category have, however, got to be defined and notified under the provision of chapter-IV of Indian Forest

Act, 1927. The rules for these forests are also to be prepared and notified under the said chapter for the Act. Record of rights admitted in these forests is to be prepared and notified under the Act and also, to be notified in the official gazette. The State of affairs being as it is at present, any system of scientific management applied to these forests, is deemed to be confronted with legal complications of a serious nature.

Vide Pr. CCF, HP Memo No. Ft. 48-66/83 (FCA) dated 20.04.2010 and the Supreme Court's order dated 12-12-1996, Forest (Conservation) Act, 1980 is applicable on all such lands in State of Himachal Pradesh, except on vested land under the H.P. Village Common Lands (Vesting and Utilization) Act, 1974 and H.P. Ceiling on Land Holding Act, 1972, as per H.P. Govt. Notification dated 21-4-2006. In ***T.N. Godavarman V/s Union of India, WP(C) No. 202/95 dated 12-12-1996***, the Hon'ble Supreme Court held that the Forest (Conservation) Act, 1980, must apply to all forests, irrespective, of the nature of ownership and classification of land thereof and it was, further, held that the word "Forest" must be understood according to its dictionary meaning. This description covers all statutory recognized forests, whether designated as reserved, protected forests or otherwise for the purpose of Section 2 (i) of the Forest (Conservation) Act, 1980. The terms of "Forest" shall not be applicable to the plantation raised on private lands, except notified private forest. However, felling of trees in these private plantations shall be governed by the HP Land Preservation Act, 1978.

The legal classifications of forest land covered by this tract are hence multifold. In summary, it can be inferred that miniscule portion of the tract is Reserve Forest, whereas a significant portion is protected forests with a substantial portion of it being undemarcated elucidating the need for demarcation and subsequent notification. In addition to these forests legally notified, there exists waste lands which have been deemed to be protected forests under Indian Forest Act and also compact wooded block forest lands with dictionary meaning of forests as outlined by Honourable Supreme Court in T.N.Godavarman case. It is to be mentioned that although the formal legal classifications are clearly defined and delineated, such a delineation on field does not exist for the latter classes of forests coming under waste land and dictionary definition category.

2.2 Forest Area under Different Working Circle

The following table summarizes the range wise forest areas in the division:

Range	RF (in Ha.)	DPF (in Ha.)	UPF (in Ha.)	Alpine Pasture (in Ha.)	Panwis (in Ha.)
Rohru	0	4042.2249	3713.02	13263	5808
Khashdar	0	18036.794	14056.36	6601	4191
Bashla	0	1427.1	1081.46	0	888
DodraKawar	0	9844.9489	2981.03	18806	0
Tikkar	0	2222.7266	2285.5639	0	1165
Jubbal	0	4393.8307	1620.093	0	560
Sarswatinagar	201.91	925 2.1092	2681.739	0	1446
Total	201.91	49219.7338	28419.2672	38670.33	14058
Grand Total	130569.241				

Table 2.5: Range wise Forest area of Rohru Forest Divison

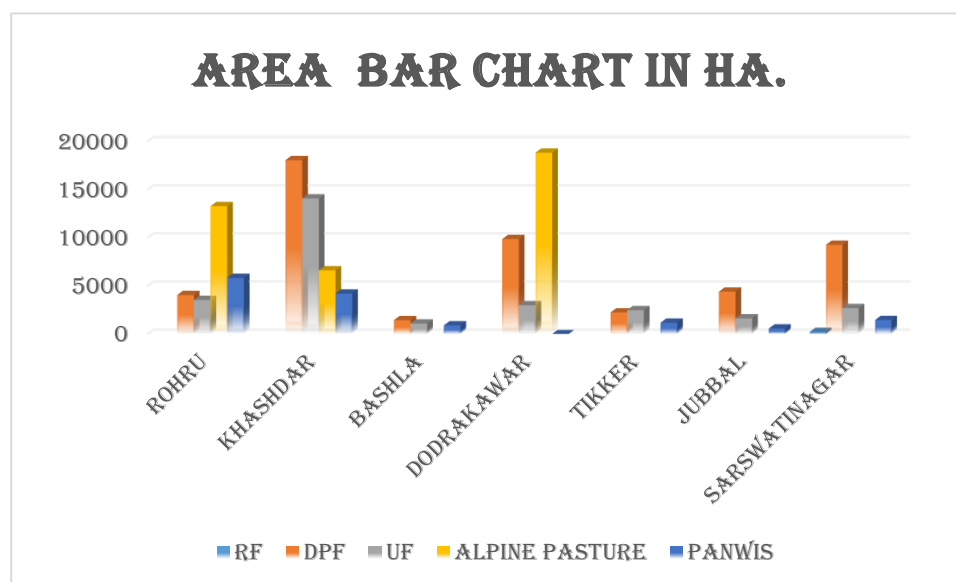
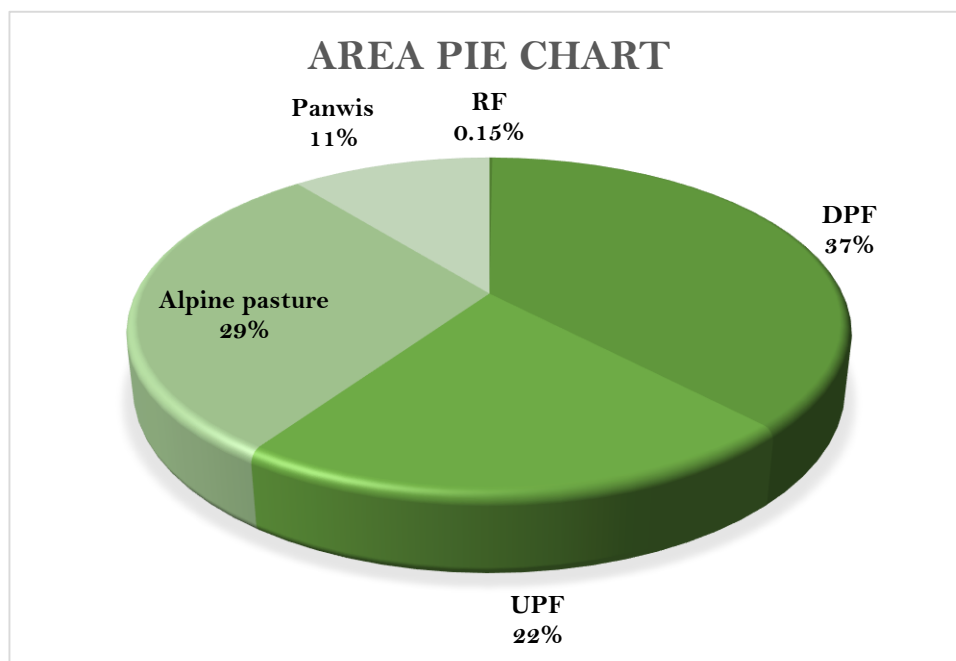


Figure 2.1 Area Chart of the tract

Percentage with respect to total forest area is as under:

RF	DPF	UPF	Alpine Pasture	Panwis
0.15	37.70	21.77	29.62	10.77

Table 2.6: Legal Category wise Percentage of total forest area of Rohru Forest Divison



In Ajay Srivastava's working plan, 7 working circles were chosen and prescribed on the basis of forest type, crop composition and management aspects. The following table summarizes the working circles and indicates the total area prescribed against each working circle:

Sl. No	Working Circle
1	Deodar-kail Working Circle (12100.82 ha)
2	Fir –Spruce Working Circle (16451.09ha)
3	Chil Working Circle (1137.33 ha)

4	Plantation working Circle (4949.68 ha)
5	Protection cum Rehabilitation (overlapping) Working Circle (110899.75 Ha.)
6	Wild life (Overlapping) Working circle
7	Grazing Overlapping Working Circle.

Table 2.7: List of Working Circles in Ajay Srivastava's Working Plan

It is clear from the above composition of working circles that substantial importance was given to Protection cum Rehabilitation Working Circle with 110899.75 Ha i.e. close to 77 % of the entire tract being put in for protection and rehabilitation. Hence, the major focus of the previous working plan is clear that it was for forest protection rather than commercial extraction which was prescribed in less than 20% area of the tract. A significant reason for this is also the presence of large patches of alpine pastures and panwis with no timber meaning the entire portion of these forest patches were put in for protection and rehabilitation.

2.3 PERCENTAGE OF FORESTS WITH SECURED BOUNDARIES

The boundary position of the forests of Rohru Forest Division are highly vulnerable and forms the single most important point for any manager taking over the reins of the forest division. Large number of boundary pillars are either missing or need maintenance. The matter of boundary pillar construction and maintenance has been constantly ignored throughout the period of previous plans rendering the current precarious situation of forests being vulnerable to encroachments.

The DPFs as the name suggests are comparatively better off with boundary pillars present in few forests indicating the delineations whereas outer-boundary of most of the un-demarcated protected forests are formed by prominent ridges, spurs and nallas and where such natural feature did not exist, and the boundary have been laid by coal tar or by double blazed rings on the boundary trees at suitable interval. The UPFs have been affected by nautores and encroachments. Even DPFs are having large number of boundary pillars which are missing or in need of major repair. The boundary pillar

registers are maintained at Range Offices but they also lack updated information especially regarding the geo coordinates. These registers needs to be properly updated with all details regarding description of location, geo coordinates, forward and backward bearings of BPs.

The complete detail of boundary pillars of the division is given in the Appendix- XI in volume-II of this plan. The abstract details of boundary pillars are as given below:

Sl.No.	Name of Forest Range	Total Existing Pillars in Good Conditions	Total Pillars Missing	Total Pillars in Need of Repair
1	Rohru	6	61	754
2	Jubbal	23	16	866
3	Bashla	0	55	494
4	Tikkar	3	20	521
5	Khashdhar	88	25	610
6	Saraswati Nagar	13	24	218
7	Dodra Kavar	4	11	54

Table 2.8: Detail of Boundary Pillars of Rohru Forest Division

Detail of Boundary Pillars of Rohru Forest Division

Sr. No.	Range Name	Forest Name	Number of Boundary Pillar Constructed	Number of BP repaired
1	Khashadhar	C.No.72aKharshali	12	12
		C.No.72b-1 Gumma	07	
		C.No.66a Sindasli	08	
		C.No.66b Gokaswari	08	
2	Dodra Kwar	C.No. 69 b Pandar	04	Nil
3	Bashla	Nil	Nil	Nil
4	Jubbal	DPF Jachli	6	Nil
		DPF GIri 4b	04	
		DPF Giri 4a	06	
		Kadol 19a	4	
		Mandhol 18a	2	
		Nahal 12	7	
		Matil 15a	6	
		Sheel 14c	4	
5	Tikkar	C.No -6 b Tikkar	02	Nil

6	Rorhu	C.No. 84 a parsa	03	
		C. No. 85 a shakhal	03	
		C.No. 84 b lowerkoti	09	
		C.No. 39	11	
		C.No. 40(b)	01	
		C.No.52 b	04	
		C.No. 37(a)	01	
		C.No. 37(d)	01	
		C.No.52a Dalgaon	03	
7	Saraswati Nagar	Jond C No 1	07	Nil
		DPF Naliban	04	4
		C No1 Chhajpur	06	Nil
		C No 2a Chhajpur	02	Nil
		C No 3 Chhajpur	02	Nil
		C No 13 b Chhapur	05	Nil

Table 2.9: Detail of new boundary pillar constructed/ repaired

2.4 Land Use Land Use Change and Forestry (LULUCF)

There has been a massive land use change over the years of the previous plans with large tracts of forest land diverted for non-forest purposes under Forest Conservation Act, 1980 (now Van Sanrakshan Evam Van Samvardhan Adhiniyam) and Forests Rights Act, 2006 Section 3(2). A total of **119.4077** Ha of land has been diverted under FCA, 1980 for non-forest purpose in the division after the inception of the act. Similarly, there has been a huge pressure on forest land diversions under Section 3(2) of Forest Rights Act in which a total area of **211.3035** Ha across the years has been diverted for non-forest purpose. Among

the 13 essential activities allowed under FRA, roads have accounted for more than 90% of the diversions severely fragmenting forests. The detail of forest diversions under both FCA and FRA are tabulated in the tables below:

Sl.No.	Year	Number of Cases approved under FCA	Total Area Diverted (in Ha)
1	2015	7	7.1966
2	2016	5	8.319
3	2017	2	54.8114
4	2018	4	7.9242
5	2019	2	6.3538
6	2021	2	27.3807
7	2022	1	1.7193
8	2023	1	5.7027
9	2024	0	0
		Total	119.4077 Ha.

Table 2.10: Detail of FCA cases processed for Rohru Forest Division

Sr.No.	Year of Sanction	Type of Project as per Section 3(2)	Number of Cases	Total Area Diverted (in Ha)
1	2016	Community Center	2	0.0617
		Hospital/PHC	3	0.5120
		Road	46	20.8309
2	2017	Anganbari	2	0.0210
		Community Centers	3	0.0825
		Hospitals	5	0.1799
		Road	124	65.1494
		School	6	0.2694
		Skill Up gradation	1	0.8321
3	2018	Community Center	5	0.3746
		Rain Water Harvesting Structure	1	0.0494
		Road	56	27.6128
		Skill	2	0.5145
4	2019	Road	18	7.4334

5	2020	-	-	-
6	2021	Road	11	5.0936
7	2022	Community centers	1	0.0374
		LWSS	3	0.1282
		Hospital	1	0.0523
		Road	47	21.3968
		School	2	0.3744
		Skill Up gradation	1	0.7736
		Telecommunication Line	1	0.0600
8	2023	Community Center	8	0.5216
		Hospital	3	0.2047
		Road	63	26.1118
		School	3	0.8976
		Telecommunication Line	9	0.3557
		Water Tank	1	0.2324
9	2024	Community Center	1	0.038

		Hospital/PHC	3	0.1661
		LWSS	2	0.0474
		Road	54	22.4952
10	2025	Community Centers	1	0.1058
		Road	15	8.2873
		Total	504	211

Table 2.11: Detail of Forest Diversions under FRA

Apart from this, the issue of encroachment has been Achilles heel of this forest division with large patches of forest land being encroached by orchardists for raising fruit crops. The detail of all such encroachment cases in the division have been updated in the MoFEES portal. The cases of encroachment are being dealt with as per the provisions of Himachal Pradesh Public Premises and Land (Eviction & Rent Recovery) Act, 1971 in which DFOs have been provided with powers of Collector Court. A total of **2479** number of cases of encroachments have been detected in division in which a total of **957.1341**Ha area was detected encroached. Eviction orders have been issued in **2454** cases totaling to **945.2330** Ha area by DFO cum Collector court. The detail of all such cases which have been decided by DFO cum collector court is given in the Appendix-XIV in Volume-II of this plan.

The Honourable High Court is also hearing the case of encroachment through Civil Writ Petition CWP No.1093/2016 in which many CWPs/ CMPs are tagged and heard in tandem. The Honourable High Court in this case had directed the formation of an SIT empowering it to identify encroachments, take spot action for eviction and fell down fruit trees in encroached land. Later on, the Honourable High Court of Himachal Pradesh made interim verdicts providing a maximum of 5 bighas land to be retained by encroacher subject to fact that the total land owned by the encroacher is not more than 10 bighas. Further, the high court has also stayed the felling of fruit trees on encroached forest land even in case of eviction. However, in the year 2025, Honourable High Court of Himachal Pradesh has amended both of these orders in which the ban

on felling of fruit trees was lifted and eviction was ordered irrespective of land holding size. However, the Honourable Supreme Court has thereafter prohibited the felling of fruit trees on evicted forest lands in an interim stay order. Such Judicial interventions and pendency of cases have adversely affected the action against encroachment and law enforcement preventing the forest department from retaining lost forest land and encroachers continuing to benefit from the leeway provided by the verdict. The stay on felling of fruit trees render the evicted parcels of land further vulnerable to re encroachment and also prevents meaningful scientific management of forests.

The detail of encroachment cases summarized for the division is tabulated below:

Sr.No.	Total Number of Cases detected in Division	Total Area of Encroachment Cases (in Ha.)	Total Area in which Eviction orders are passed (In ha.)	Total Area Evicted as per HP Public Premises Act (in Ha.)	Total Area Retained with offender in accordance with Honourable High Court Directions (in ha.)	Total Not evicted cases	Area Not Evicted (in ha.)	Total Cases under Trial in DFO cum Collector Court
1	2479	957.1341	945.2330	662.5075	12.0098	935	228.5357	21

Table 2.12: Detail of Encroachment Cases

There are large number of encroachment cases decided by DFO cum Collector court in which the alleged encroacher also prefer appeal to higher courts i.e. the Divisional Commissioner and then at the High Court. Even in cases where final eviction orders are issued, a large number of orders are yet to be implemented at field by Range Forest Officers severely pulling back the efficacy of the court. The detail of all such cases in which eviction orders are yet to be implemented by RFOs are given in the Appendix-XIV to this document.

The detail of encroachments evicted, retained temporarily and where felling has been carried out is given in the table below:

Sr. No.	Name of Forest Range	Name of the Forest	Number of Cases Detected	Total Area in which final eviction orders passed not pending appeal in Higher Courts (in Ha.)	Total Area Evicted as per Range Officers Report (in Ha)	Total Area pending for eviction in field (in Ha.)	Area Retained as per Honourable HC directions(in Ha.)
1	Bashla	C.No.35b Barara	5	0.7565	0.5247	0.1818	0.4282
2		BararaPanu	1	1.3178	1.3178	-	-
3		UPF Bahali	2	2.4857	2.4857	-	2.4857
4		Palkan Panwi	6	1.4693	1.3913	0.078	-
5		Banchuna Panwi	5	1.9302	1.9302	-	-
6		UPF -12 ferly	30	24.5957	22.1834	2.4123	15.1039

7		Karasa Shamlat	3	2.8970	-	2.8970	-
8		Rohal Panu	1	0.2119	-	0.2119	-
9		Gangtoli Panwi	1	1.8767	1.8767	-	1.8767
10		UPF Antapu	3	3.675	3.675	-	3.675
11		UPF Kanda	6	4.6225	4.6225	-	4.6225
12		NAC Gantoli	2	0.3555	-0.3555	-	-
13		C.No.32b	2	1.01	0.76	0.25	-
14		C.No.32a	27	4.4372	3.4921	0.9451	3.4849

15		UPF-11	16	10.0019	8.5387	1.4632	8.273
16		C.No.31a (i)	22	5.363	5.5472	1.8158	2.3914
17		C.No.31 b Koti	22	6.0296	5.9868	0.0428	5.6204
18		C.No.31a (iv)	1	0.0565	-	0.0565	-
19		C.No.31a (v)	5	1.4936	1.0829	0.4107	0.648
20		C.No.31a (iii)	3	0.0436	-	0.0436	-
21		DPF Bashla	1	0.5498	-	0.5498	-
22		UPF-9	12	11.6692	7.4091	4.2601	6.2091

23		DPF Malkhoon	3	3.4088	-	3.4088	-
24		UPF Mundiban	5	0.4346	0.2933	0.1413	-
25		C.No.30 d	2	0.3098	-	0.3098	-
26		C.No 30 c (i)	1	0.0868	-	0.3098	-
27		DPF Bhalara	2	0.2342	0.1330	0.1012	-
28		C.No.30 b	1	0.162	-	0162	-
29		C.No.30 b (i)	2	0.2733	0.2733	-	-
30		C.No. 29 d	1	0.152	-	0.152	-

31		C.No. 29 c	5	1.3389	0.7869	0.5552	0.7833
32		UPF -8	66	24.3234	19.4854	4.838	12.129
33		C.No.28 b	9	2.3202	2.0679	0.2523	-
34		C.No.29 a	13	3.0199	3.0199	-	0.9903
35		UPF Rehri	8	0.9599	0.7257	0.2342	-
36		C.No. 28 a	5	0.9599	0.7257	0.2342	-
37		C.No.41 c	18	4.9786	3.3487	1.6299	2.1072
38		DPF Kewli	7	1.1182	-	1.1182	-

39		C.No.41b	7	0.7097	-	0.7097	-
40		UPF Pekhadhar	1	0.2439	-	0.2439	-
41		C.No.41 a	1	0.2494	-	0.2394	-
42	Dodra Kwar	UPF Kawari& ii	9	12.0755	12.0755	-	-
43		UPF Raigad	2	2.1244	2.1244	-	-
44		UPF Dodu	2	1.1717	1.1717	-	-
45		UPF Paba	2	1.737	1.737	-	-
46	Jubbal	C.No. 11 Kalgaoon	13	4.6263	2.22836	1.7427	-

47		C.No.18a Mandhal	24	8.2661	4.6437	3.6224	-
48		C.No.18b Sari	23	3.7113	1.4690	2.2223	-
49		C.No.19a Jharag	17	3.1562	3.1562	-	-
50		C.No.19b Jharag	20	1.4872	1.2894	0.1978	-
51		C.No.17 Baral	1	1.8111	-	1.8111	-
52		C.No.13a &13b Ganga Nagar	2	0.2210	-	0.2210	-
53		C.No.12 Nahal	2	0.2090	-	0.2090	-
54		C.No. 14c Sheel	4	0.9585	0.7675	0.1910	-

55		DPF Giri 1a	7	6.6763	4.4795	2.1968	-
56		UPF Badhal	20	36.7477	17.5915	19.1562	-
57		UPF Chunjar	18	21.2455	17.1574	4.0881	-
58		UPF KalgaonTeer	8	70.7841	70.7841	70.7841	-
59		UPF Kalontha	1	0.9018	0.9018	-	-
60		UPF Kohlara	47.739 5	7.7395	7.7395	-	-
61		UPF Sanaba	17	13.1071	12.2006	0.9065	-
62		UPF Sundli	1	0.8319	0.8319	-	-

63		UPF Deem	11	4.2558	3.6558	0.6000	-
64		UPF Jachli	9	7.2745	4.9204	2.3541	-
65		UPF Mural	2	1.6724	1.6724	-	-
66		UPF Ori	10	8.5755	6.3585	2.2170	
67		Orthers	180	83.0343	65.5799	17.4544	-
68	Rohru	C.No.85	3	1.0258	0.6498	0.376	-
69		UPF Dhara	13	8.086	6.9669	1.128	3.8648
70		UPF Parsa	2	1.5667	1.5667		0.7731

71		C.No.84 b	4	3.4355	2.3067	1.128	1.6129
72		UPF Munakdhar	1	5.1052	3.2302	1.88	-
73		UPF LowerKot	3	1.9594	1.2774	0.752	0.1481
74		UPF Diyari	1	2.8712	2.8712	2.8712	2.8712
75		UPF Baggi	3	1.4891	0.3631	1.128	-
76		C.No.82 a	10	4.8435	4.0915	0.752	2.9444
77		C.No.82b	1	0.1811	0.1811	-	0.1811
78		C.No.83a	5	0.8521	0.8521	-	0.8521

79		C.No.83c(ii)	2	0.94	0.94	-	0.94
80		UPF Baggi	1	0.4008	0.4008	-	0.4008
81		C.No.83 b(iii)	8	2.2957	2.2957	-	2.2033
82		DPF Nirja	4	3.0503	2.2983	0.752	2.2983
83		UPF Jhatwari	1	1.0575	1.0575	-	1.0575
84		C.No.83 b	1	0.1635	0.1635	-	0.1635
85		C.No.83 b(ii)	1	1.2306	1.2306	-	1.2306
86		C.No.83 b(i)	2	0.2822	0.2822		0.2822

87		C.No.83cii)	1	0.5486	0.1726	0.376	0.1726
88		UPF Sanji	1	0.4854	0.1049	0.376	-
89		C.No.52 b	2	0.5863	0.5863	-	-
90		UPF18	9	48.1789	4.998	1.2346	5.0105
91		C.No.51 a(i) Brethle	13	10.0889	10.0803	0.752	7.0253
92		UPF jakhar	1	1.7493	0.9973	0.752	0.9154
93		UPF Bari Nalla	1	0.9193	0.9193	-	0.9193
94		UPF Bhamnala	2	2.0633	2.0633	-	2.0633

95		UPF 19	1	1.5415	1.5415	-	1.5415
96		UPF Kurki	1	1.5956	1.5956	-	-
97		UPF Kashkandi	13	7.3041	5.8001	0.752	4.2761
98		UPF Kutara	8	11.432	10.6562	0.752	5.6314
99		UPF BauliNala	2	1.605	1.605		1.605
100		UPF17	13	3.548	2.5814		2.2335
101		C.No.53 a	1	0.4	0.024	0.376	0.024
102		UPF Katmori	24	10.3655	9.9895	0.376	8.1324

103		UPF Kutu Parnw	13	8.7697	7.0731		3.008
104		UPF 21	1	2.1686	1.8118	0.376	1.2576
105		UPF Kharsu	27	5.9523	5.5762	0.376	3.6917
106		UPF 22	11	5.3334	5.3334		4.9093
107		C.No.53 b(i)	2	0.9396	0.9396	-	-
108		C.No.54	2	0.4516	0.4516		0.4516
109		UPF ManuPanu	5	1.4339	1.4339		0.9147
110		UPF Bijori	6	3.172	2.42	0.752	1.2066

111		C.No.55 a	13	4.7958	4.7552		3.4402
112		UPF Majani	2	0.2845	0.2845	-	0.2845
113		C.No.37C	9	2.8589	2.8589		2.6217
114		C.No.40a	7	2.6362	2.6362		2.6362
115		C.No.37d	4	1.0792	1.0792		0.8686
116		C.No.37a	12	2.6771	2.6771		1.4238
117		C.No.37b	6	1.0118	1.0118		0.6336
118		C.No.36	1	0.4643	0.081	0.376	0.081

119		C.No.46 a(ii)	22	3.3887	2.6294	0.752	1.9086
120		UPF Sharmali	1	0.2124	0.2124		-
121		C.No.40 b	4	0.3758	0.3758		0.1364
122		C.No.43a(i)	5	0.8931	0.8931		0.8931
123		C.No45 b(i)	6	3.0332	3.0332		3.0332
124		C.No46 b(ii)	1	0.6708	0.6708		0.6708
125		C.No46 b(i)	2	0.944	0.944		0.944
126		C.No.44	1	0.7515	0.3755		0.376

127		C.No.47	1	0.4159	0.0399	0.376	-
128		C.No.50	20	3.2774	3.2774	-	2.9262
129		UPF Bari	15	6.0051	5.2531	0.752	3.0318
130		UPF Bhoot	13	7.9896	5.6296	2.632	3.2253
131		UPF Jagothi	2	0.8935	0.1415	0.752	0.1404
132		UPFNoi	1	0.4285	0.525	0.376	0.525
133		UPF Khanola	1	0.151	0.1786	0.376	0.1786
134		DPF Khanola	1	0.3813	0.0053	0.376	0.0053

135	Khashdhar	C.No.61A Jakhnoti	10	2.1160	0.9880	1.1280)	-
136		C.No.61A& B Jakhnoti	3	2.2676	2.2676	-	-
137		CNO.57 Bahali	17	11.2288	8.4168	2.8120	3.0000
138		UF Dhagoli	2	0.1694	0.1694	-	-
139		C.No.59 bhamphar	3	0.2335	0.2335	-	-
140		UF Giyari	2	1.2878	1.2878	-	1.0730)
141		C.No.62a Chiroti	11	2.3201	2.3201	-	-
142		UF Andra	2	0.8965	0.8965	-	0.8917

143		C.No.60Dunna	8	3.1899	3.1899	-	-
144		C.No.62b Chiroti	2	0.2223	0.2223	-	-
145		C.No.58 Pujarli	1	1.4928	1.4928	-	-
146		UF Gonsari	1	1.5718	1.5718	-	-
147		UF Baghi	2	1.8917	1.8917	-	-
148		UfMangyari	1	0.8495	0.4735	0.3760	-
149		UF Rausi	1	0.8315	0.8315	-	-
150		Uf 34 Dolizan	6	3.0999	3.0999	-	-

151		C.No.65A Khabal	1	0.4100	0.4100	-	-
152		UF betyani	1	0.8368	0.8368	-	-
153		UF Diudi	1	0.3712	0.3712	-	-
154		UF denwari	17	3.5270	3.5270	-	-
155		UF Gad Panu	3	0.5181	0.5181	-	-
156		UF Masli	5	1.3354	1.3354		1.3141
157		UF Telga	23	8.7087	7.9567	0.7520	1.4505
158		C.No.73 a Telga	11	2.9534	2.5775	0.3759	

159		C.No.81B Kayani	3	0.2221	0.2221		0.8454
160		UF Diswani	5	3.2159	1.2154	2.0005	
161		C.NO.73C Telga	1	0.3050	0.3050		0.1926
162		UF Sandasu	10	2.0255	2.0255		0.5265
163		C.No.80A Diswani	4	4.2404	3.8644	0.3760	-
164		C.NO.81A Kayani	13	1.4157	1.4157		-
165		UfKhasdhar	15	6.6572	6.2812	0.3760	-
166		C.No.74A11 Khasdhar	9	0.7722	0.7722	-	-

167		UF Masli	4	0.4276	0.4276	-	-
168		C.No.77A Dhak	1	0.8220	0.8220	-	-
169		UF Dali	1	0.7575	0.7575	-	-
170		C.No74A1 Khasdhar	2	0.1460	0.1460	-	-
171		UfJakhi	1	0.4195	0.4195	-	-
172		UF 49 Telga	2	0.4988	0.4988	-	-
173		72b Gumma	12	1.1295	1.1295)	-	-
174		UF Larot	9	4.1775	3.7951	0.3824	-

175		UF 45 Larot	6	0.9111	0.9111	-	0.2570
176		UF Thali	1	1.4065	1.4065	-	-
177		UF Nandla	2	1.6235	1.6235	-	-
178		UF Banoti	2	1.7330	1.7330	-	-
179		UF Ranol	1	0.2674	0.2674	-	-
180		UF Thana	5	0.7173	0.7173	-	-
181		UF Koila	1	0.9653	0.9653	-	-
182		UF Gumna	1	0.9040	0.9040	-	-

183		UF Amboi	12	2.0936	2.0936	-	-
184		72A kharshali	3	0-38-94	0.3894	-	0-26-93
185		UF jhalwari	1	0.4981	0.4981	-	-
186	Saraswati Nagar	C No 1 Jond	8	-	3.0190	-	3.0190
187		C No 2 Jond	20	-	22.8360	-	22.8360
188		UPF Saskir	9	10.8502	5.8069	5.0433	5.8069
188		UPF Chhajpur	7	7.397	5.7537	1.6433	5.7537
189		UPF Shallar	27	31.1000	1.41	29.69	1.41

190		UPF Jharashli	9	9.0943	9.0943	-	9.0943
191		Kathasu Muhal	5	6.7974	5.7630	1.0336	5.7630
192		DPF Chhajpur	1	1.88	1.88	-	1.88
193		UPF Malog	3	1.6274	-	1.6274	-
194		UPF Shirol	29	19.7562	12.3087	7.4475	12.3087
195		UPF Giltari	28	15.804	14.1189	1.6851	14.1189
196		UPF Jhalta	22	13.476	10.6284	2.8476	10.6284
197		UPF Dharmana	2	1.2061	-	1.2061	-

198		UPF Sainj	1	0.4833	0.4833	-	0.4833
199		UPF Dhansar	2	1.601	1.601	-	1.601
200		UPF Kawalta	1	0.7726	-	0.7726	-
201		UPF Sharana	17	4.9989	3.8633	1.1356	3.8633
202		DPF Naliban	3	0.6488	0.6488	-	-
203		UPF Ghyan	1	0.1539	0.1539	-	0.1539
204		UPF Mihana	1	0.0859	0.0859	-	0.0859
205		DPF Kayala	1	0.8260	0.8260	-	0.8260

206	Tikkar	UF Umladwar	17	3-88-20	3-88-20	-	-
207		UF Lambidhar	5	1-74-31	1-74-31	-	0-81-00
208		UF Seri	9	1-94-01	1-94-01	-	1-38-33
209		C.No-3 Pharog	2	0-36-12	0-36-12	-	-
210		C.No-4 Hanstari	9	3-41-13	3-41-13	-	2-51-59
211		C.No-6 b Tikkar	2	0-22-62	0-22-64	-	-
212		UF Shalni	4	1-62-60	1-62-06	-	0-01-49
213		C.No22-Pujarli	15	5-79-01	5-79-01	-	-

214		UF Koti	25	9-48-84	9-27-54	0-21-30	-
215		UF Khalai	4	0-75-83	0-75-83	-	-
216		C.No-21 Friunkoti	6	0-90-05	0-90-05	-	-
217		UF Kharla	4	0-37-68	0-37-68	-	-
218		UF Tutupani	10	6-15-88	6-15-88	-	4-61-10
219		UF Jarla	3	2-95-66	2-95-66	-	2-20-46
220		UF Bamla	6	2-31-65	2-31-65	-	1-90-77
221		C.No-6 c Kasheni	10	3-99-36	3-99-36	-	0-99-36

222		UF Sitli	8	4-31-47	4-31-47	-	-
223		C.No-7 Sharontha	10	12-92-32	12-92-31	-	-
224		UF Tangri	5	1-39-01	1-39-01	-	-
225		UF Fieldbag	10	5-81-80	3-60-81	2-20-99 hac	-
226		UF Thanabag	3	1-29-94	1-29-94	-	-
227		C.No-9 a Karchari	3	0-76-30	0-76-30	-	-
228		UF Sazar	1	0-66-53	0-66-53	-	0-28-93
229		UF Sholdu	7	3-34-64	3-34-64	-	0-18-00

230		UF Khangta	1	0-37-63	0-37-63	-	-
231		C.No-20 a Jagterly	2	0-74-34	-	0-74-34 hac	-
232		UF seao	2	0-54-13	-	0-54-13 hac	-
233		UF Harshal Tibba	36	33-48-84	28-48-70	5-00-14 hac	25-56-67
		Total	1795	984.0603	776.386	424.8882	326.2137

Table 2.13: Detail of encroachment cases forest wise

Further, the forest division has also made efforts to restore the lost forest area and forest cover by undertaking plantations in encroached forest lands which were evicted and where fruit trees were felled. The detail of plantation undertaken in such areas is given in the table below:

Sl. No.	Name of Forest Range	Name of Forest	Axrea Evicted (in Ha.)	Year of Eviction	Whether Planting undertaken? (Yes/ No)
1	Rohru	UPF Kutara, C.No53	1.6936	2016-17	Yes
2		C.No.84 b	1.6129	2016-17	Yes
3		DPF Nirja	1.5731	2016-17	Yes
4		UPF Dyari	1.4805	2016-17	Yes
5		UPF Khashkandi	0.9622	2016-17	Yes
6		UPF Munchara	0.9387	2016-17	Yes
7		UPF Jakhar	0.9154	2016-17	Yes
8		C.No.40 a	0.8686	2016-17	Yes
9		UPF Dhara	0.8442	2016-17	Yes
10		C.No.40 a	0.7942	2016-17	Yes
11		C.No.84b Lowerkoti	0.7936	2016-17	Yes
12		UPF Katmore	0.6278	2016-17	Yes
13		C.No.40 a	0.1676	2016-17	Yes
14		C.No.40 a	0.1469	2016-17	Yes
15		C.No.40 a	0.1392	2016-17	Yes
16		UPF BhauliNalla	0.8307	2018-19	Yes

17		UPF BhauliNalla	0.7743	2018-19	Yes
18	Bashla	UFP 12 Ferly	1.0000	2015-16	Yes
19					
20		UFP 12 Ferly	1.2346	2015-16	Yes
21		UFP Kanda	1.4965	2015-16	Yes
22		UPF - 11Lambidhar	1.2000	2015-16	Yes
23		UPF - 11Lambidhar	1.1991	2015-16	Yes
24		C.No. 31 a (i)	0.8130	2015-16	Yes
25		UPF Kanda	1.0003	2016-17	Yes
26		UPF 9 Panikhech	1.2000	2016-17	Yes
27		UFP 12 Ferly	1.0952	2016-17	Yes
28		UPF-8 Bashuni	0.1798	2016-17	Yes
29		UPF-8 Bashuni	0.46-06	2016-17	Yes
30		UPF-8 Bashuni	0.5490	2016-17	Yes
31	Jubbal	UPF Kutu PaniJharag	2.3552	2017-18	Yes
32		DPF 18 Sari	1.7758	2017-18	Yes
33		DPF 18 a Mandhol	2.5033	2017-18	Yes

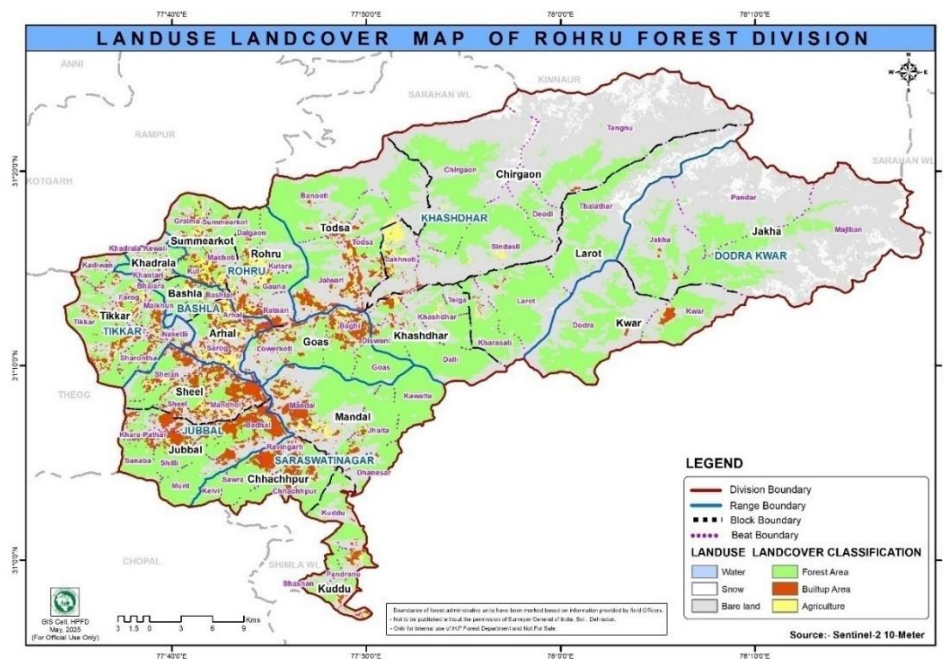
34	Sawra	C No 1 Jond	3-01-90	2018	Yes
35		C No 2 Jond	22-83-60	2016 - 18	Yes
36		UPF Saskir	5.8069	2016	3.1115
37		UPF Chhajpur	5.7537	2018	No
38		UPF Shallar	1.41	2018	No
39		UPF Jharashli	9.0943	2016 -18	2
40		KathasuMuhai	5.7630	2016 - 18	1.1216
41		DPF Chhajpur	1.88 -12	2018	1.8812
42		UPF Shirola	12.3087	2016 - 18	1.5280
43		UPF Giltari	14.1189	2016- 17 &18	1.6510
44		UPF Jhalta	10.6284	2016 -17& 18	2.0705
45		UPF Sainj	0.4833	2016	0.8435
46		UPF Dhansar	1.601	2016	No
47		UPF Sharana	3.8633	2016 - 18	No
48		DPF Naliban	0.6488	2016	No
49		UPF Ghyan	0.1539	2016	No
50		UPF Mihana	0.0859	2016	No
51		DPF Kayala	0.826	2016	No

52		Sawra	2.4336	2016	No
53	Khashadhar	UPF Giyari	1.7030	2011-12	Yes
54		UPF Masli	1.6041	2016	Yes
55		UPF Khashadhar	1.9595	2016	Yes
56		UPF Amboi	1.2024	2015	Yes
57		UPF Thana	1.2129	2015-16	Yes
58		UPF Banoti	0.9453	2016	Yes
59		UPF Koila	0.9653	2019-20	Yes
60	Tikkar	C.No.4 Hanstari	1.7263	2017	Yes
61		C.No.7 Sharonta	0.8210	2017	Yes
62		UPF Tutupani	2.6523	2017	Yes
63		UPF HarshalTiba	1.4958	2017	Yes
64		UPF Koti	1.7152	2017	Yes
65		UPF Tangri	0.8217	2017	Yes
66		UPF Sitli	2.3310	2017	Yes
		Total	155.4907		

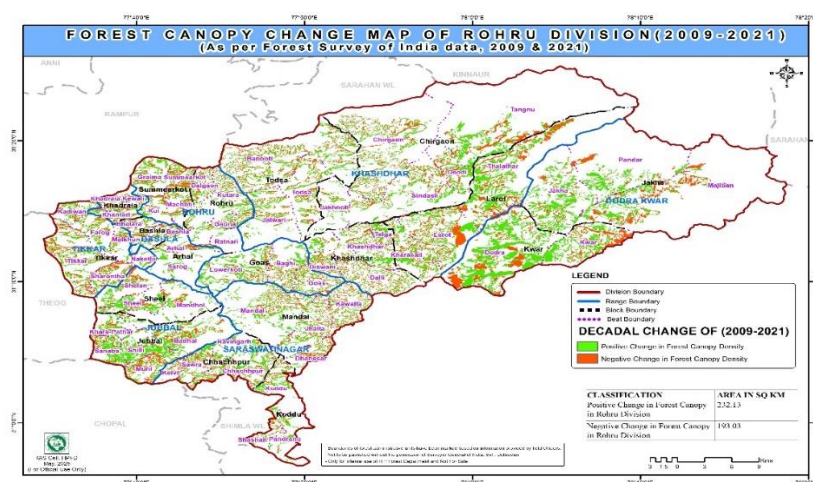
Table 2.14: Detail of Plantation undertaken in Evicted Areas

The overall LULUCF character of the forest division indicates a significant negative change in forest cover owing to the factors of forest diversions and encroachments both of which must be addressed in order to better manage the division. With the large diversions under FRA, most of the villages in the division

are now connected by road and the division is currently receiving applications for roads under FRA with regard to providing connectivity to orchards. Further, there is a strong tendency among orchardists to not part with private land for roads and instead seeking road via FRA route through forest land. It is expected that cases for such forest diversions may continue to be moved in the coming years during the operation of this plan which needs to be evaluated on case by case basis and doing cost benefit analysis.



Map 2.1: Landuse Landcover map of Rohru Forest Division



Map 2.2: Canopy change map of Rohru Forest Division

Threats to Forests

The forests of Rohru Forest Division face multifarious threats on account of various factors. The following are a summary of threats faced by forests in this division:

1. **Encroachment:** As detailed in the above mentioned section, encroachment of forest land and wooded areas for cultivation of fruits is the biggest threat to the health and security of the forests of the division. The scale of the problem is well made out in the above section. Further, it is also pertinent to mention that the documented and detected scale of encroachments may well be lesser than undetected encroachments.
2. **Illegal Mining along Pabbar River Bank:** The tract covered by this plan as mentioned includes forests which are de-facto notified as protected forests under 1952 notification owing to wastelands. The Pabbar river has great potential of minor minerals including Boulders, Bajri, Sand the detail of which was fetched from District Survey Report 2024 by Geology Department for Shimla District.

On the basis of drainage analysis, no. of tributaries, average erosion in the river bed, the annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 5 Cm. The total potential of the Pabbar River is given below in the table (DSR Report):

Name of River	Boulder (in Metric Tonnes)	Bajri (in Metric Tonnes)	Sand (in Metric Tonnes)	Total (in Metric Tonnes)
Pabbar River	18,91,008	18,91,008	16,20,884	54,02,880
Annual Replenishment				
	94,550	94,550	81,044	2,70,144

Table 2.15: Detail of Minerals of Pabbar River

There is a serious threat of illegal mining along these protected forests for sand, stone and bajri especially considering there is an ever increasing demand of minerals for construction activities and limited legal sources from adjacent areas. The mining threatens to disturb the flow of the river, cause immense loss of government revenue and also affect the

vegetation in the river bank. The detail of illegal mining cases detected and action taken are given in the table below:

Sr.No.	Year	Number of Cases detected	Type of Extraction / Transit (Manual/Vehicle/Mule)	Type of Mineral (Sand/Stone/Bajri)	Volume of Mineral involved (m³)	Number of vehicles seized	Damages collected for compounding offence
1	2014-15	11	Manual	Stone	32	0	27974
2	2015-16	25	Manual	Stone	57.91	0	81317
3	2016-17	10	Manual	Stone	90.80	0	85335
4	2017-18	9	Manual	Stone/Sand	33	0	32934
5	2018-19	6	Manual	Stone	20.91	0	22245
6	2019-20	21	Manual	Stone	96.22	0	88071
7	2020-21	26	Manual	Stone	303.40	0	350375
			Vehicle	Sand	10	3	
8	2021-22	49	Manual	Stone	117.50		452909
				Sand	10		

			Vehicle	Sand	25.5	7	
9	2022-23	53	Manual	Stone	325.70		953615
				Sand	202		
			Vehicle	Sand	30.30	11	
10	2023-24	97	Manual	Stone	140.70		996464
				Sand	90.40		
			Vehicle	Sand	67.10	32	
			Mule	Sand	27	15	
Total		307			1680.4	68	3091239

Table 2.16: Illegal mining cases detected for last 10 years of Rohru Forest Division

3. **Illicit Felling:** The threat of illicit felling is a significant threat to the forests of Rohru Forest Division. There is an ever increasing demand for timber by local villagers and right holders especially considering the type of construction in homes in which large volume of timber is utilized for paneling, doors, windows, ceiling and for floor even till date particularly among the large affluent section of society. In cases of remote ranges like DodraKwar, the utilization and requirement of timber is even more. The following are the cases of illicit felling/ illegal timber transit detected in the division during the last 10 years:

Sl.No	Range	Number of Cases	Species	Trees	Volume (in m³)	Number of Vehicles Seized
1	Rohru	66	Deodar	99	34.8371	Nil
			Kail	120	25.9345	
			Tosh	8	4.328	
			Chil	1	0.829	
			Juglans Nigra	1	0.8	
			Total	229	66.7286	
2	Bashla	28	Deodar	35	29	2
			Kail	6	1.33	
			Robina	4	0.28	
			Rai	1	0.32	
			Total	46	30.93	
3	Jubbal	53	Deodar	60	88.42	
			Kail	20	25.56	
			Total	80	113.98	6
4	Tikkar	31	Deodar	30	50.806	
			Kail	33	136.673	
			Rai	4	2.769	
			Tosh	4	2.929	

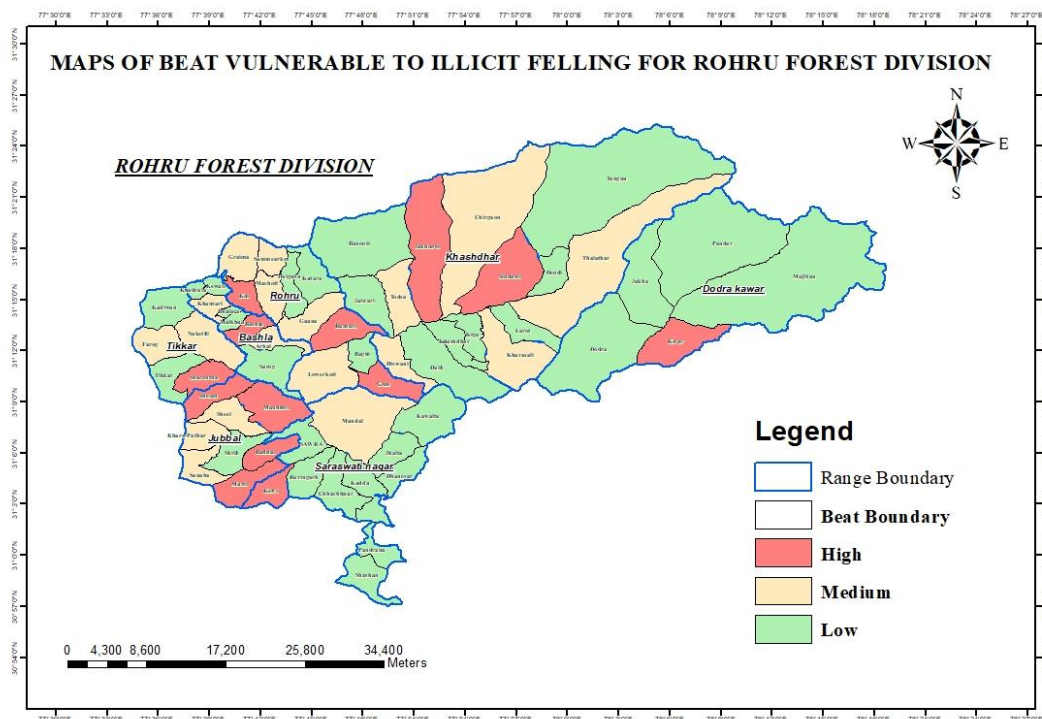
			Total	71	193.177	Nil
5	Khashdhar	61	Deodar		44.077	
			Kail		68.8751	
			Rai		10.072	
			Thuna		1.019	
			Tosh		62.846	
			Total		186.8891	
6	DodraKawar	9	Jamu	10	9.9	
			Total	10	9.9	Nil
7	S Nagar	11	Deodar	8	7.841	
			Kail	6	14.364	
			Rai	1	0.538	
			Chil	2	0.12	
			Total	17	22.863	Nil
8	Division	259	G Total	453	624.4677	8

Table 2.17: Cases of Illicit felling during last 10 years for Rohru Forest Division

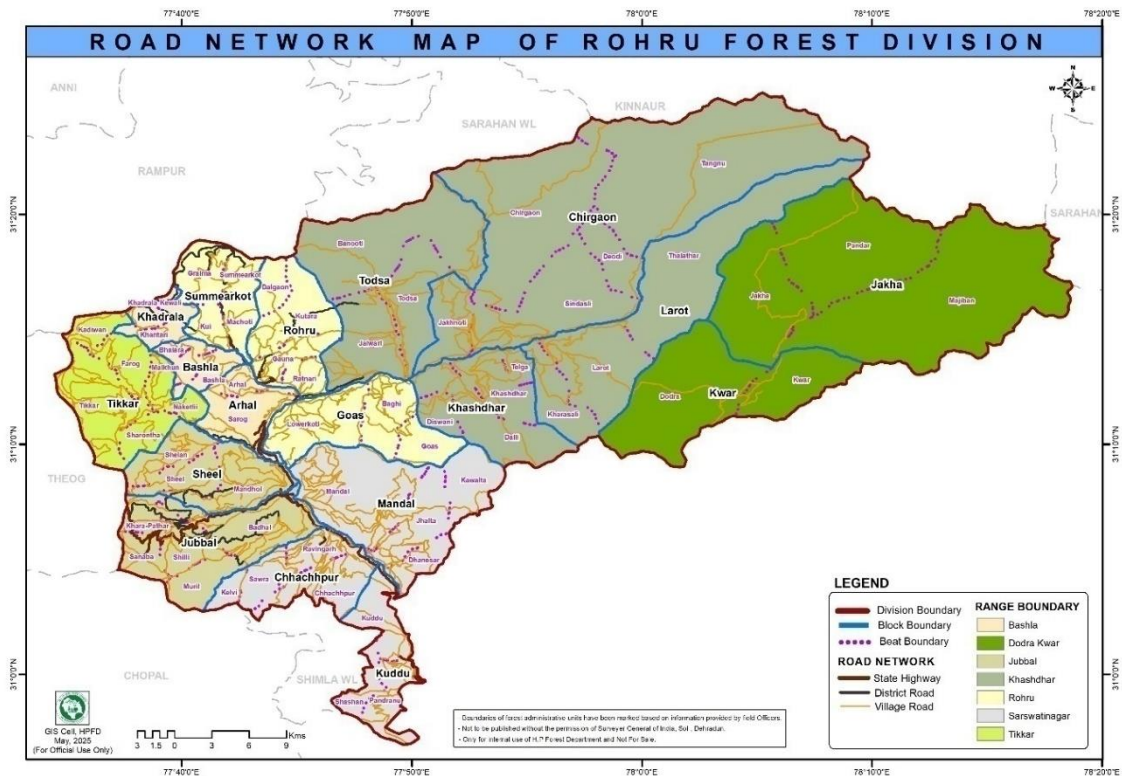
There is a differential threat of illicit felling in various forests. In the Jubbal Forest Range, the forests of Sheel block particularly at Shelan and Mandhol beats are vulnerable to illicit felling as highlighted by the detected cases. In Saraswati Nagar Range, the reserved forests of Chhajpur have been historically vulnerable to illicit felling. In Rohru Forest Range, the forests of Summerkot Block and of Dalgaon beat are considered vulnerable considering

the bordering division of Rampur and the possibility of inter divisional timber transit and smuggling. Whereas, the forests of Bashla Forest Range is considered less vulnerable to illicit felling. The entire forests of Tikker forest range is highly vulnerable to illicit felling and during the period of the previous plan, a major illicit felling case was recorded in Sharontha beat of the range. The Khashdhar Forests range has also several forest beats which are vulnerable to illicit felling in the middle elevations one among them which is the Jakhnoti beat. The DodraKwar Range as illustrated above also has chances of illegal timber extraction particularly in Dodra and Kwar beats where there is heightened dependence on timber for local household construction. Map 2.3 depicts the beat wise vulnerability map to illicit felling.

The major difference in illicit felling from the writing of the previous working plan is the rampant development of a scattered road network which links several villages and forests with the main towns and cities. The multiplicity of roads here greatly increases vulnerability of forests to illegal timber extraction coupled with the fact that power chain saws which can swiftly fell trees are available. There are also migrant labourers from Kashmir who are specialized in tree felling in operation in the area who are able to operate swiftly. The development of road network and modern technology for tree felling has greatly complicated protection of forests against illicit felling and illegal timber transit. Map 2.4 illustrates the road network of the tract in detail.



Map 2.3: Map of Beats Vulnerable to Illicit felling Rohru Forest Division



Map 2.4: Road Network Map of Rohru Forest Division

4. **Unauthorized Removal of Non Timber Forest Produce**

The forests in higher elevations are rich in biodiversity, medicinal plants, herbs and other usufructs which have value as Non Timber Forest Produce. These include large parts of Khashdhar forest range, Summer Kot Forest Block, Deorighat in Tikker, Dodra Kwar Forest Range. There are wide variety of NTFP in these forests including Guchi(*Morchella spp.*), Dhoop, Kuth, Karu, Chirayita, Ban Kakidi, *Berberis spp.*, bark of *Taxusbaccata*, *Betulautilis*, root of *Juglansregia*.

These Non Timber Forest Produce are protected under the Indian Forest Act, 1927 and Biodiversity Act, 2002. Yet, considering the rising demand for these NTFPs and the high market price fetched by them, it is a distinct possibility that unauthorized removal of such NTFP are happening from the forest ranges. By rule, these NTFPs are harvested only by local right holders who then sale them to registered MFP contractors who further apply for transit permit and then sell them. The following are the detail of unauthorized removal and transport of NTFP detected:

Details of Unauthorized extraction of NTFP and transit (in last 10 years)

Sl. No	Range	Year	Name of Forest	Beat	Species	Volume/ Quantity	DR No/ FIR No	Status of Case in Court
1.	Bashla	2014-15 To 2023-24	Nil	Nil	Nil	Nil	Nil	Nil
2.	KHASHD HAR	2021-22	Uf Tangnu	Tangnu/ Janglikh	Dhoop	6 Quntal	507/014 dt 16/2/2022	Compounded (30300/-)
3.	KHASHD HAR	2023-24	Uf Dayara	Tangnu/ Janglikh	Dhoop	100Kg	507/015 dt 4/9/2023	Compounded (6060/-)
4.	KHASHD HAR	2023-24	UF Janglikh	Tangnu/ Janglikh	Dhoop	7Quntal	507/016 dt 6/12/2023	Sent to DFO Rorhu For Auction

5.	Rohru	2019-2020	C.No.5 5	Rantari	Guchi (Morchella esculenta)	5 kg	DR/No.003/ 50 to 10/50 =8 No's DR chaked	Compound ed for Rs. 6302=00

Table 2.18: Detail of unauthorized extraction of NTFP of Rohru Forest Division

5. Forest Fires

As illustrated in the above mentioned chapter, there is a trend of increasing temperatures in the forests coupled with larger number of dry days without rain. This has led to increasing forest fires amid heatwaves in the forests. Earlier, it was observed that fires are limited to dry grasslands and Chir Pine forests. Whereas, forest fires are now also occurring in Deodar forests and Oak forests. Further, the fire season is also advancing with fires now starting from as early as March 15.

In the forests of Rohru Forest Division, there are 2 distinct fire season. The first one, being the summer fire season which starts from April and goes on till end of June or till Mid July prior to monsoon. The second one, the winter fire season sees greater number of fires and greater damage and burnt area, starting from November and going on till February.

The complete detail of fire incidents in last 10 years is annexed to this working plan. The following table summarizes the fire incidents in last 10 years of the division:

Abstract of Fire Incidents in Last 10 year

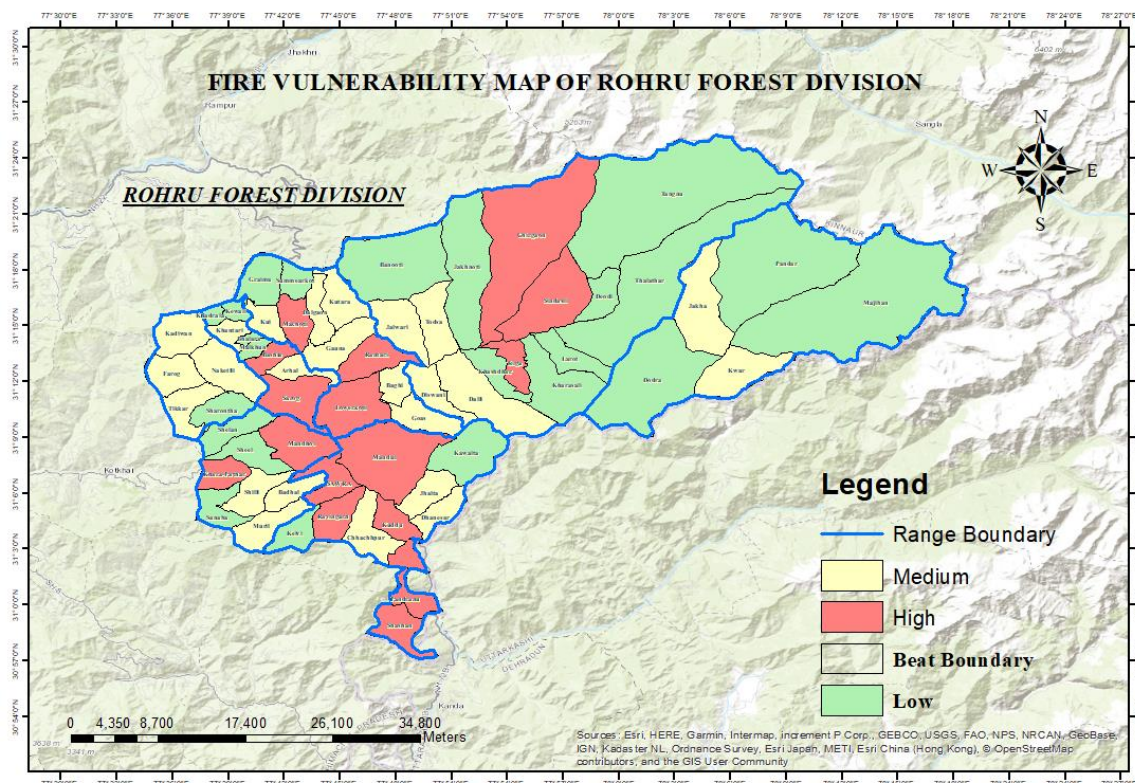
Sr.No	Year and Season	Total No of Case	Total Burnt Area (in Ha.)	Plantation Area Burnt (in Ha.)	Total loss (in RS)
1	2014-15	33	138.5	36	591653/-
2	2015-16	44	261.86	46.11	1839000/-
3	2016-17	64	236.5	63	1599000/-

4	2017-18	41	200.56	159.6	1467700/-
5	2018-19	27	182.183	66.93	9811600/-
6	2019-20	22	76	6	2500/-
7	2020-21	95	462.67	3068	2787377/-
8	2021-22	59	300.43	30	1175116/-
9	2022-23	89	543.75	36	5136900/-
10	2023-24	104	711.35	66	12544531/-
	Total	578	3113.80	3577.64	36955377

Table 2.19: Detail of Fire incidents for last 10 years

The reason for occurrence of forest fires are more due to human intervention whereas a miniscule minority of forest fire cases occur due to natural causes. The reason for kindling of fire by local people are mainly on account of protecting the apple orchards from fire and for this reason, they tend to clear the fuel on the forest side of orchard thereby damaging the flora and fauna of the forest. Further, there is also increasing tendency to burn away horticulture waste which has danger to spread to proximate forests. In certain cases, fire is kindled to enable generation of fresh fodder grass for cattle and other livestock.

The lower elevations of the division are comparatively more vulnerable to fire during summers whereas large parts of the division are vulnerable during winters for forest fires. The dry grasslands i.e. Panwi area are most vulnerable to fire. The Chil forests in Sawra range is also vulnerable as is the dry grassland and rocky portion that exists in Rohru Block and Sawra range. Similarly, there are several steep ridges and grasslands in Khashdhar forest range vulnerable to forest fire. The following map summarizes the fire vulnerability of the Rohru Forest Division:



Map 2.5: Fire Vulnerability Map of Rohru Forest Division

6. Natural Calamities

Drought: There is increasing period of no rainfall during recent years which create drought like situation rendering regenerations ineffective and exposed to diseases. The late arrival of monsoon affects young plants badly, exacerbating risk of forest fires and affects soil moisture retention.

Heat Wave: The forest division experienced a massive heat wave in year 2024 with mercury touching 35 degrees, which is unusually high for an average elevation of 1500m. With climate change and rising temperatures, there is greater risk of forest fires and low moisture retention in forests adversely affecting health of forests and young regeneration.

Snow: - Due to heavy snow fall, breaking and uprooting of trees are quite common. The damage is more in conjoined pole and sapling stands.

Rain: Persistent rain causes land slips/slide which destroys large number of trees. Land slips where the land has been broken for

cultivation on unsuitable formation. A large number of trees are uprooted due to land slips and erosion during the monsoon.

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

Lightning: Occasionally, individual trees are damaged due to lightning but the damage is insignificant. Only few trees are damaged annually by lightning.

Frost: Young seedling suffers in case of exceptional winter frost.

7. **Soil Erosion**

Parts of the tract dealt with in this plan is vulnerable to soil erosion especially considering the Pabbar river cuts through various forests of the division. During the monsoons and post snow melt, the water level in the Pabbar river rises sometimes to alarming level gushing its banks and eroding soil. Similarly, due to ever increasing road construction to provide connectivity to apple orchards, there is increasing risk of erosion and landslide.

8. **Grazing**

Considering that the number of livestock kept by local villagers has decreased over the years, it is to be said that local diurnal grazing is not a significant threat to the forests. However, migratory graziers especially of Gujjar and Gaddi community who roam the forests of the division offer significant threat to forests. These migratory graziers occupy the higher reaches in summers and pass to lower elevations during winters. It is in summer and monsoon season that they set up their temporary shelters inside forests living inside the forests and living off on forest produce. The number of livestock reared by them is also substantially higher in number compared to the permit that is issued to them. In certain cases, there is also illegal grazing by migratory graziers without permit. Further, they also threaten plantations currently raised in forests by breaking open the barbed wire fence.

The comparative data on the area available for grazing and the number of cattle units that the area can support in comparison with actual units on the ground is tabulated below:

Total Area of Division (in Ha)	Area Closed for Plantation / ANR (in Ha)	Available Area for Grazing (in Ha)	Name of Cattle Animals	Number of Units	Number of Animals	Number of units in total	Required Grazing Area (in Ha)
130569.24	1075.55	17555.88	Goat	1.5	3886	5829	2914.50
			Kine	4	5352	21408	10704
			Mule	5	563	2815	1407.50
			Sheep	1	23443	23443	11721.50
			Horse	4	426	1704	852
			Buffalo	6	30	180	90
			Donkey	3	229	687	343.50
			Total		33929	56066	28043

Table 2.20: Detail of Grazing carrying capacity of Rohru Forest Division

The complete detail of livestock in each village of forest ranges is annexed to this document as Appendix-XXV to Volume II of this plan.

9. Insects, Pathogens and Pests

There is no record available to indicate whether any serious damage occurs to forest trees by insects. The only insects known to do serious damage the Deodar cone moth *Cateremmacedrella*, the larvae of which attack Deodar cones and destroy seed. *Agrotisvosilon* kills young Deodar seedlings in nurseries. A noticeable pest of the Silver Fir is *Bralyxystussubsignatus* which causes the new shoots of the year to wither away turn yellow or orange and drop off. Bark

boring beetles are occasionally met with and are associated with the death of young Deodar saplings.

Damage caused Fungi: Damage to tree species at various stages, starting from the nursery, are being caused by different varieties of fungi. Root rot, damping off are being caused in the seedlings in the nurseries. *Pythium*, *Fusarium* and *Cylindrocladium* are the main species causing damage in the nurseries. The following are the most fungi which attack on the plants in this tract:

- i) ***Heterobasidion annosum***:- It has appeared in a few young Deodar forests in C-1 (a), 5(a), C-45 (a) and 45 (b), C-78 (a) and 78 (b) etc. It is more to be feared in young stands in damp localities. The plants start drying from the top and die in a season or two.
- ii) ***Peridermium cedri*** - It has been noticed in localized patches of Deodar in C- 5(a). To begin with, the leading shoot is attacked and gradually the whole tree is killed. It causes witches brooms in the crown.
- iii) ***Barchayella deformans*** :- This fungus is sporadically found on the current years shoot of Spruce. It causes the characteristic orange tassels frequently seen in the spring. The diseased shoots are stunted and densely covered with covered needles on which the mass of orange and teleutospores appear. This fungus does not do much real harm.
- iv) ***Trametes pinii***:- This causes significant damage to Kail in this division. The fungus causes decay mainly in the heart wood of Kail trees. The heart wood is stained light pink or brown or reddish, due to which the disease is known as 'red-rot'. *Trametes pinii* in fact, in Kail mainly attacks through trunk wounds caused during lopping which should be prohibited or controlled to minimize infection. In case of severe attack, the loss of timber is enormous. The lopping carried out during monsoon is more damaging because the infection spreads during these months therefore, the lopping that too silviculturally should be done during winter or spring seasons only.
- v) ***Fomes annosus***: It attacks deodar poles through the roots in badly drained soil and results in their death. The Deodar root fungus has very occasionally killed individual saplings and poles in pure Deodar stands. The damage due to this fungus is not appreciable and only sporadic casualties have been noticed in this division. As the fungus is soil borne, digging of trench around infected groups of poles, uprooting and burning the infected material will be helpful in controlling this fungus.

Peridermiumcedria needle fungus causes witches broom and kills trees by attacking leading shoots. *Fugarium* species causes “dumping off ” of the seedling on the wet sites. Other fungi are not of much consequence except for termite pinii.

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

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

2.6 Distribution of Different Forest Types

Considering the vast geographical expanse, diversity in elevation, aspect and terrain, there are also different forest types in the forest division. The altitudinal shift from 1300 m to 5700 m is indicative of the kind of diversity one can expect in forest type. This means there is immense diversity in tree species and clear zonation as per altitude. The lower elevations of Sawara range have presence of Chir Pine in them whereas the middle elevations in various forests of Rohru, Bashla, Tikker forest ranges have Deodar forests. The forest division is also home to large patches of Himalayan Blue Pine Forests spread across parts of all forest ranges in the division with this forest type being the most widespread and predominant forest type occurring at elevations from 1800-3900m.

Higher elevations of Tikker, Khashdhar Forest Ranges, Summer Kot Block, Jubbal Forest Range is having Spruce-Fir Forests. At even higher elevations, there are forests of *Betula utilis* and *Taxus contorta* which belong to category of RET species. They are found near peaks of Chanshal, ChanderNahan and Moral Danda. According to the Champion and Seth Classification, the following table list the various forest types found in the division:

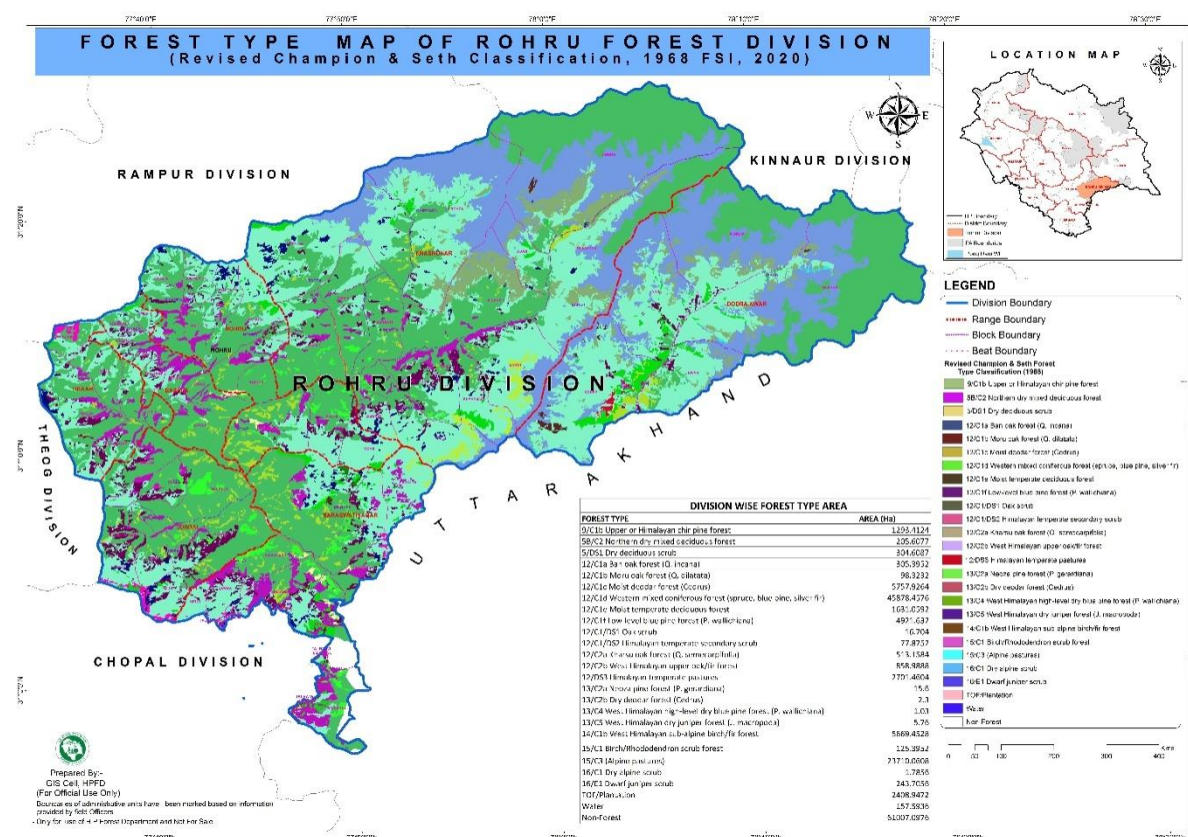
Group	Forest Type	Area (in Ha.)	Description
9	9/C1b Upper or Himalayan Chir Pine Forest	1293.4124	These forests occur on lower to mid-elevations with warm, dry slopes. They are predominated by <i>Pinus roxburghii</i> (Chir Pine), having open canopy and grassy undergrowth. These forests are fire-prone and often support seasonal grazing.
5	5B/C2 Northern Dry Mixed Deciduous forest	205.6077	Characterized by a mixture of drought-resistant deciduous species such as <i>Anogeissus latifolia</i> , <i>Acacia</i> , and <i>Terminalia</i> species. These forests occur in dry foothill regions and exhibit leaf shedding during summer.
	5/DS1 Dry Deciduous scrub	304.6087	A degraded form of deciduous forests where tree cover is sparse and shrubs dominate. Mostly occurs on overused and eroded slopes due to grazing and lopping.
12	12/C1a Ban Oak Forest (<i>Quercus leucotricophora</i>)	305.3952	Found in moist temperate regions at mid-elevations. Dominated by <i>Ban Oak</i> , these are dense forests that provide excellent soil and water conservation, supporting rich understory vegetation.
	12/C1b Moru oak Forest(<i>Quercus Dilatata</i>)	98.3232	Occurs at slightly higher elevations than Ban Oak. Moru Oak forms dense stands with moist, cool conditions, and supports diverse ferns, mosses, and shade-tolerant shrubs.
	12/C1c Moist Deodar forest (<i>Cedrus</i>)	5757.9264	Deodar forests occur in cool, moist temperate zones. Known for tall, straight, high-quality timber trees (<i>Cedrus deodara</i>). The forest floor is cool, shaded, with sparse undergrowth.
	12/C1d Western mixed coniferous	45878.4576	These forests form higher elevation conifer belts with species like <i>Picea smithiana</i> , <i>Abies pindrow</i> , and <i>Pinus wallichiana</i> . They have a

	forest (spruce, Blue Pine, Silver Fir)		closed canopy, cold climate, and support limited understory vegetation.
	12/C1e Moist temperate deciduous forest	1631.0592	Located in moist valleys, dominated by species like <i>Aesculus</i> , <i>Acer</i> , <i>Populus</i> , and <i>Betula</i> . They display vibrant seasonal leaf color and support rich biodiversity.
	12/C1f Low-level blue pine forest(<i>P. wallichian</i>)	4921.632	Found in mid to higher elevations. These forests are dominated by Blue Pine with well-developed understory of shrubs. The climate is cool and moist.
	12/C1/DS1 Oak scrub	16.704	A degraded stage of Oak forests due to lopping, fuelwood extraction, and heavy grazing. The tree cover is reduced and replaced by small, bushy oak shoots.
	12/C1/DS2 Himalayan temperate secondary scrub	77.8752	Regenerating forests dominated by shrubs and young trees. These develop on abandoned land, fire-burnt areas, or heavily grazed slopes.
	12/C2a Kharsu oak forest (<i>Q. semecarpifolia</i>)	513.1584	Occurs at higher elevations near timberline. The Kharsu Oak has thick leathery leaves adapted to cold conditions. These forests play an important role in watershed protection.
	12/C2b West Himalayan upper oak/fir forest	858.9888	A transition zone near sub-alpine region, consisting mainly of <i>Kharsu Oak</i> and <i>Fir</i> . These forests are cold, moist, and retain snow for long periods.
	12/DS3 Himalayan temperate pasture	2701.4604	High-altitude meadows used for summer grazing. Dominated by herbaceous grasses and medicinal plants.
13	13/C2a Neoza pine forest (<i>P. geradiana</i>)	15.6	Found in dry, cold valleys. Neoza Pine produces edible chilgoza seeds. These forests are highly sensitive and slow-growing.

	13/C2b Dry Deodar forest (Cedrus)	2.3	Occur in higher, drier regions where Deodar is present but moisture availability is low. The canopy is open with sparse undergrowth.
	13/C4 West Himalayan high-level dry blue pine forest (P. wallichiana)	1.03	Found in dry high-altitude areas with scattered Blue Pine. The climate is cold and arid.
	13/C5 West Himalayan dry juniper forest (J. macropoda)	5.76	Characteristic of very high altitudes and cold desert regions. Stunted Juniper shrubs/trees form open forests with minimal ground cover.
14	14/C1b West Himalayan sub-alpine birch/fir forest	5669.4528	Located near the tree line. Dominated by <i>Betula utilis</i> (Birch) and <i>Abies spectabilis</i> (Fir). They withstand heavy snow and strong winds.
15	15/C1 Birch/Rhododendron scrub forest	125.3952	Sub-alpine scrublands dominated by <i>Betula</i> and <i>Rhododendron</i> shrubs. These occur above closed forests and below alpine meadows.
	15/C3 (Alpine Pastures)	23710.0608	Natural alpine grasslands found above tree line. Rich in summer alpine herbs and used heavily for seasonal grazing.
16	16/C1 Dry alpine scrub	1.7856	Occurs in cold, dry high-altitude areas with sparse vegetation. Composed mainly of small, hardy shrubs and cushion plants.
	16/E1 Dwarf juniper scrub	243.7056	Extreme high-altitude scrub formed by low, prostrate shrubs of <i>Juniperus</i> . Found in windy, cold, and very dry slopes.
	TOF/ Plantation	2408.9472	Tree outside forest areas including roadside, farmland bunds, institutional and community plantations. These are artificially managed for fuel, timber, and environmental benefits.

	Water	157.5936	Includes rivers, streams, nallahs, lakes, reservoirs, and water bodies present within the division.
	Non-Forest	61007.0976	Land areas not covered under forest vegetation such as agriculture land, habitations, barren lands, rocky surfaces, and infrastructure.

Table 2.21: Detail of Various forest type found in Rohru Forest Division



Map 2.6: Forest Types of Rohru Forest Division

Description on Major Forest Types in Tract

Himalayan Chir Pine Forest Type

These forests are found in lower elevations of the tract mainly in Sawra Range and certain parts of Rohru and Bashla range in sparse distribution. These forests are highly vulnerable to forest fires due to presence of inflammable and resinous pine needle which make up the forest floor.

Deodar Kail Forests

This is a dominant coniferous tree species in the region, known for its large and valuable timber. Deodar Forest area unique due to their cultural and spiritual significance, strong, rot-resistant wood, and the specific environment they inhabit. Additionally, deodar forests are a vital part of the mountain ecosystem.

The tract exhibits both cohabitation of Deodar and Himalayan Blue Pine as well as segregated forests of Deodar and Kail. The latter is the most predominant forest type in the tract which denotes its high adaptability to different elevations and soil types.

Himalayan Fir and Spruce Forests

These forests contributing to diverse forest landscape. Fir and spruce forests often have a multi-layered canopy and dense understory, creating a diverse and heterogeneous stand structure. The complex structure supports a wider range of species than many other forest types. The needle –like leaves of fir and spruce trees are adapted to withstand harsh winter conditions and allow for year-round photosynthesis. The dense, layered structure and diverse fire types in these forests can result in patchy burns, leaving some trees untouched. These forests are also highly vulnerable to the effects of climate change.

Broad leaved Forests

These forests are found in the higher elevations of the tract. The main species in these forests include Horse Chestnut, Maple, Jamu, Walnut etc. They are fruiting in nature and are crucial for wildlife and avian species conservation. The fallen leaves of trees in these forests enrich the soil with nitrogen. These forests are believed to improve soil moisture and humidity, contributing to a more stable water supply, especially during dry periods.

2.7 Trees Outside Forest Cover

The forest division is having good potential for trees outside forest cover. There are large chunks of private lands which are contiguous and having good tree cover. These areas are governed under Land Preservation Act, 1978 where in a 10 year felling programme is followed for timber extraction. Under the 10 year felling programme, the owner of the land is granted permission to fell a maximum of 1/3rd of the trees or 40 percentage of volume of trees whichever is

less. This helps to encourage regeneration at the same time providing for sustainable harvest. However, in the private areas of the division, the 10 year felling programme is being utilized as a long term plan to convert wooded private lands to orchards in a phased manner.

Chapter-3

Maintenance, Conservation and Enhancement of Biodiversity

3.1 Forest Composition and Distribution

The forests of the tract are highly diverse in nature with as many as 23 different forest types detected in the forest division as the Forest Survey of India Report. This includes the Himalayan Chil Pine Forests in lower elevations, Moist Deodar Forests in middle elevations, Himalayan Blue Pine Forests, Western Mixed Conifer Forests (Spruce/Fir) at higher elevations, Oak forests (both Moru and Kharshu) at varying elevations, Juniper Forests, Birch and Rhododendron scrub forests at the tree line. Apart from this, there are large areas dominated by alpine pasture and dry scrub forests which are comparatively open forests and grasslands.

3.1.1 Forest Types and Correlation with Climate, Soil and other Factors

The forest types of the tract, its composition and distribution is correlative of the altitudinal zonation and the difference in elevation. Based on the differences in elevation, the conditions of soil and climate attributes are also varying. For example, the soil in Chil Pine Forests are sandier in nature whereas in higher elevations especially in Mixed conifer forests, the soil is more deep and clayey loamy in nature. Further, the humus content of the soil in these forests are also higher. The higher elevation forests also have moist forest floor particularly in case of northern aspect forests considering they receive higher precipitation in the form of rain and snow. Generally, it can be thus interpreted that the lower elevation forest types are drier, have low soil depth and are vulnerable to forest fires whereas the higher elevation forest are cooler, moist, have greater soil depth and receive more precipitation.

3.1.2 Summary of Important Trees: The common trees species found in the division are *Pinus roxburghii*, *Pinus wallichiana*, *Cedrus deodar*, *Abies pindrow*, *Picea smithiana*, *Acer acuminatum*, *A. caesium*, *Alnus nitida*, *Betula utilis*, *Cupressus torulosa*, *Cedrella serrata*, *Ficus palmata*, *Juglans regia*, *Juniperus macropoda*, *Olea cuspidata*, *Populus ciliata*, *Populus alba*, *Prunus cornuta*, *Pyrus pashia*, *Quercus leucotrichophora*, *Quercus dilatata*, *Quercus semecarpifolia*, *Rhododendron arboretum*, *Salix spp.*, *Taxus contorta*, *Ulmus waalichiana* etc.

Among the aforementioned tree species, *Taxus contorta* is listed as endangered by the IUCN and figures in IUCN red list. The regeneration of this species is also very less with substantially low number of young trees or woody

regenerations found in the forest floor. On similar lines, the Himalayan Birch i.e. *Betula utilis* although classified as Least Concern by IUCN is also not showing robust signs of regeneration in the forests and are centered in few forests. The common trees of Deodar, Chil Pine, Himalayan Blue Pine, Spruce, Fir are in good number and generally the regenerations are also good in the forest floor. These conifer forests especially Deodar-Himalayan Blue Pine and Himalayan Blue Pine-Spruce-Fir are found as associates with sometimes clear zonation not possible. There is a tendency seen in Deodar-Blue Pine forests that Blue pine tends to dominate and take up the forest floor especially in the event of aftermath of forest fire. No major diseases have been recorded in the trees and as such the growing stock of the division is healthy in nature. Regarding age classes, due to no commercial felling after the ban on green felling, there has been no working of the forests. Hence, almost all the forests are leaning towards uneven aged stand and clear periodic block divisions are not visible. There are large number of mature trees in the forests and associated young crop is also visible in the same forest compartments indicating the uneven age of the forest stands.

3.1.3 Summary of Shrubs and herbs: Given the diversity of forest types and altitudinal zonation, a wide variety of shrubs and herbs is found in the forests of Rohru Forest Division. Many of these shrubs and herbs also form a key source of NTFP for their medicinal value. The important shrubs found distributed are *Artemisia maritime*, *Berberis spp.*, *Coriaria nepalensis*, *Daphne papyracea*, *Desmodium tiliaefolium*, *Indigo feragerardiana*, *Juniperus recurva*, *Prinsepia utilis*, *Lepidagathis lanceolata*, *Ribes orientale*, *Rhododendron lepidotum*, *Deutzia staminea*, *Rubus ellipticus*, *Sarcococca saligana*, *Spiraea canescens*, *Woodfordia fruticosa*, etc.

Important herb species found distributed in the division are *Aconitum heterophyllum*, *Anaphalis nubigena*, *Androsace spp.*, *Aquilegia pubiflora*, *Atropa belladonna*, *Asparagus filicinus*, *Campanula spp.*, *Cannabis sativa*, *Chenopodium album*, *Delphinium denudatum*, *Digitalis purpurea*, *Ephedra gerardiana*, *Fragaria vesca*, *Gentiana kurroo*, *Geranium nepalense*, *Gerardiana heterophylla*, *Hypericum cernuum*, *Impatiens spp.*, *Jurinea macrocephala*, *Gerbera lanuginosa*, *Mentha sylvestris*, *Picrorhiza kurroo*, *Polygonum spp.*, *Potentilla spp.*, *Strobilanthes spp.*, *Valeriana wallichii*, *Rumex hastatus*, *Viola serpens*, *Swertia cordata*, *Saussurea costus*.

3.1.4 Climbers, Grasses and Bamboos: The important grass species are *Andropogon ischaemum*, *Agropyron spp.*, *Arundo donax*, *Cynodon dactylon*, *Calamagrostis littorea*, *Dactylis glomerata*, *Eragrostis nigra*, *Festuca spp.*,

Oplismenus compositus, *Panicum plicatum*, *Poa pratensis*, *Setaria glauca*. etc. The Himalayan bamboo i.e. *Arundinaria spp.* is found distributed in the division.

3.2 Plant Species Diversity

Species diversity indices are a measure of resilience of ecosystems and barometer of ecological diversity. The indices of species diversity are measure of how many different species occupy an ecosystem or forest compartment and how abundantly each of them occur and which among the different species dominate over the other. In order to evaluate these aspects and throw more light on the ecological diversity and inter species relationship, competition and dominance, as per the National Working Plan Code 2014, the parameters of density, frequency, total basal cover, dominance, Importance Value Index are discussed in this section.

3.2.1 Methodology and data collection

The methodology followed for data collection with respect to calculation of various parameters of plant diversity is the technique of Survey and Assessment of Forest Resource using Grid and Quadrants Method (Sample Plots). The data collected during enumeration of plant species in the Plot Enumeration form is utilized to compute the various indices. The sample plot size and its parameters are taken as per the standard set in National Working Plan Code, 2014.

Habitat	No. of Species	No. of Individuals	No. of Sample Plots
Tree	37	8898	430
Shrub	9	336	430
Herb	7	37	430
Total	53	9271	

Table 3.1 Enumeration data of trees, shrubs and herbs in Rohru Forest Division

3.2.2 Importance Value Index (IVI) of species

Importance Value is a measure of how dominant a species is in a given forest area. It is a standard tool used by foresters to inventory a forest. Enumeration of individuals of each species and the DBH of each tree are utilized to derive secondary attributes like basal area (BA- square m/ha), density (D- trees per ha) and frequency. Density is the number of individuals of each species enumerated per sample plots. Frequency is the number of quadrats where plant presence in relation to total plot is enumerated as shown in tables. In calculating this index, the percentage values of the relative frequency (RF), relative density (RD) and relative basal area (RBA) are summed up together, and this value is designated as the Importance Value Index (IVI) of the species. The maximum IVI value is 300 (100 each for RBA, RD and RF). It is assumed that the dominance of a species increases with an increasing importance value and that the species with lowest importance value is the least dominant one.

The details of range wise calculated IVI values using relative density, relative frequency and relative basal area of each species of 5 habitat types as mentioned. Table 3.2 contains the species which are having highest IVI in all the forest ranges of Rohru Forest Division. Working Circle wise Highest Importance Value Index (IVI) of Species in Rohru Forest Division:

Working Circle	Species	Density	Relative Density	Frequency	Relative Frequency	Dominance	Relative Abundance	IVI
Deodar/ Kail	Deodar	6.00	24.47	107.00	22.81	127.21	24.31	71.59
	Kail	14.22	57.99	169.00	36.03	271.68	51.92	145.95
	Rai	0.04	0.15	1.00	0.21	0.61	0.12	0.48
	Tosh	1.91	7.79	64.00	13.65	70.82	13.53	34.97
Spruce/F IR	Deodar	0.26666	1.29	0.06	1.91	1.13	1.04	4.25
	Kail	1.86	9.02	0.25	8.09	8.07	7.45	24.55
	Rai	6.84	33.17	0.81	25.96	40.29	37.20	96.32
	Tosh	6.46	31.33	0.71	22.77	37.99	35.07	89.17
HBL	Ban	1.39	6.68	0.11	3.70	7.02	4.99	15.37
	Jamu	1.76	8.46	0.26	8.89	8.88	6.31	23.65
	Kharshu	4.78	22.96	0.37	12.59	28.98	20.59	56.15
	Maple	2.89	13.88	0.26	8.89	21.96	15.60	38.37
	Walnut	0.67	3.24	0.24	8.15	6.34	4.51	15.89
	Rakhal	1.84	8.87	0.08	2.96	7.30	5.19	17.02
Chil	Chil	9.52631	85.38	1.00	66.67	5.09	88.13	242.27

Table 3.2 Working Circle wise highest Importance Value Index (IVI) of species in Rohru Forest Division

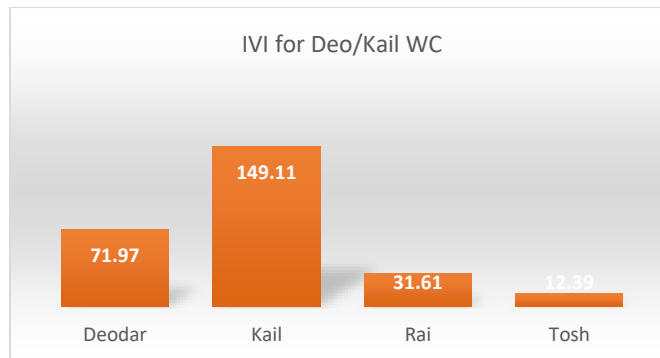


Figure 3.1: IVI for Deodar Kail working circle

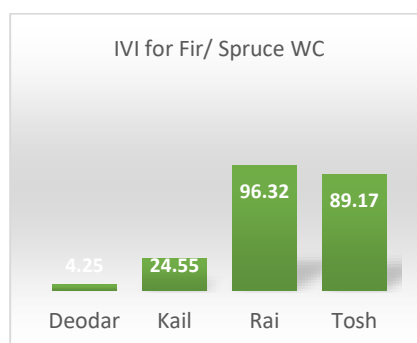


Figure 3.2: IVI for Fir Spruce working circle

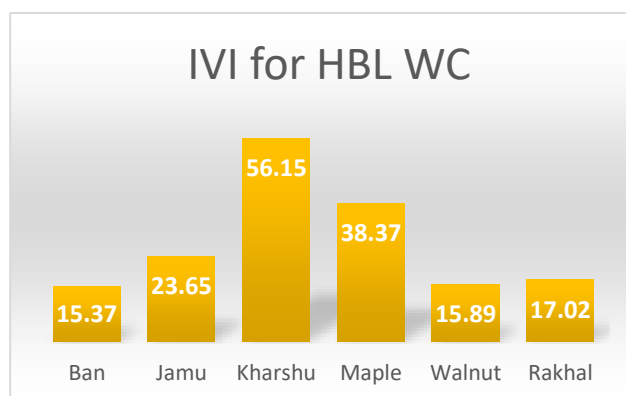


Figure 3.3: IVI for HBL working circle

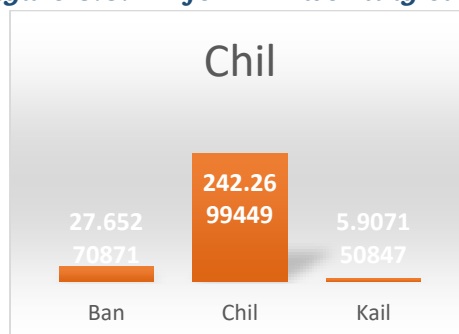


Figure 3.4: IVI for Chil working circle

3.2.3 Shannon-Weiner Diversity Index

The Shannon diversity index (H) accounts for species abundance by calculating the proportion of individuals of each species compared to the total number of individuals in the community (P_i)¹. High values of H would be representative of more diverse communities. A community with only one species would have an H value of 0. If the species are evenly distributed, then the H value would be high. So the H value allows us to know not only the number of species but how the abundance of the species is distributed among all the species in the community. Ecosystems with the higher score being the most diverse.

$$\text{Shannon Index (H)} = - \sum_{i=1}^s p_i \ln p_i$$

Where: $P_i = n/N$ $\ln$ = natural log

n = the total number of individuals of a particular species

N = the total number of individuals of all species.

Working Circle	SWDI
Deo/Kail WC	1.338330811
Fir/Spruce WC	1.956437671
HBL WC	2.543362927
Chil WC	0.601180104

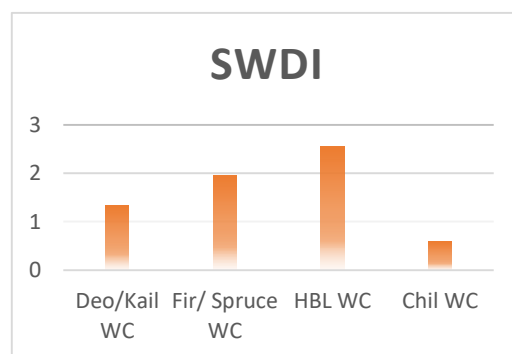


Table 3.3 Working Circle wise Shannon-Wiener Diversity Index (SWDI)

¹

The diversity index clearly denotes the increased biodiversity in High Altitude Broad Leaved Working Circle compared to other working circles which is understood to be due to wide diversity of broad leaved species found in the tract. This indicates the increased ecological importance of this working circle and the immense biodiversity it accommodates.

3.3 Status of Biodiversity Conservation in Forests

The biodiversity of the state of Himachal Pradesh is governed by various legislations like the Indian Forest Act, 1927, Biodiversity Act, 2002, Wildlife Protection Act, 1972 etc. These legislations are further solidified by notification of rules under various acts. The state has notified the Himachal Pradesh Biodiversity Rules, 2019 and also put in place the institution of Himachal Pradesh State Biodiversity Board. Under these rules, the state has notified DFOs as authorized officers for regulating the extraction of biological resources and enforcing principles of Access and Benefit Sharing.

The act also puts in place institution of Biodiversity Management Committees (BMCs) at the panchayat level in order to decentralize management of biodiversity and ensure maintenance of People's Biodiversity Register. The institution of BMCs prevent the exploitation of biological resources and provides the first right of biological resources to local right holders for sustainable utilization. A total of 37,32 and 25 BMCs are registered in Rohru, Chhohara and Jubbal blocks respectively the comprehensive detail of which is annexed in Volume II of this plan as Appendix- XXVI.

The Rohru Forest Division also has been entering into annual agreements with registered MFP contractors who collect the biological resources from right holders and further sell it to open market. A total of 16 such ABS agreements have been made with MFP contractors realizing 2.5 lakh rupees as ABS fees which has been deposited with HP State Biodiversity Board. The comprehensive detail of ABS agreements and fees is given in Appendix-XXX in Volume II of this plan and the list of registered MFP contractors is given in Appendix- XXIX of Volume II.

The tract dealt with in this working plan is having immense biodiversity, the conservation of which is the foremost objective of management. Among such biodiversity, there are many high value medicinal plants which need to be conserved. Recognizing this, a scheme of 'Van Sampridi Jan Sampridi Yojana' was implemented in the division. Under the scheme, several User Groups were created in Rohal under Khashdhar Forest Range in which local right holders were encouraged to

raise and sustainably extract medicinal plants from delineated forest patches. 14 such user groups were formed and the program resulted in sustainable livelihood generation for the user groups and conservation of medicinal plants in the area.

Apart from this, a key part of biodiversity conservation in the division has been the closing down of certain areas for Assisted Natural Regeneration to prevent grazing and encourage and enhance biodiversity in fenced and protected areas.

3.4 Status of Species Prone to Exploitation

In the tract dealt with in this plan, no such species is prone to unsustainable harvest looking from prism of legal extraction especially considering there is a blanket ban on green felling in the area. Regarding extraction of Non Timber Forest Produce, there is a 4 year extraction cycle which is followed ensuring sustainability in extraction. However, there are chances of illegal extraction and exploitation in case of certain high valued species and its usufructs.

One such scenario is that of *Taxus contorta*, which finds its place in the IUCN Red List. It is likely that the illegal extraction of tree's bark which is used in cancer is one cause for the decline of this species and the virtual absence of young trees. Similarly, *Trillium govanianum* (Nag chatri) is a high valued medicinal plant which was once extracted in the DodraKwar Range in the 4 year cycle following which the species has not revived in the said forests.

In summary, it can be assumed that there is no major threat when it comes to exploitation in the case of trees considering the ban on green felling. Whereas, in the case of shrubs and herbs, there is a need to keep check on illegal extraction which can lead to over exploitation and threaten biological resources.

3.5 Conservation of Genetic Resources

As on date, there are no permanent preservation plots/ sample plots/ medicinal plants conservation areas which have been demarcated and delineated in the division on record. However, 14 Ha area in Rohal Forests of Khashdhar Forest Range is being managed under the 'Van Sampridi Jan SampridiYojana' for the conservation of medicinal plants and genetic resources. Apart from this, in order to establish an ex situ facility

for raising of MAPs, a nursery for raising of medicinal plants was established at Rohal. Currently, a nursery at Manera Thatch is planned to be developed for raising of medicinal plants.

3.6 Fauna and their habitats

The tract dealt with in this working plan courtesy of wide diversity in forest types and habitats has immense potential to support a variety of wildlife whether it be mammalian fauna, reptiles, amphibians, pisces or avifauna. The vast diverse landscapes entail that there are a lot of mosaic habitats which can support rich wildlife who make the lesser Himalayas their home.

It is understood that the historical habitat range of many species of the Western Himalayas falls in this forest division. However, there is a serious gap of data when it comes to the wildlife presence. There is little meaningful data in terms of number of different species, abundance of species, habitat correlation, species density where minimal scientific literature is available. Hence, the description of existing status of fauna is difficult. On the basis of field anecdotes, it is clear that there was significant hunting pressure from villagers as hunting is imbibed in the culture although no cases of poaching or hunting was detected during the period of previous working plan. It is assumed that it is because of the hunting culture especially during winters after the snowfall that it is increasingly difficult to spot a wild animal in these forests.

The following are some of the important faunal species along with their suitable habitats described in the section below:

3.6.1 Mammals

Sr. No.	Common Name	Local Name	Zoological Name	Schedule
1	Leopard	Tendua	<i>Pantherapardus</i>	I
2	Goral	Goral	<i>Nemorhaedus goral</i>	I

3	Barking Deer	Kakkad	<i>Muntiacus</i> <i>Muntjak</i>	II
4	Rhesus Macaque	Bandar	<i>Macaca Mulatta</i>	II
5	Grey Langur	Langur	<i>Presbytis entellus</i>	II
6	Leopard cat	TenduaBilli	<i>Felis bengalensis</i>	I
7	Porcupine	Shail	<i>Hystrix indica</i>	I
8	Red Fox	Lomadi	<i>Vulpes vulpes</i>	I
9	Himalayan Yellow Throated Marten	Sakralu	<i>Martes flavigula</i>	I
10	Indian Giant Flying Squirrel	Eenn	<i>Petaurista philippensis</i>	II
11	Sambar	Raal	<i>Rusa unicolor</i>	I
12	Himalayan Black Bear	Baalu	<i>Ursus tibetanus</i>	I
13	Jungle Cat	Jungli Billi	<i>Felis chaus</i>	I
14	Royle's Pika		<i>Ochotona roylei</i>	I
15	Himalayan Musk Deer	Kasturi	<i>Moschus leucogaster</i>	I

Table 3.4: List of Mammals in Rohru Forest Division

The flagship species of conservation in the Rohru Forest Division are described below:

1. **Common Leopard**

The Common Leopard is distributed throughout the tract dealt with in this working plan and they adapt greatly to the diverse forest types and habitat making their presence felt in all forests across climate, terrain and prey populations.

Being the apex predator in the tract, the common leopard is a keystone species in the eco system with the population of this apex predator helping in controlling the population of prey species thus helping in conserving the landscapes and enabling the sustenance of habitat.

There have been reports of common leopard sighting in various parts of the division near human settlements rearing the head for chances of human-leopard conflict. The leopard being a highly adaptable species, there is no unique habitat for the leopard. It is found in all types of forest even in scrub, dry grassland forests and dense tree covered forests.

2. Himalayan Black Bear

The Himalayan Black Bear is the most important flagship species of the tract dealt with in the plan. The suitable habitat for the Himalayan Black Bear includes the Deodar and Oak forests with bears particularly taking a liking to the Oak forests which have plenty of acorns. This keystone species is also found all across the tract with higher altitude forest dominating the habitat suitability of the black bear.

The predominance of fruit orchards in the vicinity of forest has greatly increased the human-bear interface with a large number of bears straying into human settlements and orchards in search of fruits. This exacerbates the negative relationship between orchardists and bears with few resorting to elimination and revenge killing of bears. The human-bear conflict is a significant management issue which must be paid heed to. The detail of human-wildlife conflict in which majority of the cases pertain to Himalayan Black Bear and is given in the table below:

Sl. No	Year wise	Name of Forest Range	Number of conflict cases	Number of human deaths	Number of human injury/disability	Number of livestock kills
1	2015	Khashdhar	6		2	Cow 5
2	2016	Rohru	2		1	Cow 2

		Khashdhar	2			Horse 1 Cow 1
		Dodra Kwar	1	1		
		Tikkar	2			Cow 2
3	2017	Dodra Kwar	9			Sheep-15 Donkey 2
		Rohru	1			Horse 1
4	2018	Khashdhar	17		4	Donkey 1 House 2 Cow 4 Sheep 16 Mare 4 Ox 1
		Rohru	1			Cow 1
5	2019	Khashdhar	5			Cow 2 Donkey 1 Mare 1 Horse 1
		Dodra Kwar	1		1	
		Rohru	3			Sheep 5 Cow 1
		Jubbal	1			Cow-1

6	2020	Khashdhar	15		2	Horse 1 Sheep 21 Mare 1 Cow 1 Ox 1
		Rohru	7			Cow-2 Mare 1 Sheep 12
		Jubbal	1			Sheep 1
		Dodra Kwar	2		2	
7	2021	Khashdhar	7		1	Cow 9 Horse 2 Cow 1
		Rohru	1		1	Cow 1
		Dodra Kwar	1		1	
8	2022	Rohru	3			Horse 1 Cow 2
		Dodra Kwar	1		1	
		Tikkar	1			Cow 1
		Khashdhar	13			Sheep 61 Cow 1

9	2023	Khashdhar	27		3	Sheep 48 Mare 3 Horse 2 Ox 1 Cow 6 Donkey 2
		Dodra Kwar	1		1	
		Rohru	1		1	Sheep 1
10	2024	Rohru	2			Cow 2
		Khashdhar	12		1	Sheep 23 Cow 3
			146			

Table 3.5: Detail of Human- Wildlife Conflict in the Tract

Currently, compensation for wildlife damage is being given in cases of human-wildlife conflict. It is noted that maximum number of bear conflict incidences are reported from Forest Ranges of Khashdhar and Jubbal. There is a need to collect more data and set up robust conflict mitigation mechanisms to manage the human-bear conflict.

3. Himalayan Musk Deer

Commonly known as the Kasturi and famed for its musk pods, this critically endangered herbivore is likely to have its presence in the tract dealt within the working plan although there is a data gap when it comes to confirmation of the species. However, the tract is part of its distribution and historical habitat. The Musk Deer is on the verge of extinction from the Himalayas owing to its uncontrolled poaching for extraction of musk which

is highly valuable in the wildlife crime market. It is likely that even in the tract the hunting of musk pods was prevalent or still is.

The tract dealt with in this plan has highly suitable habitats for the musk deer with many forests in the sub alpine and alpine region ideal for supporting musk deer populations. This includes the high altitude forests of Khashdhar – Chandernahan, Buranghatti, Moral Danda peak and the Chanshal pass region apart from the Rupin pass. These forests where the tree line culminates and alpine meadows take over is suitable habitat for musk deer. It is a habitat specialist herbivore tuned to the alpine scrub forests.

4. Himalayan Ghoral

The Himalayan Ghoral is a near threatened ungulate species which prefers steep rocky ridges with grass cover. Its brown coat makes it ideal for camouflage as safety from predators. It is a social animal with generally the species being spotted in herds.

The tract dealt with has many suitable micro habitats for the Ghoral. The Sawra range forests with Chil pine forests and steep rocky ridges are suitable habitats of the Himalayan Ghoral. The Chhajpur forests here also boundary the Talra Wildlife Sanctuary which is presumed to have good population of Ghoral. The Ghorals are other wise distributed throughout the tract with its elevation ranging from 900- 2500 meters making it a notable presence in wide variety of forest types.

5. Red Fox

The Red Fox is a small carnivore species which plays a vital ecological role in the maintenance of food web and ensuring the balance in ecosystem. They help to control the population of small prey while they follow an omnivorous diet feeding on insects, fruits and also clean up the eco system by scavenging. The Red fox has a thick fur brown coat and white tail which distinguishes it from its sister species.

The tract dealt with is an ideal habitat for the Red Fox given its widespread presence in forests in mid elevations whether it be the Chil pine zone or the Deodar-Kail forests where it is able to feed on a variety of small birds, insects, rodents and other small prey.

6. Barking Deer

Locally known as Kakkar, the Indian Muntjac is a common Himalayan herbivore which prefers wooded compact forests. It has a terrific brown colored coat which makes it discernable. Further, it has a solitary nature in contrast to other herbivores which also sets it apart.

This ungulate species makes the tract dealt within this plan its home thanks to the last tracts which are woody and occupied. The oak forests in general are preferred by the barking deers. Being a browser as well as a grazer, it feeds on grass, shrubs and low hanging leaves from trees. It generally prefers a forest with higher leaf litter, the reason for which it is expected to prefer the many oak forests of the division.

3.6.2 Birds

The tract dealt with has immense diversity in birds considering the presence of riverine tract, mountains, dense forests, open grasslands, scrub lands and wooded landscapes. This highlights the diverse habitats and micro habitats which are available to avifauna.

The birds of prey include eagles, kites and vultures which are found in the tract. The Himalayan Griffon is the most common vulture found. It is a vital species in the eco system which cleans up through scavenging enabling a healthy food web. Apart from the Griffon, there are chances of White Rumped Vulture and Red Headed Vulture which are critically endangered and are most important from conservation point of view.

The tract is also habitat to wide variety of pheasant species. In the lower elevations, the Wild Jungle Fowl is found. In mid elevations, the Cheer Pheasants are found especially in dry grasslands whereas in temperate wooded forests of similar elevation, Koklass pheasants find suitable micro habitat. In higher elevations, the colourful Himalayan Monal is found which feeds on roots, tubers, insects, worms etc. Most of these pheasants exhibit sexual dimorphism and also play key ecological role in seed dispersal. The presence of Western Tragopan, the state bird is also likely in the tract especially given it is a habitat specialist preferring the Kharshu Oak forest (*Quercus semicarpifolia*). Considering the tract has high density of these forests at higher elevations, the presence of this endangered bird is a distinct possibility.

Apart from these birds, the tract supports large number of terrestrial birds. These include flycatchers, woodpeckers, warblers, doves, tits, finches, sparrows etc. They are found mostly in wooded landscapes and mosaic habitats. Most of these birds are classified as Least Concern in IUCN given their widespread dispersal in non forest areas also. Nevertheless, they play an important ecological role in dispersion of seeds and maintaining vegetation cover.

The tract also has a riverine portion in which the common birds found are White capped redstart, Plumbeous redstart, kingfishers and forktails.

3.6.3 Reptiles

Reptilian fauna found in the tract includes snakes, lizards, gekos. Among snakes, the Himalayan Pit Viper is a vital species found in the tract. The other species found in the tract include the Himalayan Trinket, Checkered Keelback, Himalayan Mountain Keelback, Common Krait, Rat Snake. Among lizards, the monitor lizard and rock lizard are found in the tract.

3.6.4 Fishes

Considering the presence of Pabbar river, several fishes are found in the tract along the length of Pabbar. These include the trout fish and the Mahseer.

3.7 Threats and Challenges related to Wildlife

3.7.1. Habitat Fragmentation

Habitat fragmentation owing to increasing linear infrastructure through forests at break neck speed is the major threat for wildlife considering the splitting of wildlife corridors. This has increased exponentially after the process of diversion of forests was simplified under Forest Rights Act, 2006 leading to **504** cases of forest diversions under FRA, 2006 mainly for providing connectivity to villages and apple orchards in the region.

Apart from this, encroachments as discussed in previous chapters is another thorn in the foot of wildlife conservation as it has cornered previous wildlife habitats and robbed the willdife of their homes.

3.7.2 Hunting/ Poaching

The culture of hunting is prevalent in Theog, Chopal, Jubbal and Rohru regions with large number of gun license and gun ownership. Given the difficult terrain and geography, it is difficult to keep a check on hunting. In addition to licensed guns, it is also possible that country made unlicensed guns are utilized. The hunters are on the prowl mostly during winter season when footmarks/pugmarks of animals become visible. No cases of hunting or poaching have been officially recorded during the previous plan which points to a lack of effective patrolling and law enforcement mechanism with respect to hunting.

3.7.3 Human-Wildlife Conflict

The main economy of the region is based on apple and fruit production. However, there are cases in which wildlife are responsible for crop depredation. This mainly involves Himalayan Black Bear, Rhesus macaques, Grey Langurs and avi fauna. In such cases, people resort to revenge killing which threatens wildlife.

As per the H.P. government notification No.FFE-B-A(10)-1/2009 dated 25-09-2018, compensation is being disbursed to affected victims of human-wildlife conflict. As per the notification, 4.0 lakh rupees is disbursed in case of death of human being and 2.0 lakh rupees in case of permanent disability. Apart from this, livestock losses are also compensated under the notification.

3.7.4 Forest Fires

Large parts of the tract dealt with are vulnerable to forest fires either in the Summer or Winter season when dry fuel is present on forest floor. This includes the panwis and grass lands with sparse vegetation which are ideal habitat for wildlife. Forest fires threaten the habitat and also tends to lead to loss of life especially for the young wildlife. It is hence identified as a major threat especially given the increasing tendency of global warming.

3.7.5 Extended Habitat in Proximity to Protected Areas

The Eco Sensitive Zone of Talra Wildlife Sanctuary falls in the Chhajpur block of Sawra Forest Range. These forests are excellent habitat for wildlife including the Himalayan Ghoral, Barking Deer, Himalayan

Black Bear, Common Leopard. In the extended habitats also, the threat of habitat fragmentation and poaching looms large which negatively affects wildlife.

3.8 Protection and Management of Fauna

The previous working plan of the division had a Wildlife (Overlapping) Working Circle which mentioned few measures to conserve wildlife. This includes minimizing the guns, protection from forest fires, retaining dry and hollow trees, conserving broad leaf forests. However, there has been little concrete action on the ground towards wildlife conservation to have a meaningful impact. The following are some of the actions taken for protection and management of fauna:

- Over the past years, there has been no NoC issued for gun licenses in case of crop protection and this has helped clamp down on the usage of gun to an extent
- **Construction and maintenance of water ponds** in forest areas has helped retain moisture, conserve soil and also provide water availability for wildlife. The detail of such ponds made is given in the annexure to this plan.
- **Fire Protection:** The clearing of fire lines and engagement of fire watchers during fire season has mitigated the impact of forest fires conserving wildlife habitat
- **Monkey Sterilization:** In order to manage human-monkey conflict, rhesus macaques were captured and sterilized enabling targeted reduction in population and providing relief from conflict
- **Rescue of injured wildlife** and their treatment and rehabilitation at Rescue and Rehabilitation Center in Shimla
- **Providing Compensation for Human-Wildlife Conflict cases:** As per the HP government notification, the division is providing compensation for victims of human-wildlife conflict in terms of loss of livestock, human injury/ fatality, deaths. A total of 146 such cases have been processed in which a total amount of 25,56,000/- Rs has been handed over as compensation to victims. This has helped the cause of conservation and helped quell revenge mentality.
- **Awareness on Wildlife Conservation:** Every year, programs are organized targeting youth and children to spread the message of wildlife conservation especially during wildlife week and during other notable days.

CHAPTER-4

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

4.1 Status of Regeneration

The status of regeneration was monitored through regeneration plots laid out in the tract. Overall, the tract is having good regeneration in several forest types. It is seen that the regeneration in Deodar Kail forest is excellent in most of the forests. On the other hand, the regeneration of Spruce-Fir is comparatively lesser. The regeneration of Oak forests especially that of Kharshu Oak is varying with respect to forests. In some reaches, the crop is highly mature in nature and there is absence of young crop and established regeneration whereas in some forests there is sufficient regeneration. The regeneration in case of *Taxus contorta* is very worrying given there is substantially low numbers of woody/ whippy regeneration in the forests.

The following factors are identified with respect to regeneration of trees in forests:

- **Light:** It is an established factor that light is an important factor of regeneration in forests. The requirement of light varies for different species with Deodar and Himalayan Blue Pine being significantly light demanding species. Spruce Fir Trees are also light demanding but are in general more shade tolerant.
- **Grazing:** There has been a considerable decline in biotic pressure owing to dip in local diurnal grazing. This has substantially help enhance the regeneration in forests. However, the threat of migratory grazing still persists with respect to regeneration
- **Forestry Activities:** The absence of silvicultural working in the forests has adversely affected regeneration as the canopy has continued to remain closed for long years preventing required light for regeneration. The salvage removal from forests has positively affected the regeneration with at least some sort of opening of the canopy happening in forests where salvage lots were worked by HP State Forest Corporation.
- **Impact of Good Seed Years:** The frequency of good seed year positively affects regeneration. The predominance of good seed years has positively enabled regeneration in the case of Deodar-Kail working circle forests.
- **Forest Fires:** The increasing forest fires has adversely affected regeneration with young crop succumbing to forest fires easily.

- **ANR/ Plantation:** The closing of forests for grazing and undertaking plantation in these areas has assisted and enabled regeneration.

In order to evaluate regeneration in various sample plots chosen, the following categorization is made out based on the number of seedlings, saplings and adult plants in the sample plot taken for data collection.

4.1.2. The regeneration data collected from the sample plots shows is summarized in the table below based on the number of seedling/saplings in the sample plot:

Sl. No	Total No. of Seedlings and Saplings recorded in Sample Plot	Category	Sample Plot Counts
1	0 – 5	Poor	280
2	6 – 10	Fair	105
3	11 – 20	Good	45

Table 4.1: Regeneration detail for the tract

Sr.No.	Name of Range	Number of Sample Plots having poor regeneration	Number of Sample Plots having fair regeneration	Number of Sample Plots having good regeneration
1	Bashla	18	9	8
2	Rohru	40	16	6
3	Jubbal	19	13	3
4	S Nagar	53	14	5

5	Khashdhar	88	20	12
6	Tikkar	17	8	8
7	Dodra Kawar	49	8	5

Table 4.2: Range wise Regeneration detail of the tract

4.2 AREA AFFECTED BY FOREST FIRE

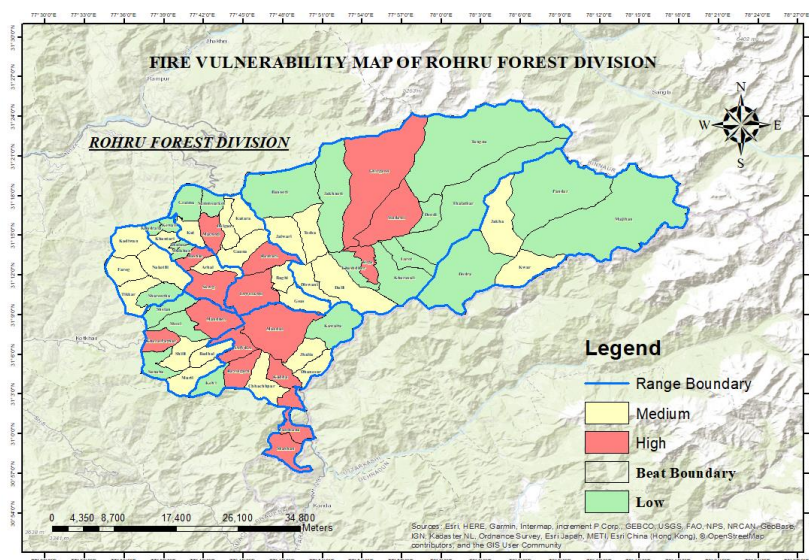
The tract dealt with in the forest division are prone to forest fires especially the Chil Pine forests, Himalayan Blue Pine forests, dry grasslands and panwis. The tract is vulnerable to fires in both winter and summer seasons. The trend of forest fires broadly shows an increasing trend with greater detection possible due to FSI alerts received from MODIS and SNPP satellites. There is also a trend in which forest fires occur adversely every 3 years or so in which fuel accumulates on the forest floor. The complete detail regarding forest fires given in the Appendix-XVII in Volume-II of this plan. The following table summarizes the forest fire incidents and the forest area of the tract which are affected due to the forest fires in past 10 years:

Sr.No	Year and Season	Total No of Case	Total Burnt Area (in ha.)	Plantation Area Burnt (in Ha.)	Total Loss (RS)
1	2014-15	33	138.5	36	591653/-
2	2015-16	44	261.86	46.11	1839000/-
3	2016-17	64	236.5	63	1599000/-
4	2017-18	41	200.56	159.6	1467700/-

5	2018-19	27	182.183	66.93	9811600/-
6	2019-20	22	76	6	2500/-
7	2020-21	95	462.67	3068	2787377/-
8	2021-22	59	300.43	30	1175116/-
9	2022-23	89	543.75	36	5136900/-
10	2023-24	104	711.35	66	12544531/-

Table 4.3: Detail of Forest Fire incidents during last 10 years

Based on the fire incidents, a fire vulnerability map of the division based on beat level vulnerability is given below:



Map 4.1 Fire Vulnerability Map of Rohru Forest Division

4.2.1 Forest Fire Mitigation Measures

In order for fire protection and mitigation, the following measures are adopted currently in the tract

1. **Registration of All Forest Staff on FAST Portal for Fire Alerts:** SMS based fire alerts are disseminated from FSI portal to all field staff upto DFO level who are registered to receive fire alerts on their mobile phones. As soon as the alerts are received the concerned team at block or range level depending on intensity of fire is dispatched.
2. **Regular Patrolling and Engagement of Fire Watchers:** During the fire season, all staff are asked to remain at Headquarters and no leaves are provided. Further, fire watchers are engaged in fire sensitive beats/blocks to assist field staff. The regular patrolling of staff along with fire watchers helps in immediate detection and action of fire protection
3. **Clearing of Fire lines:** Before the onset and during the fire season, the fire lines of the division are cleared to provide break to forest and safeguard forests. The following are the fire lines which are presently maintained in the division:

Sr.No.	Range	Name of Forest	Length of Fire Line	Starting Point of Fire Line	End Point of Fire Line
1.	Rohru	C.No. 47(a) Seri 47(b)	1.00km	Sungari C.No.47 (a)	Sari C.No.47 (b)
2.		Dalgaon C.No. 52 (c) Satigad C.No.48 (a) , Nasari C.No.48 (b)	1.5km	Dalgaon C.No. 52 (c)	Nasari C.No.48 (b)
3.		Gowas C.No.82 (a)	1.00km	Gowas C.No.82 (a)	Gowas C.No.82 (a)

4.		Dabri 83b (ii) & C/No. 83 (c) i Baggi	1.00km	Dabri 83b (ii)	C/No. 83 (c) i Baggi
5.		Lowerkot C.No.84 (b)	2.00km	Lowerkot C.No.84 (b)	Lowerkot C.No.84 (b)
6.	Bashla	C.No.31a(v) Jhaltu	1.5km	Jhaltu	Malkhoon Nallah
7.		C.No 31a(i) C.No 31a(iv)	1.km	C.No 31a(i)	C.No 31a(iv)
8.		C.No 30c(ii) Malkhoon C.No. 30b(i) Bhalara	1.5km	C.No30c(ii)Malkhoon	C.No. 30b(i) Bhalara
9.		C.No 30 b(i) bhalara C.No 30a Bhalara	1.5km	C.No 30 b(i) bhalara	C.No 30a Bhalara
10.		C.No 34 Sharog	2.km	C.No 34 Sharog	Mundidhar
11.		C.No 28a Kewli C.No 28 b Bajeshal	1.km	C.No 28a Kewli	C.No 28 b Bajeshal
12.	S/Nagar	Shashan C.No 7(a) DPF Kashta (ii)	8.km	Shashan C.No 7(a)	DPF Kashta (ii)

Table 4.4: List of Fire Lines in the tract

4. The practice of control burning is done to reduce the fuel load in forests and to prevent spread of forest fires. It is prescribed to be done mainly along fire line and road adjacent forests. The following is the detail of control burning executed in forest division in the last 5 years:

Sr.No.	Name of Forest Division	Year	Area control burned (in Ha)	Expenditure (in Rs.)
1	Rohru	2020-21	160 ha.	80000
2		2021-22	Nil	
3		2022-23	Nil	
4		2023-24	Nil	
5		2024-25	200 ha.	100000

Table 4.5: Detail of control burning during last 5 years

5. **Awareness Campaigns:** Organizing mass awareness programs for local people through JFM/Eco-development Committees for collaboration in forest fire protection and control along with forest department.
6. **Community Participation:** The local villagers are involved in fire fighting and fire protection. The right holders are duty bound to assist the field staff in dousing forest fires and in case they are not cooperating, their rights of timber distribution, MFP access can be suspended.
7. **Techniques of Fire fighting:** There are various fire fighting techniques in the vogue for dousing the fire. The following are some of the techniques employed currently in the field:
- a) **Control Line Method:** A control line is established to stop fire spread by robbing fire of its fuel by physical means, i.e., by breaking the availability of fuel continuity. A control line can also be established by directly extinguishing the fire along the edge or by making the fuels non-inflammable. However, the physical removal of fuel is by far the most

common approach. The fuel can be removed with fire rakes and fire can be suppressed with the help of fire beater/ fire broom/ fire swatter or locally made bush broom/ *Jhapa*.

b) Area Method: Instead of constructing the control lines on the perimeter of the fire, the burning area or the part of it, may be treated as a whole. The small fires or part of large fires, are frequently treated with water or other chemicals if available on an area basis. The fire from all sides of an area is contained by cutting fuel with the help of fire rakes from the periphery. The fire is contained in an area.

c) Counter firing: It means the deliberate setting of fires at a substantial distance from the front of a forest fire to reduce fuels in its path or to change the direction of fire. The basic principle of backfiring is to fight fire with fire- some area is deliberately sacrificed to prevent a larger loss. Fighting fire with fire is always risky since larger backfires as well as main fire may become unmanageable. Some calculated risks are always necessary. Wind direction is always being considered during backfiring as fire moves towards prevailing wind direction.

d) Water for fire suppression: The three-way effect of water on fire-

- Brings down the temperature of the fire-affected area down.
- Exerts smothering effect on fire by reducing the availability of oxygen.
- Wets the fuel and making it temporarily non available for combustion.

8. Fire Burnt Area Damage Assessment: The damage of fire burnt area is assessed as per the Himachal Pradesh Fire Protection Manual in which area more than 5 Ha is assessed by DFO and more than 10 Ha is assessed by the CF. All fire burnt areas are uploaded in the FIRE portal. The damages are assessed in 2 stages one immediately after the fire and one after the rains.

4.3 Area damaged by Natural Calamities

4.3.1 Flood and Landslides: The tract is prone to floods especially low lying areas near the river bank. The most devastating flood in Chirgaon in 1997 reaping rich havoc in the region. Similarly, in 2023 also the heavy monsoon had caused flooding and landslides which usually occur together during the monsoon season.

a. Stream bank protection: Stream bank protection is the process of placing material along a bank of a watercourse for the purpose of erosion control to prevent the loss of bank material and property adjacent to the banks of the watercourse. One of the main reasons for the frequent occurrence of landslides in the hilly areas is toe cutting by streams and rivers. In order to confine the flow and protect the bank, construction of spur walls/retards is desirable to deflect water of torrents from toe cutting of banks particularly at the curves. As a matter of fact R.C.C. block spur wall involves large scale work with heavy cost. Therefore, wire mesh boulder or stone spur walls are constructed as there is no dearth of boulders or stones in the hills.

In the silt setting between parallel lines of spur walls, species which grow well near stream beds are planted e.g. *Ipomoea*, *Salix*, *Ulmus*, *Jamun* and local grasses etc. The spurs and dykes are also made with the help of growing vegetation like *Ipomea* and grass. In the tract dealt with, one can spot such vegetation along the length of Pabbar river.

b. Channelization of River: There have been many projects brought in for channelization of the river in the tract to safeguard the land and prevent bank erosion. These projects are executed by the IPH and PWD departments after taking permission from the district administration. These projects have helped provide stop gap arrangements for preventing flooding in the valley.

4.3.2 Soil Erosion: Soil erosion takes place on the Himalayan mountains and hillocks due to removal of vegetation by flood, forest fires and anthropological pressure. A separate Working Circle for Soil and Moisture Conservation was formulated in the division considering heavy soil erosion on the higher slopes. On the basis of stock mapping analysis, the forest area of the division can be broadly divided into three categories-

a. Soil erosion prone areas- These are areas where the strata is loose and prone to soil erosion. This includes areas which suffered landslips recently requiring concerted action to retain soil and conserve moisture. The slips on the way to Chirgaon, at Jakha and Kwar villages fall in these category where significant landmass has slipped. In these areas generally forest cover is also limited leading to chances of erosion. Further, increased road construction activity under Forest Rights Act is also leading to soil erosion.

b. Rootstock rich areas- At moderate gradients, there are still some rootstocks of prime species like fir and kail, and that of miscellaneous species. Closure of the area, gap plantation aided with natural regeneration will help retain the area into good forests.

c. Barren areas- Lies mostly at the foothills near the habitations. It is devoid of any vegetation, except some bushy plants and dry grasses.

4.3.2.1 Mitigation strategies to control soil erosion:

Following techniques are being followed for soil and water conservation in the division:

4.3.2.1.1 Gully plugging and nala control

To control gullies and nalas, the erosive velocities are reduced by flattening out the steep gradient of the gully by constructing a series of checks which transform the longitudinal gradient into a series of steps with low riser and long flat treads. This involves construction of check dams (vegetative, stone and crate wire or wire mesh check dams). Spur walls and retaining walls are also constructed for bank protection to save valuable agricultural fields from being cut up. Mechanical measures (check dams) are supplemented by planting in gullies behind check dams. All gully or nala control work starts from the top of gully/nala and this activity must cover both non-arable and arable land.

Following types of structures are being constructed under mechanical measures for control of soil erosion:

a. Brushwood check dams

These are constructed with cheap readily available materials. In brushwood check dams small branches preferably of coppiceable species like poplar are fixed in two parallel rows across the gully or nala and packed with brushwood between the rows of these vertical stakes. The vertical stacks can be tied down with wires or fastened with sticks across the top. The important point in erecting brushwood check dams is to pack the brushwood as tightly as possible and to secure it firmly. Brushwood check dams are generally meant for small gullies or at the starting stretch of the gullies.

Any tree or shrub species, such as bamboo, poplar, *Cassia*, *Ipomea* etc., are used as posts. The flexible branches of trees, flexible stems of shrubs and the strips made of bamboo stems used as interlink material. These materials are woven between wooden posts driven into the ground. Brushwood check dams are also constructed with the help of pine needles. Pine needles are woven with barks of trees or with the help of local bushes and these woven material of pine needles is placed across the gullies at sufficient distances. The spaces behind the brushwood check dams are filled with soil to the spillway.

b. Stony check dams

For constructing dry stony check dams, the site is cleared and the sides are sloped 1:1. The bed of gully is excavated for foundation to a uniform depth of 0.45 m to 0.60 m and dry stones are packed from that level. Over the foundation, dry stone masonry superstructure of the check dam is constructed. The stones are dressed and properly set in with wedges and chips. The width of check dam at the base is approximately equal to maximum height and successive courses are narrower so the section is roughly a trapezium. In the centre of the dam portion sufficient waterway is allowed to discharge the maximum run off.

c. Crate wire or wire mesh check dams

When a dry stone check dam is held down with woven wire netting, the life and strength of the structure is enhanced many fold. The mesh of wire is generally 0.15m x 0.15m and care should be taken that stones used are larger than the mesh size so that stones do not pass through the mesh. After completion of stone work, the wire netting is tied, covering the masonry tightly so that the whole structure becomes one piece. The stability is secured by careful masonry work, setting and wedging. Wire mesh stone check dams have proved very useful and long lasting than ordinary stone check dams.

d. Diversion drains

The diversion drains are used to cut the runoff away from gully head; from the area kept under treatment of erosion control etc. Apart from this, they also serve as a spillway to take out the water from the earth dam, and to protect critically planted areas from washing. Diversion drains intercept the storm water which could otherwise flow down from higher ground on to the arable land which it protects. It is the first line of defense and vital for protection systems and structures below down. It effectively controls the runoff from outside the arable land and conducts it safely to natural outlets. The diversion drains are aligned on non erosive and non silting grades. It is protected from silting. A narrow and deep ditch does not get silted up as rapidly as a broad and shallow ditch of the same cross sectional area and is therefore, self maintaining. Grasses are planted which are local and spread well.

e. Contour trenching

Contour trenches are widely used for moisture conservation in plantation areas. It is a practice of excavating trenches along a uniform level across the slope of land. Bunds are formed along the trenches on the downstream side with material taken out of them. The expected service life of a trench is about 3 to 4 years, after which, the vegetation is supposed to perform the conservation function. Contour trench break the velocity of runoff and store whole or part of runoff. If contour trenches are constructed on the slope at the interval, just before runoff water attains erosive velocity; their life will be much more. The intercepted runoff percolates through the soil slowly and is made available to the plants.

They are normally used in the upper portion of watershed for the plantation of forestry plants. Fodder grasses planted on the bund and trees planted just downstream of the trench or in the trench itself in gravelly soil. Contour trenches are of two types:

f. Continuous trenches

The trenches are called continuous when there is no break in length and can be 10-20m long across the slope depending upon the width of the field. Trenches are generally used in low-rainfall areas and dug with a cross section varying from 30cm to 45cm x 45cm.

g. Staggered trenches

The staggered trenches are used to cut the slope and also for checking soil erosion. In staggered trenching, the trenches are located directly below one another in alternate rows and in a staggered fashion. These may be 2m to 3m long and the spacing between the rows may vary from 3m to 5m.

4.4 Area Protected from Grazing:

The area of the tract dealt with has seen a considerable decline in grazing pressure over the years with people in the tract becoming highly prosperous and affluent owing to the apple crop. This has reduced the number of livestock reared by people. However, there is significant pressure from migratory graziers which includes Gujjars, Gaddi etc. The carrying capacity of the tract for grazing is worked out on the basis of below mentioned table:

Total Area of Division (in Ha)	Area Closed for Plantation / ANR (in Ha)	Available Area for Grazing (in Ha)	Name of Cattle Animals	Number of Units	Number of Animals	Number of units in total	Required Grazing Area (in Ha)
1305569.241	1075.55 ha.	17555.88ha.	Goat	1.5	3886	5829	2914.50
			Kine	4	5352	21408	10704
			Mule	5	563	2815	1407.50
			Sheep	1	23443	23443	11721.50
			Horse	4	426	1704	852
			Buffalo	6	30	180	90
			Donkey	3	229	687	343.50
							28043

Table 4.6: Calculation of Carrying Capacity of the Livestock Population in the Tract

It is also to be noted that the division has large area of alpine, sub alpine pasture and panwis. Hence, there seems to be enough availability of fodder in the forests to sustain grazing. However, there are highly biodiverse landscapes in the area which sustains Rare, Endangered and Threatened Flora that overlap with grazing area. The chances of indiscriminate grazing in such areas such as Moral Danda peak, Chander Nahan, Buran Ghatti, Rupin Pass can adversely affect the biodiversity and lead them to local extinction. Hence, it is vital that these areas are brought under rotational closure.

4.5 Lopping Practices

Lopping of branches for fodder is a common practice in many parts of the division. The graziers lop the trees to feed their cattle, resulting in inflicting heavy injury to the trees. Sometimes trees are reduced to a leafless stem, resulting in death.

Due to heavy lopping, the biomass and carbon stocks of the forest declines, without any decline in the forest cover. The local people depend on the forests of Rohru for fodder, fuel wood, domestic animal's bedding and leaf manure. As a result, removal of leaves and twigs through lopping of branches and heavy extraction from the forest floor takes place. Species like *Cedrus deodara*, *Pinus wallichiana*, *Aesculus*, *Morus*, *Ficus* and Ban oak suffer greatly on account of heavy and irregular lopping, especially near the habitation and along the Pabbar River. It is prevalent in the forests around the habitations. The canopy density decreases due to heavy lopping resulting in low production of seeds which impacts badly on regeneration of species. The practice of lopping is also done by migratory graziers who camp for months on in the jungle to meet their requirements of fuel.

The tract also sees the practice of destructive top lopping in forests areas adjacent to apple orchards for the purpose of drying native forest trees and encroaching on forest land. This is a common practice seen throughout the tract.

4.6 Area infested by invasive species in forests

In the past *Acacia mollissima* and *Leucaena leucocephala* (Su-babul) were planted in the blank areas of forests have become invasive spp in the natural forests. Anthropological pressure on Rohru forests has also increased the vacant areas in the forests due to decrease in density of forests.

The spread of other weeds, which require control measures, are *Parthenium*, *Tiliari*, *Bhaikal*, *Eupatorium*, *Imperata cylindrica* and *Loranthus* and other parasitic plants. There has been increased growth of *Eupatorium* especially in areas which are moist and shady. The proliferation of this weed species is noted as a major threat for regeneration and forest health.

4.8 Incidences of Pests and Diseases

Insects and microbes are integral components of forest dynamics. However, under certain conditions they adversely affect attainment of objectives such as tree growth and survival, wood quality, wildlife habitat, recreation, scenic value,

provision of forage for domestic animals and cultural resources. There are various insects, which cause damage to many tree species as defoliators, borers, moths, termites, caterpillars, grasshoppers etc. The main species being affected are *Quercus spp.*, *Cedrus deodara*, *Pines* etc. Damage to tree species at various stages, starting from the nursery, are being caused by different varieties of fungi. Root rot, damping -off are being caused in the seedlings in the nurseries. Fungi such as *Pythium*, *Fusarium* and *Cylindrocladium* are the major species causing damage in the nurseries.

4.8 Forest Degradation and their Drivers

The causes of forest degradation in the tract includes large scale encroachments, forest diversions, mining in the Pabbar river bank, illicit felling, unauthorized removal of forest produce, climate change, forest fires and over grazing in certain forest patches. All of these aspects have already been dealt in great detail under the threats section and further elaboration here is not necessary.

4.9 Pollution Control and Environmental Protection

Solid Waste Management is a growing problem in the tract with drastic increase in usage of plastic in all villages. However, systems of door to door collection, transportation and disposal has not been made fool proof. The state government has made little meaningful efforts in this direction. This is also a growing threat to forests as people then resort to dumping the plastic waste in forest land. A solid waste management plant is proposed to be constructed in Rohru and Chirgaon under Forest Conservation Act, 1980. Decentralized waste management plans are required in each of the villages in the division.

Apart from solid waste, the tract is not known for any major industries and hence there is little pollution. Further, air quality throughout the tract is also satisfactory.

Chapter-5

Conservation and Maintenance of Soil and Water Resources

The Rohru Forest Division has large patches of forests which form the watershed of the Pabbar river which drains into the Tons in Uttarakhand. The Pabbar river shed system is crucial as a vital eco system service emanating from the Chander Nahar glacial source in the forests of Khashdhar Range. Apart from this, the tract receives good amount of rain and snowfall particularly in the higher reaches which replenishes the watershed, spring sheds and thus ensure the availability of water for several villages, human settlements as well as for the wildlife.

Regarding the soil in the tract, there has been elaboration in the previous chapter. The inter relationship between soil and water is crucial and with drop in precipitation and increased number of dry days, there is tendency of soil to break and moisture retention on forest floor has considerably reduced. This has reduced the productivity and site quality from point of view of regeneration as well as shrub/ herb cover. Further, extreme events also lead to loss of soil and formation of gullies and ravines.

5.1 Area treated under soil and water conservation

The lesser Himalayas being relatively young of geological origin, there exists forest patches which are vulnerable to soil erosion. There are large number of streams and drainage lines which tend to result in soil erosion across the tract. The absence of a long term soil moisture conservation plan and its execution meant that there are no consistent interventions made in order to address the issue of soil and water conservation. The following include the details of soil moisture conservation efforts made in the form of various check structures i.e. dry stone check dams, water harvesting structures, crate wire structures, retaining walls, water ponds:

Sl.No.	Range	Name of Forest Compartment	Name of Nallah/Stream treated	Type of SMC structure	Number of Structures
1	Bashla	UPF-12 Ferly	Ferly Nallah	C/O Dry Check Wall in Ferly Nallah during year 2022-23	18 No.
		C.No. 32 a	Batari Nallah	C/O Dry Check Dam/Check Wall in Batari Nallah during year 2022-23	4 No.
		C.No. 32a&b	Arhal Nallah	C/O Check wall at Arhal Nallah during year 2022-23	3 No.
		C.No.32a	Ghursu Nallah	C/O Check Dam/Check Wall in Ghursu Nallah during year 2022-23	4 No.
		UF-12 Ferly	Mehandali Khad	C/O Check wall at Mehandali Khad during year 2022-23	18 Nos
		UF-12 Ferly	Bahali Nallah	C/O Dry Check Dam at Bahali Nallah during year 2022-23	3 Nos

		UF-12 Ferly	Shangla Pani Nallah	C/O Create wall at Shangla Pani Nallah during year 2022-23	18 Nos
		UF-12 Ferly	Khatli Nallah	C/O Check wall at Khatli Nallah during year 2022-23	16 Nos.
		UF-12 Ferly	Saragori Nallah	C/O Dry Stone Check wall at Saragori Nallah during year 2022-23	16 Nos.
		C.No. 31a(vi) Jhaltu	Jhaltu Nallah	C/O Dry Check Dam in Jhaltu Nallah during year 2022-23	3 Nos.
		C.No. 28b	Bajeshal Nallah (Khoruwad Nallah)	C/O Dry Check Dam in Bajeshal Nallah (Khoruwad Nallah) during year 2022-23	3 Nos.
		C.No.29a	Sukhdei Nallah(Khadralla Nallah)	C/O Check walls in Sukhdei Nallah(Khadralla Nallah) during year 2022-23	5 No.
		C.No.29a	Khadralla Nallah	C/O Check walls in Khadralla	8 No.

				Nallah during year 2023-24	
		UPF-12 Ferly	Ferly Nallah	C/O Dry Check Dam in Ferly Nallah during year 2023-24	2 No.
		Tandali Panwi	Dogra Khad	C/O Create Wall in Dogra Khad during year 2023-24	32 No.
		C.No.30d Malkhoon	-----	C/O Check wall in Malkhoon Nallah during year 2018-19	4 No.
		C.No.29c Kako Basa	-----	C/O Check wall in Sharigad during year 2018-19	4 No.
		C.No.34 Sharog	-----	C/O Water Harvesting Structure in Sharog Nallah during year 2020-21	1 No. 1 lakh Litre
2	Khashdhar		Gartu Nalla		
			Dhamidar Nalla		
			Kewala Nalla	C/o Check Dam in Jabal Kayala to Kewala Nalla 2016-17	20 Nos.

			Pani Nalla	Wire Crate protection Suna Pani Nalla 2016-17	1
			Sunda Nalla	Soil Conservation ar Sunda Nalla 2017-18	
			Laila Khad	Check dam in laila Khad 2017-18	
			Laila Khad	Check dam in Laial Khad near School 2017-18	
			Khilocha Nalla	Check Dam in Khilocha Nalla with crate wire 2017-18	
			Banoti Nalla	Check walls in Banoti Nalla 2018-19	2 Nos.
			Jhalwari Nalla	Check walls in Jhalwari Nalla 2018-19	2 Nos.
			Tharanguchu Nalla	Check walls in Tharanguchu Nalla 2018-19	3 Nos.

			Shauntwari Nall	Check walls in Shauntwari Nalla 2018-19	5 Nos.
			Lamchi Nalla	Check Dams in Lamchi Nalla 2018-19	4 Nos.
			Shuthi Gad	Check Dams in Shuthi Gad 2018-19	4 Nos.
			Sunda Nalla	Crate Wire and Check Dams at Sunda Nalla 2018-19	12 Nos.
			Andhra Khad	Crate wire and Check Dams at Andhra Khad 2018-19	12
			Malwari Nalla	Crate wire and Check Dams at Malwari Nalla 2018-19	12
			Sodhroti Nalla	Crate wire and Check Dams at Sidhroti Nalla 2018-19	12
			Baldwala Nalla	Check Dams Baldwala Nalla 2018-19	15

			Chachia Nalla	Check Dam 2020-21	
			Himrinalla	Check Dam 2020-21	
			Sharda gad	Check dam 2021-22	
			Kunder Nalla	Crate wall 2022-23	16
			Tehri Nalla	Crate wall/Check Dam	10
3	Dodra kawar		Katol Nalla	Soil conservation work in Katol Nalla	
			Gajyani Nalla	Check dams and check walls in Gajyani Nalla	25 Nos.
			Tin Nalla	Check walls in Tin Nalla	20 Nos.
			Grazni thach Nalla	Crate wire wall	
			Bouth	Dry Check Dam	
			Kalaiganch Nalla	Check Dam 2021-22	

			Lamchi Nalla	Check Dam 2021-22	
			Sankpati Nalla	Check Dam 2021-22	
			Udak Nalla	Check Wall 2022-23	24
			Kalapani	Dry Check Dam 2023-24	10
4	Rohru		Chupari Nalla	Soil conservation in Chupari Nalla 2016-17	
			Samoli Nalla	Wire Crate protection 2016-17	1
			Rantari Nalla	Check Dam 2016-17	1
			Malwari Nalla	Check Dam 2016-17	20
			Shekhal Nalla	Check Dams 2016-17	7
			Shekhal Nalla	Soil conservation 2016-17	

			Chamni Gad	Nala Stablization 2017-18	11
			Phakal khad	Nala stabilization 2017-18	11
			Chiuni Nalla	Crate wall 2021-22	
			Sidhroti Nalla	Dry Check Dam 2021-22	
			Jamni Khad	Dry Check Dam 2021-22	40
			Pakhal Khad	Dry Check Dam 2021-22	30
			Hingwall Naal	Dry Check Dam 2021-22	30
			Naser nalla	Dry Check Dam 2021-22	40
			Mastot nalla	Dry Check Dam 2021-22	30
			Bakhirna Nalla	Dry Check Dam 2021-22	
			Devali Khad	Check Dam 2022-23	40

			Jamuni Khad	Check Dam 2022-23	40
			Naltu Khad	Check Dam 2022-23	30
			Pakihal Khad	Check Dam 2022-23	30
			Dangri Gad	Check Dam Crate wall 2022-23	40
			Gawas nalla	Dry Check Dam 2023-24	10
			Jamuni Nalla	Dry Check Dam 2023-24	10
			Pakhal Khad	Crate Wire Check Dam 2023-24	
5	Jubbal	UPF Snabha	Snabha nalla	Retaining wall in Snabha Nalla 2018-19	1
		DPF Muril -I	Muril Nalla	Check wire crate wall	10
6	Tikkar		Tutupani Nalla	Check walls 2018-19	3
			Ban Buti Nalla	Check Dam 2020-21	

			Ban Buti Nalla	Check Dams 2020-21	
			Koti Nalla	Check Dam 2020-21	
			Kharla Nalla	Check dam Crate wall 2020-21	
7	Saraswati Nagar		Jharla Khad	Soil Conservation Work 2017-18	
			Mandal nalla	Soil Conservation Work 2017	
			Jakod nalla	Soil Conservation Work 2017	
			Sainj Nalla	Soil Conservation Work 2017	
			Badiyar Nalla	Dry Check Dam 2023-24	

Table 5.2: Detail of drainage line treatment made in the tract during last 10 years

Sr.No.	Range	Name of Forest Compartment	Name of Plantation (if any)	Type of SMC structure (Staggered/ Contour Trenches/ Water Ponds/ WHS Structures)	Capacity in Volume (m3)/ Rmt
1.	Jubbal	C.No. 18 B Sari	Nil	WHS	8000 m ³
2.		C.No. 11 Kalgaon	Nil	WHS	144 m ³
3.		15c Kaina	15 c Kaina 10 ha.	Contour Trenches	5000 Rmt
4.		15c Kaina	15c Kaina 6 ha.	Contour Trenches	3000 Rmt
5.		15c Kaina	-	Pond	342 m ³
6.		15c Kaina	-	Pond	342m ³
7.		UF Snaba	UF Snaba 10 Ha. JICA	Pond	150 m ³
8.		UF Snaba		WHS	8 Rmt.
9.		UF Deem		Pond	115 m ³
10.		UF Ori	UF ori	Contour Trenches	5000 Rmt.
11.		UF Deen	UF Deem	Contour Trenches	5000 Rmt.
12.	D/Kawar	U.F. Kawar II	Kawar 40 hec.	Contour trenches	-

13.		U.F. Kalapani	Kalapani10 hec.	Contour trenches	-
14.	Bashla	C.No.34 Sharog	-----	C/O Water Ponds during year 2021-22	3 No. 20000 Litre/Each
15.	Tikkar	C.No-20 aJagterly	Nil	Water Pond (Kanal Dholi)	27 m3
16.	Tikkar	C.No-20 aJagterly	Nil	Water Pond (Kanal Dholi)	21m3
17.		C.No -22 Pujarli- 4	Nil	WHS	3 no
18.		UF Koti	Nil	Koti Nalha	1 no
19.	Rohru	C.No.54 Goana beat	Buthara khad	WHS	100000 Ltrs
20.	Rohru	UPF.19 Kutara beat	Bharetly khad	WHS	100000 Ltrs

Table 5.3: Detail of water retention structures constructed in the division

Method of treatments

The following treatments were executed in the tract for drainage line treatment:

- I. Dry Stone check dams:** A series of dry stone check dams are constructed along the drainage line to treat the drainage line, reduce soil erosion and increase the sustenance of water resources
- II. Crate Wire/ Spur Structures:** These structures were mostly constructed in forest patches which witnessed large volume of water and steep drainage lines.
- III. Water Harvesting Structures/ Concrete Check Walls:** These structures have been created with particular objective to not only

resist the flow of water but also increase and conserve the moisture level in forest floor.

The following interventions are done in order to retain moisture and water on forest floor:

- i. **Construction of Water and Percolation Ponds:** These have been constructed in forests to increase water retention on the forest floor and ensure the provision of water for wildlife and livestock
- ii. **Staggered/ Contour Trenches:** These trenches were constructed in the forest to ensure retention of water and enable moisture on forest floor. In some cases, these structures were utilized in plantations to assist the growth of planted plants.
- iii. **Water Harvesting Structures:** Under the Scheme Jal Bhandaran Yojana and other schemes, various water harvesting structures were created in the tract at suitable locations with objective to ensure permanence of water availability.

5.2 Duration of water flow in the selected seasonal streams

The annual rainfall of the Division is less than 2000 mm per annum which occurs more during 2 monsoon months i.e. July and August although the tract also receives precipitation in the winters in the form of snow fall and rain. The duration of water flow in streams also reflect seasonal rainfall patterns with flow being the maximum in the months post the summer and winter precipitation i.e. September-October and March-April. During the post winter season and with rising temperatures, there is increased snow melt and glacier melt which happens due to which the water levels as well as velocity of water begins to increase significantly. This is very visible in the Pabbar river system particularly in Chirgaon area where the Andhra river tributary also joins it.

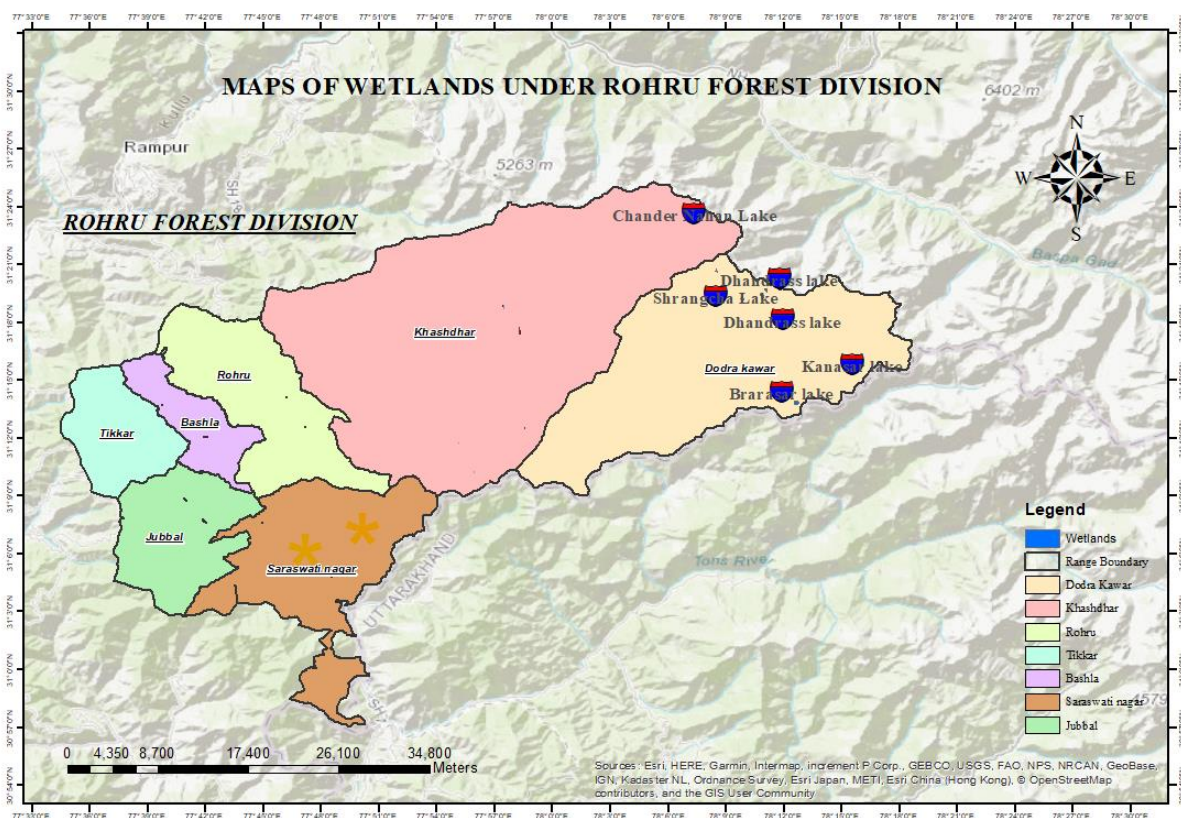
In addition to water shed, the tract being in the lesser Himalayas have a significantly high number of springs, locally known as chasmas, which are a result of geological phenomenon like faults occurring due to sheer stress. This is a vital perennial source of fresh water to many villages. In the hills, these springs captured as Baoris (cemented structures) have been since ages traditional sources of water which the villagers were dependent on. However, with advent of lift schemes of Jal Shakti Vibhag, the dependence of villagers on the springs has reduced and piped water supply is reaching homes. Many of these springs have dried up also which has adverse effects on ecology and human beings considering this is a perennial fresh water source.

5.3 Wetlands/ Water Bodies in Forested areas

Wetlands are shallow water lotic ecosystems which are vital for biodiversity, cultural, aesthetic, climate regulation and water provisioning services. The tract dealt with in the working plan have few important wetlands or water bodies in forest areas which are crucial from ecological point of view. There are Eight notified wetlands under Wetland (Conservation and management) Rules, 2017 by HP State Wetland Authority. The detail of all such wetlands are given in the table below:

Sr No.	Name of Range	Name of Wetland	Estimated Area (in Ha.)	GPS Location
1	Khashdhar	Chander Nahan Lake	0.151	31.378849° 78.101236°
2	Dodra Kavar	Bararasar Lake	14.59	31.230921° 78.211137°
3		Kanasar	21.64	
4		Dhandras 1	3.58	-
5		Dhandras 2	4.91	31.320283° 78.164249°
6		Sharangcha 1	9.41	31.322966° 78.181133°
7		Sharangcha 2	3.97	31.328852° 78.184937°
8		Rupin Uper water fall lake	7.68	31.344840° 78.141565°
		Total	65.931	

Table 5.4: Detail of Wetlands in the Tract



Map 5.1: Map of Wetlands in the Tract

The Kharshali lake located in the forests of Kharshali beat of Khashdhar forest range is an important wetland located amidst dense deodar forests which provide for catchment area of the lake. The dense forests surrounding the lake is vital to the sustenance of lake. A major programme of wetland restoration was undertaken for the lake in which desiltation of the lake was performed in order to restore the lake and take it back to the current state. The lake campus also has a temple of the revered Kali mata which is worshipped by the local villagers. The lake and temple together is a popular eco-tourism destination among visitors and has potential to educate visitors on the aspects of forest conservation.

Saru lake is another important wetland located amidst the meadows of Chanshal valley. It is also a popular destination for hikers and eco tourists trekking from the Chanshal top. The lake has crystal clear blue water which makes it a majestic sight for visitors.

The tract does not have any wetlands declared under the Ramsar convention. The wetlands in the tract are managed and governed as per the

Indian Forest Act, 1927 and the Wetland Conservation Rules notified by Government of India. There is no serious anthropogenic threat for the wetlands. However, the threat of siltation needs to be addressed in long term for many of the wetlands. Further, the conservation of the forested catchment is also crucial to ensuring good health of wetlands in forest areas.

5.4 Water Levels in the Wells in the vicinity of forest area

Due to poor potentialities in hilly hard rock areas and hilly sloping terrains, groundwater development is low. However, in these areas, major water supply and water sources are ground water based viz., perennial springs, river Pabbar and hand pumps. Springs are tapped at the source and water is supplied under gravity. All urban areas and villages are supplied water from ground water sources. The major part of the Rohru is underlain by hard rock formation of Proterozoic age. These older rocks are devoid of any primary porosity. Secondary porosity (fracture & fissure) in these rocks, topographical set up coupled with precipitation in the form of rain and snow, mainly govern occurrence and movement of ground water and form aquifers of low yield prospect. In the terrace deposits along the major rivers, pore spaces between sand, gravel and talus material also form the avenue for ground water movement. The major parts of the areas are hilly & mountainous with highly dissected and undulating terrain. These areas are underlain by consolidated hard rock's of Proterozoic period. Ground water potential in such areas is very low due to its hydrogeomorphic set up. Springs and Pabbar river are the main ground water recharge structures that provide water for domestic and irrigation in major rural and urban centers.

The springs, locally called “*Chasmas*” are mainly gravity, contact or fracture type. The springs located along major thrust/fault or structurally weak planes are high yielding. The discharge of these springs varies from seepages to as high as ten litres per second (lps). The State Department has drilled shallow bore wells fitted with handpumps to provide domestic water. The average depth of these hand pumps is 50 - 60 m, having low discharges up to 1 lps (*Reference: Environmental and Social Impact Assessment Report of Horticulture Department*).

5.5 Status of aquifers, and their sustainability

Ground water is the water that seeps through rocks and soil and is stored below the ground. The rocks in which ground water is stored are called aquifers. Aquifers are typically made up of gravel, sand, sandstone or limestone. Water moves through these rocks because they have large connected spaces that make them permeable. The area where water fills the aquifer is called the

saturated zone. The water resources are available either as spring water or groundwater and the principal source for both the resources is precipitation in the form of snow and rain. Scientists studied specific sustainability indicators to analyze the aquifers. They incorporated groundwater storage data from their GRACE Groundwater Drought Index (GGDI) tool and focused on three primary performance indicators: reliability, resilience, and vulnerability. These indicators, typically used in water resources systems, characterize the likelihood of the aquifer's ability to be used dependably in the future.

Alluvium is the major aquifer system which covers maximum area of Himachal Pradesh especially Satluj, Bias and Ravi alluvial areas. Aquifers in far from the forests in Rohru exhibited high vulnerability and low resilience. These aquifers are overstressed and non renewable; however, their large storage capacity can make up for slow recharge time, so they also ranked as more reliable. In contrast, aquifers in close proximity to forests had low reliability scores but high resilience scores due to faster recharge. Because vulnerability is largely influenced by groundwater recharge, the least vulnerable aquifers are found in forest areas. Forest vegetation increased ground water recharge capacity at a faster rate after rains. There is thus an immediate need to conserve and augment water resources. Based upon the climatic conditions, topography, hydrogeology of the area, rain water harvesting and artificial recharge to ground water need to be planned and implemented by construction of suitable structures. Roof top rainwater harvesting in urban/rural areas and water harvesting in rural area need to be adopted. The proper scientific intervention for spring development and revival of traditional water storage is required in water scarce hilly upland.

Ground water quality of Rohru has been deteriorating since past years due to increase in concentration of pollutants like nitrate, fluoride, salt etc. into water. The main sources of pollution to River Pabbar is sewerage load contributed by habitation of Chirgaon, Rohru, Jubbal and Hatkoti located at the bank of River Pabbar and its tributary rivulets and also the rural area of Tehsil Chirgaon, Rohru and Jubbal located at the bank of River.

Chapter-6

Maintenance and Enhancement of Forest Resource Productivity

Productive functions of forest

The National Working Plan Code 2014 provides for data collection for the forest growing stock, biomass and Carbon. It indicates how well a forest is stocked. It also corroborates with the guidelines of United National Framework Convention on Climate Change (UNFCCC) for assessing and reporting of greenhouse emissions including Carbon removed from the forests. India has also joined Intergovernmental Panel on Climate Change (IPCC) for reporting on emissions periodically.

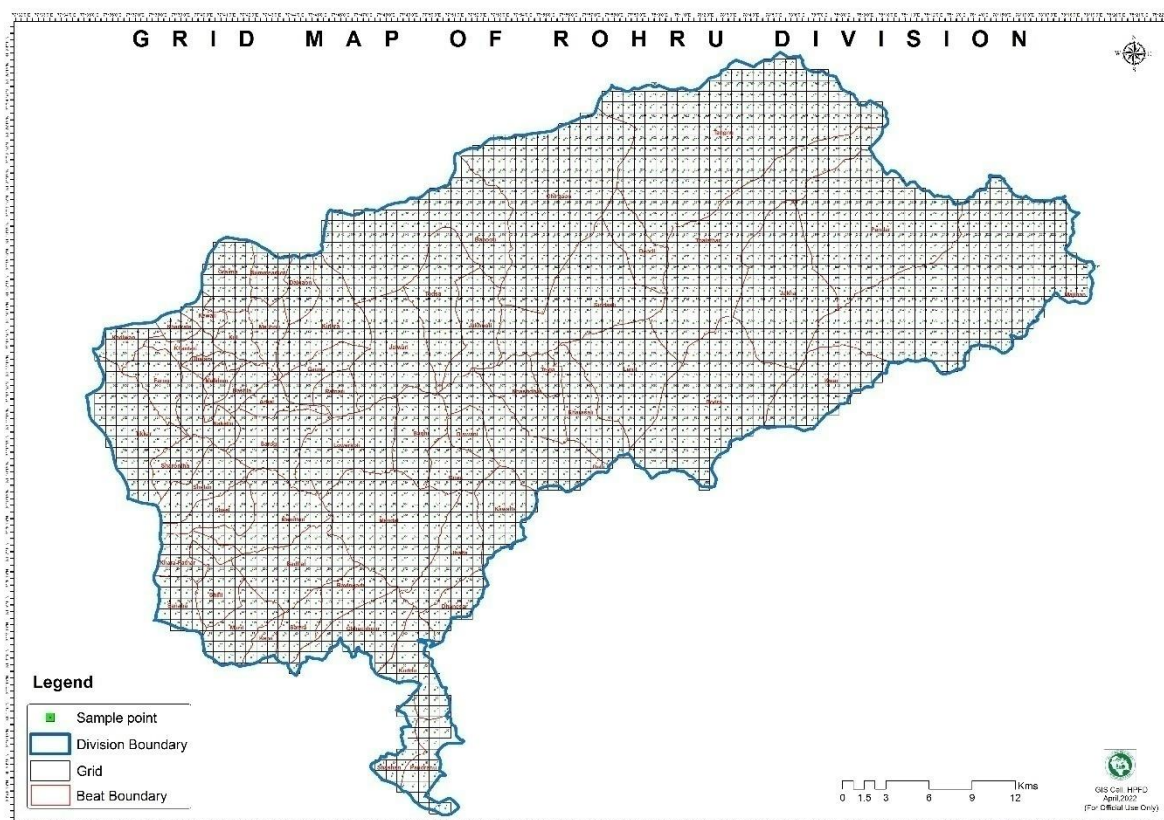
Since the beginning of working plan preparation in India and abroad, the growing stock of forests per unit area has been assessed to fulfill the forest based requirements particularly of timber. Until third quarter of the twentieth century, the forests were managed particularly for timber, and a few NTFPs. The NWPC 2014 encourages data collection for biodiversity (chapter 3) and growing-stock composition which is very important for sustainable management of forests for a continuous flow of ecosystem services including mitigation and adaptation to climate change.

6.1 Growing Stock of Wood

Growing Stock is an important parameter to assess the total standing volume and to evaluate the extent of harvestable timber. The growing stock is the sum by number or volume of all the trees growing in the forest or a specified part of it. Growing stock indicates the age, maturity, evenness and distribution of trees in the forest. In this context, it provides valuable data for forest managers in terms of the total volume of timber that is available and the amount that can be sustainably harvested keeping in mind the aspects of annual increment, yield and sustainability.

6.1.1 Methodology for Computation of Growing Stock

The methodology used for collection of growing stock data is systematic grid based sampling and collection of data from sample plots. The entire tract was divided into 5x5 km grids and a total of 2780 grids were laid out across the tract. A total of 430 sample plots were laid across various grids sampled.



Map 6.1: Grid Map of Rohru Forest Division

Each sample plot centre point was navigated using hand held GPS device and upon reaching the point, a square plot of 0.1 Ha was laid out by measuring 22.36 meters in all four directions. The enumeration of all trees in sample plot was performed and subsequently noted and compiled for all 430 sample plots defined in the tract.

Information on regeneration status of tree species was recorded in the same sample plot by observing 3x3 m quadrature plots in every corner of the sample plot. Similarly, data of shrubs and herbs were recorded from sample plot area by observing 3x3m plots and 1x1 m plot respectively. Accordingly, these data were compiled for all the plots and enumeration data was recorded.

Table 6.1 Species Wise Number of Trees in the Tract											
Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL (in No.)
Deodar	301671	441897	444822	266207	188182	78348	27505	8786	4393	4393	1766205
Kail	930866	1333587	1052658	632688	400371	233633	94460	20137	5493	6592	4710485
Rai	268062	385298	466979	503878	520321	486395	296509	133033	71093	81853	3213421
Tosh	203219	297526	431431	597289	459671	387808	194474	117427	101679	694503	2859974
Chil	84775	70975	72946	39430	41402	29573	11829	5915	0	0	356845
Kharshu	205069	344346	204017	103385	58884	34434	13736	1511	6045	4534	975960
Other B/Ls	197198	364950	282168	246201	114537	67252	56767	10255	4028	15747	1359102
Total	2190862	3238578	2955021	2389078	1783367	1317443	695281	297064	192730	182569	15241993

Table 6.1: Species wise Number of Trees in the Tract

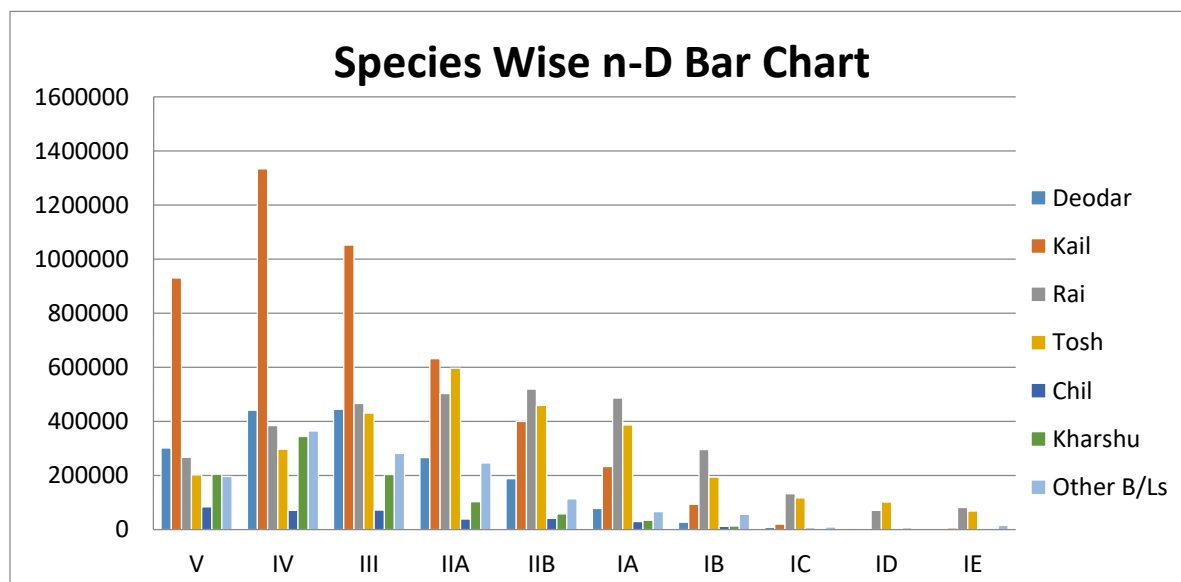


Figure 6.1: Species wise n-D Bar Chart

Table 6.2 Species Wise Growing Stock for Rohru Forest Division (m ³)											
Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Deodar	30167	132569	266893	346070	395182	286752	151280	61505	36244	36244	1742906
Kail	65161	466755	736861	1012301	968898	848089	481747	133908	53552	64270	4831542
Rai	26806	123295	326885	796128	1571370	2675173	2164517	1243863	776330	893834	10598201
Tosh	14225	89258	310630	955662	1310061	1908015	1419663	1197751	1306578	892436	9404280
Chil	5087	21292	62004	63089	122136	131599	71211	44359	0	0	520777
Kharshu	61521	103304	204017	186092	176652	158398	86537	12090	58031	55311	1101952
Other B/Ls	39440	72990	197517	320061	240527	221930	289510	70758	34239	176370	1663343
Total	242406	647716	2104808	3679402	4784825	6229957	4664465	2764235	2264974	2118465	29501253

Table 6.2: Species wise Volume of Trees in the Tract

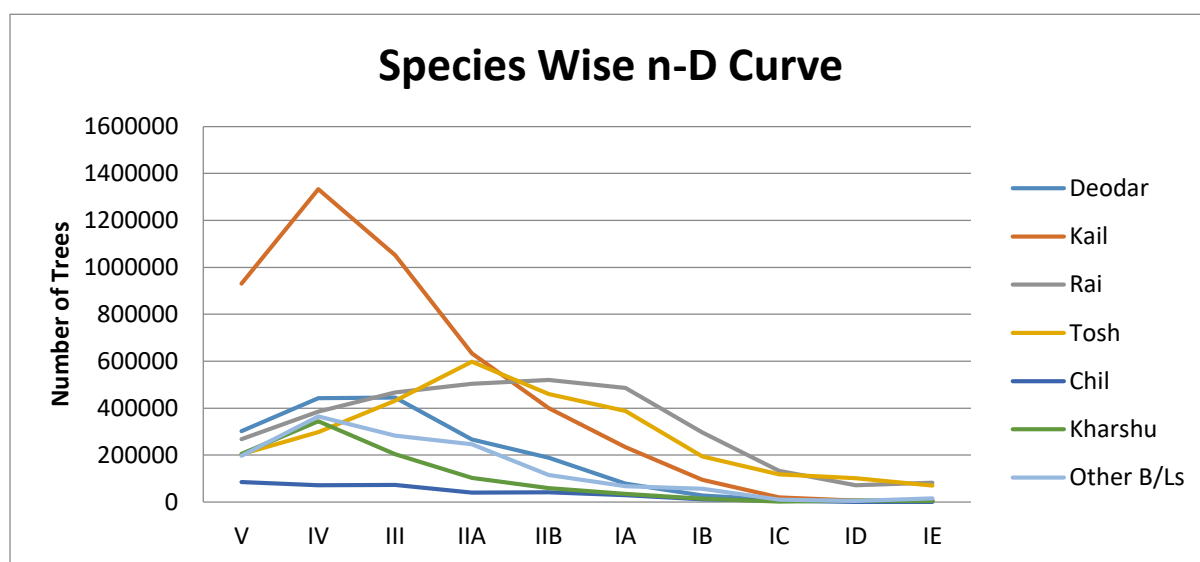


Figure 6.2: Species wise n-D curve in the Tract

6.2 Growing Stock of Bamboo

No bamboo is present in the tract and hence no discussion is made in this section regarding growing stock of bamboo.

6.3 Increment in Volume of Identified Timber Species

No exercises were carried out regarding assessment of timber. However, details of growth and increment are discussed in Chapter 12 of this plan.

6.4 Efforts towards enhancement of forest productivity through quality plantation activities (plantations under different schemes in the division in last 10 years)

In the past during the period of previous working plan and after, efforts have been made to stock the forest lands with low density and also to restock evicted areas. Some of these plantations have borne fruit and have been successful in increasing forest cover and enhanced the growing stock of the division adding to volume of timber and improving carbon stocking. The detail of all such plantations carried out in the tract during the last 10 years is given in Appendix XXXIV in Volume II of the plan. The abstract detail of plantation is given below:

Sr.No.	Range	Year	Area of Plantation (in Ha)
1	Tlkkar	2017-18	36.89
		2018-19	16
		2019-20	15
		2020-21	40
		2021-22	31
		2022-23	13
		2023-24	30
2	Dodra Kavar	2017-18	19.59 ha
		2018-19	18.73 ha

		2019-20	19.59 Ha.
		2020-21	1 ha
		2024-25	15
3	Rohru	2017-18	50
		2018-19	18
		2019-20	0.5
		2020-21	25
		2022-23	21
		2024-25	13
4	Khashdhar	2017-18	65
		2018-19	12
		2019-20	5
		2020-21	17
		2021-22	5
		2024-25	5
5	Sarswatinagar	2017-18	0.5
		2018-19	16
		2019-20	8.5
		2020-21	99
		2021-22	38
		2022-23	16
		2023-24	25

6	Jubbal	2018-19	17
		2019-20	32
		2020-21	7
		2021-22	15
		2022-23	2
		2023-24	20
7	Bashla	2015-16	0.2 Ha
		2016-17	10.3 Ha
		2017-18	Nil
		2018-19	5 Ha
		2019-20	30
		2020-21	26
		2021-22	2 Ha
			5 Ha
			6 Ha
		2022-23	5 Ha
		2023-24	19

Table 6.3: Detail of Plantaion raised during last 10 years in the division

The major objective of raising plantations in the tract is to enhance growing stock with a view to increase eco system services of water provisioning, climate regulation. The enhancement of stock is not directly correlated to production forestry and enhanced volume extraction owing to the ban on green felling that is prevalent in the tract.

The threat of fire and quality of planting stock have been crucial in pulling back the efficacy and effectiveness of plantation previously adversely affecting survival and growth of these plantations. In this context, site selection of plantation is crucial and necessary efforts needed to be taken to improve the quality of planting stock and mitigate the fire threat.

6.5 Carbon Stock

Forests stored carbon reduces the process of climate change. The atmospheric carbon is stored by forest vegetation (biomass of trees, shrubs and herbs) and locked in the form of wood and wood products thus make carbon dioxide concentration at reasonable level in the atmosphere which helps in climate change mitigation. Sustainably grown and harvested wood also provides renewable alternative to fossil fuels and enhance carbon storage. It is, therefore recognized that carbon storage of forest biomass can be enhanced through innovative silvicultural techniques, eco-restoration of degraded landscapes, improved biomass productivity etc. Forest soil must be kept healthy and fertile for enhancing forest biomass. Range wise carbon stock in different forest types of Rohru Forest Division is calculated as per the following method:

6.5.1 Methodology for calculation of carbon stock

For estimating carbon stock, different forest carbon pools (IPCC GPG (2003)) are required:

Components	Pools	Description
Living Biomass	Above ground biomass	All living biomass above soil including stem, stump, branches, bark, seeds and foliage
	Below ground biomass	All living biomass of live roots
Dead Organic matter	Dead wood	All non- living woody biomass not contained in litter, either standing or lying on the ground. Dead wood also includes

		dead roots and stumps larger than or equal to 10 cm in diameter.
	Litter	All non living biomass with a minimum diameter (5 cm) above mineral soil.
Soil	Soil organic matter	Organic carbon in soil upto 30 cm depth.

Table 6.4: Table for calculating carbon stock (Source-FSI, 2017)

a) Aboveground biomass: Aboveground biomass was calculated by multiplying the Bole Biomass with Biomass Expansion Factor (BEF). Aboveground biomass = Bole Biomass x BEF. Where, BEF will be taken from IPCC Good Practice Guidance for LULUCF (2006).

b) Below ground biomass: Below ground biomass was calculated by using root-shoot ratio (R), adopted from IPCC Good Practice Guidance for LULUCF (2006). The “R” value of 0.24 (dimensionless) was used.

The living bio mass includes the addition of both above ground and below ground bio mass. In order to compute the living biomass in the tract, the growing stock species wise volume is taken. Based on the volume of each species, the Average Biomass Expansion Factor and the R/S ratio, the Below Ground Biomass is calculated. Consequently, the total living biomass is computed as below:

Sr. No.	Species	Volume (m3)	Specific Gravity	Woody Biomass (Tonnes)	ABE F	AGB	R/S	BGB	Total Living Biomass (in Tonnes)
		A	B	C=A*B	D	E=C*D	F	G=E*F	G+E
1	Deodar	1742906	0.7	1220034.2	1.3	1586044.5	0.24	380650.67	1966695.13
2	Kail	4831542	0.4	1932616.8	1.3	2512401.8	0.24	602976.442	3115378.28
3	Rai	10598201	0.4	4239280.4	1.3	5511064.5	0.24	1322655.48	6833720
4	Tosh	9404280	0.4	3761712	1.3	4890225.6	0.24	1173654.14	6063879.74
5	Chil	520777	0.4	208310.8	1.3	270804.04	0.24	64992.9696	335797.01

6	Khars hu	1101952	0.75	826464	1.4	1157049.6	0.24	277691.904	1434741.5
7	Other B/Ls	1663343	0.6	998005.8	1.4	1397208.1	0.24	335329.949	1732538.07
	total	29863001		13186424		17324798		4157951.56	21482749.7

Table 6.5: Living Biomass Calculation Table

(ABEF: Average Biomass Expansion Factor as per IPCC 'Good Duidance' manual, for tropical climate zone Pines 1.3 and BLs 1.4)

6.6 Carbon Sequestration and Mitigation

Forests play a vital role in mitigation and adaptation of climate change. Forests sequester and store more carbon than any other terrestrial ecosystem and are important natural 'break' on climate change. A growing forest, with healthy and vigorous crop is the signature for the maximum carbon 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. The growing stock of trees must be so constituted that it provides regularly the greatest possible quantity of the desired products including the intangible benefits.

Green house Gas effect is the phenomenon in which Green House Gases including Carbon Dioxide, Methane, Nitrous Oxide and other such GHGs which exist in the atmosphere preventing the escape of heat and leading to increased global temperatures. The increased emissions of GHGs especially carbon dioxide as a result of energy utilization, usage of fossil fuels, transportation, agriculture etc has led to global climate change especially global warming.

Carbon sequestration through forests and trees is the most natural and effective way to sink carbon and mitigate the effect of GHGs. The health of forests, soil and the vitality of forests is crucial to ensure that forests continue to sequester carbon and mitigate and offset GHG emissions which continue to occur. In this regard, the forests of the tract situated in Western Himalayan landscape is crucial for climate change mitigation and in pursuit of India's INDCs as part of Paris Climate Agreement especially with regard to the INDC of adding 2.5 to 3 billion tonnes of carbon sinks.

In this context, the capacity of the forests to sink carbon or sequester carbon is evaluated on the basis of scientific data and living biomass calculated.

The following table represents the species wise amount of carbon sequestered in the tract:

Sr.No.	Species	Total Living Biomass (kg)	Carbon Content (50% of Total Living Biomass)	Carbon Dioxide Sequestered (kg) Carbon Content x44/12	Carbon Dioxide (in Million Tonnes)
1.	Deodar	1966695.13	983347.6	3605608	3.605
2.	Kail	3115378.28	1557689	5711527	5.711
3.	Rai	6833720	3416860	12528487	12.528
4.	Tosh	6063879.74	3031940	11117113	11.117
5.	Chil	335797.01	167898.5	615627.9	0.615
6.	Kharshu	1434741.5	717370.8	2630359	2.630
7.	Other B/Ls	1732538.07	866269	3176320	3.17632
	total	21482749.7	10741375	39385041	39.38504

Table 6.6: Carbon Dioxide sequestration data for Rohru Forest Division

As seen from the above table, it is clear that the carbon stock of division sequesters 40 million tonnes of carbon dioxide which is a huge contributor to climate change mitigation. In this context, it assumes great importance in pursuit of national climate change targets and to mitigate global climate change that meaningful efforts are made to conserve the existing growing stock, restock encroachment affected areas and enhance the growing stock in low density forest patches wherever feasible.

Chapter-7

Optimization of Forest Resource Utilization

The population around Rohru forest division has been increased as compared to past data. More than 70% of population of Rohru forest division lives in the rural areas. Horticulture has become a key economic activity in Rohru in recent years. People have large scales apple and other fruit orchards adjoining to the forests. In light of increasing risks in apple growing, diversification into other crops is increasing. Such diversification includes off-season vegetable growing by farmers, as well as cultivation of ginger and garlic. Areas have been brought under Horticulture with formation of farmer producer companies (FPC) in which cultivation of apple, pear, plum, mango, citrus and stone fruits play a vital role in boosting village economies. Floriculture, kiwi production, beekeeping (producing about 50mt of honey), and mushroom cultivation are also becoming popular among local farmers. People live near the forest tracts at higher altitudes are dependent upon the forest produces for their livelihood. Some fulfill their basic needs of fuel and fodder while other collect NTFPs (medicinal plants etc.) for livelihood. The main occupation of the majority of the population is horticulture with a small section practicing agriculture raising crops of red rice, maize, rajma, potato and local crops like Koda, Chalai etc.

7.1 Recorded Removal of Timber

The removal of timber from forests of the tract is executed on different accounts. This includes the removal of salvage timber from timber lots handed over to HP Forest Corporation. It also includes timber distributed to right holding villagers in forest compartments as per the forest settlement and as per the Himachal Pradesh Forest (Timber Distribution to Right Holders) Rules notified in 2016. Apart from these, there is also illicit removal of timber for construction of houses and illicit timber transit.

Apart from the above recorded removals, there is also removal on account of forest diversions under Forest Conservation Act, 1980 and Forest Rights Act, 2006 Section 3(2). A total of 500.2427 Ha of forests have been diverted with recorded removal of trees totaling to volume of 8828.36 m³.

There are no silvicultural felling apart from salvage removal in the tract owing to the blanket ban on green felling by the Honourable Supreme Court in the W.P Civil No 171/96 titled as T. N. Godavarman vs Union of India passed in the year 1996. Post this, there has been no silvicultural operations or timber removals carried out in forest as per the prescriptions of the working plans.

7.1.1 Timber Distribution to Right Holders

The population around the forests of Rohru mostly live in the houses made up of wood. The roofs, walls and floor are made up of wood frames extracted from the forests. The demand of large size timber is significant for construction of houses. For house construction, people required large sized timber (50-70 cm dia) of Deodar, Kail, Rai, Tosh and Chil in and around areas. Timber is distributed to right holders as per Forest Settlement and in accordance with the timber distribution rules in which dry/ salvage timber in right holding forests are marked by forest staff after sanction at DFO level. Each household has right of timber of 7 m³ for new construction and 3 m³ for repair during period of 20 and 10 years.

The complete detail of timber distributed is Appendix -XIX in Volume-II of this Working Plan. The abstract of the details is given below:

Sr No.	Division	Deodar		Kail		Chil		Tosh		Rai/Fir		Total	
	Rohru	No	Vol (m ³)	No	Vol (m ³)	No	Vol (m ³)	No	Vol (m ³)	No	Vol (m ³)	No	Vol (m ³)
1	2014-15	97	238.16	36	92.35	-	-	-	-	1	3.02	134	333.53
2	2015-16	530	1521.51	261	761.4	-	-	1	4.92	4	17.04	796	2304.87
3	2016-17	759	2364.19	470	1551.98	-	-	7	34.44	22	106.79	1258	4057.4
4	2017-18	447	1260.22	363	1114.97	-	-	3	14.76	67	88.89	880	2478.84
5	2018-19	253	787.31	269	711.55	-	-	9	44.28	45	208.62	576	1751.76
6	2019-20	155	481.82	166	529.31	-	-	4	19.68	3	10.1	328	1040.91
7	2020-21	194	594.65	352	1126.36	-	-	73	241.87	31	136.35	650	2099.23
8	2021-22	261	262.22	502	1638.28	1	4.45	38	188	54	213.68	856	2806.63
9	2022-23	197	611.64	297	1005.37	-	-	33	154.9	31	150.12	558	9922.03
10	2023-24	298	909.43	442	1772.61	-	-	43	191.25	81	353.77	864	3227.062
Total		3191	9531.15	3158	10304.2	1	4.45	211	894.1	339	1288.38	6900	30022.262

Table 7.1: Detail of Timber Distribution During last 10 years in the Tract

Among the different tree species, Deodar and Kail are the most sought after given their increased market value and durability in house construction and repair.

7.1.2 Timber Distribution for Cremation

Apart from the timber distribution for house construction and repair, trees are also granted for cremation of dead body the detail of which is maintained by the forest guard concerned. The following table summarizes the detail of timber distributed for cremation and complete detail is given in the Appendix-XX in volume-II of this Working Plan:

Abstract Dead body related Timber distribution (vol in m ³)														
Sr. No.	Year	Division	Deodar		Kail		Chil		Rai/Fir		B/L		Total	
			Nos.	Volume	Nos.	Volume	Nos.	Volume	Nos.	Volume	Nos.	Volume	Nos.	Volume
1	2014-15	Rohru	125	82.5	87	57.95	1	0.85	0	0	0	0	213	141.3
2	2015-16		94	60.2	113	102.57	9	16.2	11	19.36	6	4.6	222	185.43
3	2016-17		102	62.5	146	127.15	12	11.7	14	21.43	10	11.8	286	233.32
4	2017-18		103	74.5	99	107.88	11	11.35	7	5.92	28	25.4	194	178.45
5	2018-19		109	72	142	124.81	15	17.85	13	16.94	11	23.4	291	264.8
6	2019-20		124	84.9	145	132.3	11	11.05	14	15.14	8	19.2	303	262.59
7	2020-21		161	120.5	191	183.16	20	24.77	12	11.98	3	5	387	344.41
8	2021-22		138	117.4	201	188.9	13	16.3	7	8.49	6	15.8	342	324.93
9	2022-23		119	89	184	183.55	24	26.05	20	30.06	3	7.4	350	350.46
10	2023-24		152	97	116	105.41	10	10.73	7	10.3	0	0	298	239.04
	Total		1227	860.5	1424	1313.68	126	146.85	105	139.62	75	112.6	2886	2524.73

Table 7.2: Detail of Timber Distribution for cremation During last 10 years in the Tract

7.1.3 Salvage Removal

Every year the forest staff prepare salvage lots consisting of fallen and dry trees to be handed over to HP State Forest Corporation for timber extraction and sale. In the last 10 years, a total of 278 salvage lots have been handed over to HPSFC and a total of **110857.46** m³ volume of timber has been extracted. The following table summarizes the division level detail of volume of timber extracted for different species:

Year	Chil	Deodar	Kail	Rai	Tosh	BL	Total
2014-15	738.39	3521	10512	7077.4	2610.3		24459
2015-16	302.66	297.25	220.35	670.59			1490.85
2016-17		2720.3	11379	4741.5	6857.3		25697.88
2018-19	403.33	0	651.18	598.71	7413.8		9067.05
2019-20	224.89	382.57	1156.6	5739.5	4480.1	1.5	11985.15
2020-21		113.97	1506.4	3124.4	5634.1		10378.88
2021-22	375.75	263.31	256.93	2087.5	4446.3		7429.72
2022-23	4890.2	222.26	220.78	619.71	1385.8	60.66	7399.46
2023-24	14.92	79.46	185.19	2763.8	2898.9		5942.29
2024-25	461.58	108.59	553.28	1641	4242.8		7007.18
Total	7412	7709	26641	29064	39969	62.16	110857.5

Table 7.3: Detail of Salvage lot removal During last 10 years in the Tract

The comprehensive detail of salvage lots handed over and extracted by HP Forest Corporation is annexed in Volume II of this plan as Appendix-XXI.

Among the different species, Deodar and Kail have maximum salvage removal in line with the overall species composition dominated by these 2 species. This is also apt considering these are the 2 most valuable timber species making timber extraction profitable for the HP Forest Corporation.

7.1.4 Recorded Removal under FRA and FCA

The detail of trees removed and timber extracted from lots made for forest diversions under FRA and FCA (now Van Sanrakshan Evam Van Samvardhan Adhiniyam) are summarized in the table below:

Year	Lot No	Name of Forest Compartment	Species	Volume Extracted (m ³)	Market Rate (IN Rs)	Royalty Realized(in Rs)
1	17/2014-15(RA)	UF Mihana	Deo	4.30	3260/-	43604/-
2	01/2015-16(RA)	UF Nadu nuglee	Deo	34.80	3318/-	134471/-
			Kail	10.80	1740/-	
			Rai	0.35	608/-	
3	02/2015-16(RA)	UF Dancar	Deo	7.20	3318/-	355942/-
4	07/2015-16(RA)	UF Badhal	Kail	26.18	1740/-	45553/-
5	08/2015-16(RA)	UF Jubbal	Deo	3.50	3318/-	27673/-
			Kail	9.23	1740/-	
6	09/2015-16(RA)	UF Swara	Deo	9.45	3318/-	63068/-
			Kail	18.45	1740	
			Rai	45.98		
			Tosh	15.10		
			BL	97.72		
7	10/2015-16(RA)	UF Kula dhan Rotun	Kail	15.68	3318/-	365/-
8	12/2015-16(RA)	UF Kulha dhar	Deo	0.70	3318/-	45980/-
9	24/2016-17(HEP	UF Kuddu	b/1	15.3	459/-	7023/-

10	25/2016-17 HEP	UF Farog	Chil	7.45	319/-	2376/-
11	26/2016-17 HEP		Chil	15.19	319/-	4846/-
12	27/2016-17HEP		B/L	9.35	459/-	4291/-
13	28/2016-17HEP		Chil	5.17	319/-	1649/-
14	29/2016-17HEP	UF Ghari nalla	Deo	19.16	6120/-	261536/-
			Kail	44.73	3218/-	
			Rai	0.32	523/-	
15	30/2016-17HEP	UF Farog	Kail	9.21	1609/-	9923/-
16	31/2016-17HEP		Kail	6.30	1609/-	10136/-
17	32/2016-17HEP		Kail	69.53	1609/-	111873/-
18	33/2016-17(RA)	UF Jakha	Deo	2.80	6120/-	51214/-
			Kail	10.59	3218/-	
19	34/2016-17(RA)	UF karshal	Chill	41.65	268/-	25820/-
			b/L	7.60	230/-	
20	35/2016-17(RA)	UF Rohotan	Deo	15.00	3061/-	66254/-
			Kail	12.65	1609/-	
21	36/2016-17(RA)	Rohru	Kail	25.32	1609	22446/-
			Rai	32.94	523/-	
			B/L	5.96	230/-	
22	37/2016-17(RA)	UF Sheela pani	Kail	1.60	1609/-	31996/-
			Rai	17.06	523/-	

			Tosh	8.32	523/-	
23	38/2016-17(RA)	UF Bashla	Deo	4.00	3061/-	31882/-
			Kail	2.30	1609/-	
24	39/2016-17(RA)	UF Sawara	Deo	0.60	3060/-	15700/-
			Kail	7.44	1609/-	
			Rai	2.22	460/-	
25	40/2016-17(RA)	UF Santoshi nagar	Deo	44.27	6120/-	546117/-
			Kail	71.95	3218/-	
			Rai	95.10	1050/-	
			B/L	2211.32	459/-	
26	41/2016-17(RA)	UF Jailot	Kail	4.90	3218/-	62432/-
			Rai	8.80	1045/-	
			Tosh	23.40	1045/-	
			B/L	37.10	659/-	
27	42/2016-17(RA)	Bashal	Deo	22.42	6120/-	306076/-
			Kail	1.60	3218/-	
			Rai	10.22	1045/-	
28	43/2016-17(RA)	UF Mihina	Kail	5.90	3218/-	55765/-
			Chil	29.61	459/-	
			Other	10.80	230/-	
29	44/2016-17(RA)	Bashla	Kail	4.20	3218/-	73816/-
			Chil	2.35	1045/-	
30	45/2016-17(RA)	UF Jagothinala	Kail	22.97	3218/-	140576/-
31		Khashdhar	Deo	4.50	6120/-	229186/-

	46/2016-17(RA)		Kail	62.66	3218/-	
32	47/2016-17(RA)	Bashla	Kail	1.89	3218/-	5632/-
33	03/2017-18(RA)	Rohru	Deo	5.00	3170/-	130702/-
			Kail	33.27	938/-	
			Rai	33.13	469/-	
34	04/2017-18(RA)	Rohru	Kail	8.30	3170/-	130702/-
35	17/2017-18(RA)	k/dhar	Kail	0.70	3170/-	5238/-
			Chil	6.93	270/-	
36	18/2017-18(RA)	Tikkar	Deo	0.30	5350/-	35842/-
			Kail	11.43	3170/-	
37	19/2017-18(RA)	Bashal	Deo	3.30	5350/-	179674/-
38	22/2017-18(RA)	Jubbal	Kail	32.07	3170/-	81311/-
39	23/2017-18(RA)	Khashdhar	Kail	25.79	3170/-	17866/-
40	24/2017-18(RA)	Rohru	Kail	4.74	3170/-	79210/-
			Tosh	6.00	469/-	
41	25.2017-18(RA)	UF Dhak	Kail	23.52	3170/-	83122/-
			Tosh	20.01	469/-	
42	26/2017-18(RA)	UF 3 Jakhi	Deo	10.26	5350/-	2590443/-
			Kail	480.77	3170/-	
			Rai	172.01	938/-	
			Tosh	906.36	469/-	
43		Swara	Deo	2.10	5350/-	125654/-

	27/2017-18(RA)		Kail	29.88	3170/-	
			Rai	17.80	938/-	
			tosh	16.05	469/-	
44	28/2017-18(RA)	Khashdhar	Deo	24.28	5310/-	153356/-
			Kail	7.40	3170/-	
45	29/2017-18(RA)	Rohru	Deo	9.32	5350/-	53283/-
			Kail	17.42	3170/-	
			Rai	1.58	938/-	
46	30/2017-18(RA)	Jubbal	Kail	36.62	3170/-	116085/-
47	31/2017-18(RA)	Jubbal	Deo	3.80	5350/-	115850/-
			Kail	25.54	3170/-	
			Rai	17.12	938/-	
			Tosh	1.60	469/-	
48	32/2017-18(RA)	Rohru	Deo	14.80	5350/-	95178/-
			Kail	5.62	3170/-	
49	33/2017-18(RA)	Rohru	Kail	21.31	3170/-	67108/--
50	34/2017-18(RA)	Rohru	Deo	19.06	5350/-	132804/-
			Kail	9.43	3170/-	
			Rai	0.70	938/-	
			Tosh	0.30	469/-	
51	35/2017-18(RA)	Bashla	Kail	27.79	3170/-	90232/-
52	36/2017-18(RA)	Bashla	Kail	20.16	3170/-	60356/-
53		Rohru	Kail	0.42	3170/-	2210/-

	37/2017-18(RA)		B/L	2.47	270/-	
54	38/2017-18(RA)	Jubbal	Kail	25.24	3170/-	79788/-
55	39/2017-18(RA)	Jubbal	Deo	7.66	5350/-	47640/-
			Kail	2.10	3170/-	
56	40/2017-18(RA)	Jubbal	Kail	21.31	3170/-	10144/-
57	41/2017-18(RA)	Rohru	Deo	4.95	5350/-	2316/-
58	42/2017-18(RA)	Jubbal	Kail	53.96	3170/-	171054/-
59	43/2017-18(RA)	Swara	Deo	1.30	5350/-	10303/-
			Kail	12.83	3170/-	
60	44/2017-18(RA)	Rohru	Kail	10.64	3170/-	32176/-
61	45/2017-18(RA)	Jubbal	Kail	16.61	3170/-	52210/-
62	46/2017-18(RA)	Jubbal	Kail	12.02	3170/-	38104/-
63	47/2017-18(RA)	Swara	Kail	13.39	3170/-	15470/-
64	48/2017-18(RA)	Rohru	Kail	8.96	3170/-	27838/-
65	49/2017-18(RA)	Rohru	Kail	8.61	3170/-	24410/-
66	50/2017-18(RA)	Bashla	Deo	1.30	5350/-	317390/-
67	02/2018-19(RA)	UF Darshal	Deo	0.30	6268/-	62366/-
68		UF Pagas	Deo	17.16	6268/-	645620/-

	11/2018-19(RA)		Kail	144.80	3704/-	
			Rai	1.58	1092/-	
69	12/2018-19(RA)	DPF Dudra	Deo	1.80	6268/-	50174/-
			Kail	10.50	3704/-	
70	13/2018-19(RA)	UF Baggi	Kail	29.42	3704/-	108972/-
71	14/2018-19(RA)	UF Kue	Deo	188.90	6268/-	1534016/-
			Kail	94.59	3704/-	
			Rai	0.32	1092/-	
72	15/2018-19(RA)	DPF Sheel	Deo	0.60	6268/-	112436/-
			Kail	29.34	3704/-	
73	16/2018-19(RA)	UF31 a bashla	Deo	20.20	6268/-	224918/-
			Kail	26.54	3704/-	
74	17/2018-19(RA)	UF Darmana	Deo	20.80	626/-	13020/-
75	18/2018-19(RA)	UF Sheel	Deo	4.2	6268/-	55364/-
			Kail	7.84	3704/-	
76	01/2019-20(RA)	UF Jakhnoti	Deo	2.40	7583/-	86564/-
			Kail	16.65	4106/-	
77	2/2019-20(RA)	UF Snaba	Deo	12.40	7583/-	144621/-
			Kail	47.54	4106/-	
78	3/2019-20(RA)	UF Snaba	Kail	52.04	4104/-	106838/-
79	4/2019-20(RA)	UF Larot	Kharak	8.40m3	359/-	8478/-
			Kunich	14.50		

			Khnoor	9.50		
			Paban	1.50		
			Akhrot	11.60		
			Shirola	1.60		
80	5/2029-20(RA)	UF Kharshali	Deo	3.10	7583/-	0
			Kail	10.57	4106	
81	6/2019-20(RA)	UF K/pathar	Kail	13.09	4106/-	27093/-
			Rai	0.32	1370/-	
82	7/2019-20(RA)	UF Shindasli	Kail	21.37	4106/-	43873/-/-
83	8/2019-20(RA)	UF Jhalwari	Kail	40.03	4106/-	82182/-
84	9/2-19-20(RA)	UF Banoti	Kail	17.25	4106/-	36072
			Rai	0.96	1370/-	
85	10/2019-20(RA)	UF Dodsa	Kail	3.63	4106/-	48881/-/-
			Rai	60.48	1370/-	
86	11/2019-20	UF Gawas	Kail	22.89	4106/-	65481/-
			Rai	22.70	1370/-	
			Tosh	4.29	1370/-	
87	12/2019-20 (RA)	UF Badhal	Devdar	16.86	3792/-	104172/-
			Kail	19.60	2023/-	
88	13/2019-20(RA)	UF Bashla	Devdar	26.62	7583/-	149641/-
			Kail	23.04	4106/	
			Rai	2.04	1370/-	

89	14/2019-20 (RA)	UF Samrkot	Devdar	15.20	7583/-	68738/-
			Kail	5.30	4106/-	
			Rai	0.32	1370/-	
90	15/2019-20(RA)	UF Kelwi	Deodar	3.10	7583/-	33455/-
			Kail	10.57	4106/-	
91	16/2019-20 (RA)	UF Chajpur	Kail	18.79	4106/-	40844/-
92	21/2019-20(RA)	UF Kui	Kail	3.15	4106/-	37958/-
93	27/2019-20(RA)	UF Mandal	Kail	4.13	4106/-	16958/-
94	28/2019-20 (RA)	UF Shili	Deo	4.20	7583/-	70326/-
95	31/2019-20(RA)	UF Mandhol	Kail	12.27	4106/-	52844/-
96	32/2019-20 (RA)	UF Shalan	Deo	10.92	7583/-	97547/-
			Kail	3.35	4106/-	
			Rai	0.72	1370/-	
97	33/2019-20(RA)	UF Sheel	Deo	17.02	7583/-	167987/-
			Kail	9.68	4106/-	
98	34/2019-20(RA)	UF Machoti	Deo	1.50	7583/-	11375/-
99	35/2019-20 (RA)	UFBadhal	Deo	10.36	7583/-	128690/-
			Kail	13	4106/-	
			Rai	3.02	1370/-	
100	36/2019-20(RA)	UF Tikkar	Kail	14.66	4106/-	60194/-

101	37/2019-20(RA)	UF Gawas	Kail	9.68	4106/-	39746/-
102	38/2019-20 (RA)	UF Kelwi	Deo	0.60	7583/-	203299/-
			Kail	48.22	4106/-	
103	01/2020-21(RA)	UF Sari	Deo	0.60	6484/-	12666/-
			Kail	2.45	3582/-	
104	02/2020-21 (RA)	DPF (4b) Giri	Deo	31.05	6484/-	262957/-
			Kail	13.52	3582/-	
			Rai	11.0	1200/-	
105	03/2020-21(RA)	Kiari	Kail	2.17	3582/-	14577/-
106	05/2020-21(TL))	UF Dholzan	Kail	1.47	3582/-	8520/-
			Chil	4.37	745/-	
107	06/2020-21(TL)	UF Thali	Chil	10.80	745/-	8046/-
108	04/2022-23 (RA)	UF Machoti	Kail	6.50		11482/-
109	21/2024-25(RA)	UF Sungri	Deo	0.60		
			Kail	3.35		
110	22/2014-25 (RA)	UF Shoba	Deo	2.80		
			Kail	2.45		
			Rai	0.32		
111	23/2024-25(RA)	UF Thafli	Kail	10.56		

112	24/2024-25(RA)	C.No 3 Jondi	Rai	240.51		
113	12/2022-23(RA)	UF Badhal	Kail	3.35		5203
114	13/2022-23(RA)	UF Gawas	Kail	7.97		22028/-
			Rai	41.6		
115	14/2022-23(RA)	UF Mural	Deo	13.32		47140/-
			Kail	8.02		
116	15/2022-23(RA)	UF Gawas	Kail	8.11		12595/-
117	16/2022-23(RA)	UF Smmerkot	Kail	29.87		46648/-
118	02/2023-24(RA)	UF Chajpur	kail	43.02		67456/-
			Moru	2.1		
119	03/2023-24(RA)	DPF Shalntu	Chil	301.88		92978/-
120	08/2023-24(RA)	UF Chajpur	Kunish	36.6		113500/- 4346/- 57180/-
			Alanthus	52.09		
			Populous	1.4		
			Kainth	1.8		
			Chuli	1.9		
			Acacia	11.5		
			Drake	5.4		

			Robinia	36.8		
			Eucalyptus	51.3		
			Ficus palmate	3.08		
			Kail	33.37		
			Chil	416.66		
			Kunish	15.6		
			Eucallup	141		
			Reetha	0.3		
			Derek	2.5		
			Chip pine	49.81		
			Kail	0.56		
			Populous	50.57		
121	09/2023-24(RA)	Jhalta	Kai	9.68		15033/-
122	10/2023-24 (RA)	Jhalta	Deo	17.15		57425/-
			Tosh	80.54		
123	28/2024-25(RA)	UF Jhalwari	Kail	3.70		
124	31/2024-25(RA)	UF Shirol mandal	Kail	4.27		
125	32/2024-25(RA)	UPF Jarshli	Kail	6.7		
			Chil	0.3		
			BL	0.3		

Table 7.4: Detail of lots in lieu of diversion of forest under FRA and FCA during last 10 years in the Tract

7.2 Recorded Removal of Fuelwood

With the advent of LPG and increased distribution to households under PM Ujjwala Yojana, the usage of fuelwood has come down considerably. Further, fuelwood is also available in private lands in many of the forest ranges. There is still dependence to an extent for fuelwood from the forests. However, this is not to a significant extent which affects the forests adversely. The detail of socio-economic survey conducted in villages adjacent to forest shows the dependence of fuelwood. Socio-economic survey was done at 45 different villages under seven ranges of Rohru forest Division to understand the forest eco system and dependence of villages on forests.

Detail of fuelwood from socio-economic survey is as under:

Sl No.	Village Name	Block	Range	Fuelwood consumption annually (in Qtl.)
1	Sharog	Bashla	Bashla	800
2	Arhal	Bashla	Bashla	170
3	Bashla	Bashla	Bashla	250
4	Khangteri	Khadralla	Bashla	1130
5	Bajeshal	Khadralla	Bashla	1320
			Total	3,670
6	Pandar	Jakha	Dodra Kwar	1145
7	Jiskoon	Jakha	Dodra Kwar	80.72
8	Jakha	jakha	Dodra Kwar	581.584
9	Kiterwari	Kewar	Dodra Kwar	167
10	Dodra	Kewar	Dodra Kwar	122
			Total	2096.304
11	Kholara	Jubbal	Jubbal	606.3

12	Deem	Jubbal	Jubbal	528
13	Badhal	Jubbal	Jubbal	54
14	Kaina	Sheel	Jubbal	750
15	Melthi	Sheel	Jubbal	600
16	Mandhol	Sheel	Jubbal	762.84
17	Kelvi	Jubbal	Jubbal	33
18	Chamoru	Jubbal	Jubbal	528.12
			Total	3862.26
19	Chichwari	Chirgaon	Khashadhar	20
20	Janglakh	Chirgaon	Khashadhar	105
21	Khabal	Chirgaon	Khashadhar	760
22	Diswani	Khashdhar	Khashadhar	60
23	Lorot	Larot	Khashadhar	100
24	Khindarid Khjoptwari	Larot	Khashadhar	70
25	Dumerara	Todsa	Khashadhar	165
26	Todsa	Todsa	Khashadhar	780
27	Ranol	Todsa	Khashadhar	168
			Total	2228
28	Gawas	Gawas	Rohru	630
29	Bagi	Gawas	Rohru	40
30	Gauna	Rohru	Rohru	560
31	Dalgaon	Rohru	Rohru	350

32	Kui	Summerkot	Rohru	1810
33	Khanola	Summerkot	Rohru	600
34	Bhaloon	Summerkot	Rohru	1210
			Total	5200
35	Kohani	Chhajpur	Saraswati Nagar	620
36	Malog	Chhajpur	Saraswati Nagar	184
37	Salna	Kuddu	Saraswati Nagar	230
38	Nagali Shashan	Kuddu	Saraswati Nagar	253
39	Jhalta	Mandal	Saraswati Nagar	586
40	Bharot /Genshta	Mandal	Saraswati Nagar	179
			Total	2052
41	Pujarli NO 4 & Tikkar	Tikkar	Tikkar	100
42	Kadiwan	Tikkar	Tikkar	363
43	Kuthari	Tikkar	Tikkar	572
44	Karchari	Tikkar	Tikkar	48
45	Fruinkoti	Tikkar	Tikkar	10
			Total	1093
Rohru Division			G Total	17,974

Table 7.5: Detail of fuelwood extracted in 45 villages in the Tarct

7.3 Recorded Removal of Bamboo/ Rattans

The tract dealt with has no bamboo except the hill bamboo/ the nirgal species found in certain parts like the forests of Summer kot block. No removal of bamboos is recorded in the tract.

7.4 Recorded Removal of Locally Important NTFPs and MAPs

Local communities still rely on medicinal plants for primary healthcare and treating common ailments. The most common use is for treating skin diseases, cuts and wounds, cough and cold, stomach infection, and rheumatism. It is also recorded that a single species may be used for curing many ailments.

Sr. No.	Botanical Name	Common Name	Uses
1.	<i>Aconitum heterophyllum</i> Wall.	Atis, Patish	The root contains non-toxic, amorphous alkaloids, atisine (0.4 %), dehydroatisine, heteratisine and hetisine. The dried root of Indian Atees is the part which is believed to have analgesic, anti-inflammatory, antipyretic, anti-periodic, aphrodisiac, astringent properties according to Ayurveda.
2.	<i>Artemisia vulgaris</i>		The crushed leaves are inserted into the nose to stop bleeding. A bath prepared with the crushed leaves is used to treat allergic reactions. Raw leaves are chewed as a treatment for oral ulcers.

3.	<i>Asparagus racemosus</i> Willd.	Shatawar	It is considered both a general tonic and a female reproductive tonic. Shatavari is the main ayurvedic rejuvenative tonic for the female. A mixture of honey and fresh root juice is given as a demulcent in dyspepsia.
4.	<i>Atropa belladonna</i>	Saagngur	Atropine eye drops are still used by ophthalmologists when they dilate a patient's pupils to get a good view of the retina during an eye exam.
5.	<i>Berberis aristata</i>	Kashmal, Khepacho	The decoction of roots is used in the ailment of eye disease.
6.	<i>Bunium persicum</i> (Boiss.) Fedtsch	Kala Jeera	In the indigenous systems of medicines, the fruit are regarded as stimulants, carminative and useful in curing diarrhoea, dyspepsia, fever, flatulence, stomach-ache, haemorrhoids and obstinate hiccup.
7.	<i>Dactylorhiza hatagirea</i> (D. Don.) Soo	Salam Paja, Hathajari	The roots are considered to be tonic and aphrodisiac, mucilage jelly is nutritious and useful in

			diarrhea, dysentery and chronic fever.
8.	<i>Ficus palmate</i>	Phedu	The fruit is demulcent, emollient, laxative and poultice. It is used as a part of the diet in the treatment of constipation and diseases of the lungs and bladder.
9.	<i>Gentiana kurroo</i> , Royle	Karu, Kaur	The plant is valued as bitter tonic, antiperiodic, expectorant, antibilious, astringent, stomachic, anthelmintic, liver tonic, blood purifier and carminative.
10.	<i>Gloriosa superba</i> Linn.	Langli, Kalihari	Seeds and tubers contain valuable alkaloids viz., superbine, gloriosine and colchicines as the major constituents, which are used as an antidote for snake bites, gout and rheumatism. In the world market glory lily is considered as a rich source of colchicines and gloriosine. The flower is used in the treatment of snake bite, skin disease, respiratory disorders.

11.	<i>Hypericum perforatum</i> Linn.	Basant	It is mostly used for treating depression, to soothe the nerves and heal wounds, burns and snake bites. It has gained importance due to its antidepressant activities and is also being investigated for its potential activities against HIV.
12.	<i>Juniperus macropoda</i>	Guggal, Dhup, Shur	It is used to treat colic, cough, chest colds, diarrhea, impotency, and indigestion; The resin is used externally on ulcers.
13.	<i>Nardostachys grandiflora</i> DC.	Jatamansi, Balchharh	It is widely used as antioxidant, anti-inflammatory and for cardiovascular diseases.
14.	<i>Picrorhiza kurroa</i> Royle ex Benth.	Kutki, Kaur, Karru	Rootstock is used as hepatic-protective, anti-periodic, cholagogue, stomachic, anti-amoebic, antioxidant, anthelmintic, anti-inflammatory, cardio-tonic, laxative, expectorant etc. P
15.	<i>Podophyllum hexandrum</i> Royle	Bankakri, Kanda-ri-mokri	It can be used to treat typhoid fever, jaundice, dysentery, chronic hepatitis, scrofula, rheumatism, skin

			diseases and tumorous growth
16.	<i>Prunus armeniaca</i>	Chulli, chul	The seed oil is used to cure arthritis.
17.	<i>Rheum australe</i> D. Don	Revandchini, Chukri, Chuchi	The roots are chiefly used in tonsillitis, regarded as astringent, laxative and also as tonic. The paste is applied in mumps and also taken orally. It is as efficacious as tincture iodine for healing cuts, wounds and swellings. It purifies blood and by being astringent reduces the swellings and rheumatic pains quite effectively
18.	<i>Rhododendron arboretum</i>	Burans	Flowers are used to cure high blood pressure and for heart diseases.
19.	<i>Rosa moschala</i>	Kuja, Yal	Flowers pastels are used in making gulkand which is used in making various medicines.
20.	<i>Swertia chirayita</i> Karst.	Chirayita, Chirata	Whole plant is medicinal. It is useful as bitter tonic or mild febrifuge and possesses anthelmintic, antipyretic, antiperiodic and anti-diarrhoeal properties. It

			also cures leucoderma, inflammation, burning sensations, urinary troubles, bronchitis, asthma, malaria and liver problems.
21.	<i>Taxus concorta</i>	Rakhal, Barmi, Neyamdal	The bark is used in curing of blood cancer.
	<i>Valeriana jatamansi</i> , Jones.	Tagar, Sugandhbala, Mushkbala	Oil is also used for making perfume and hair oil. Oil used as a tonic and stimulant in certain medicinal preparations. Powdered drug mixed with sugar is used in urinary troubles. A decoction of the drug is reported to be given in Nepal to mothers after pasturition, probably as a sedative.
22.	<i>Viola serpens</i>	Bansfa	The flowers of this plant are used for curing respiratory disease especially cold and cough.
23.	<i>Withania somnifera</i> Dunal	Ashvagandha, Asgandh,	Roots are generally used for general and sexual debility besides its use in leucorrhoea, rheumatism, dyspepsia, skin diseases and bronchitis. It is valued as a potent tonic, delays ageing, greying

			of hair and provides physical as well as mental strength.
24.	<i>Woodfordia floribunda</i> (Syn <i>W. fruticosa</i>)	Dhan, Dawe	It is a popular medicinal plant useful in various ailments including bowel disorders. It has recently proved to be a rich storehouse of chemical constituents with promising anti-tumor and anti-inflammatory activities as revealed in modern biology-based studies. Investigations in progress may identify new molecules with anti-peptic ulcer activities and confirm the usefulness of traditional remedies to develop new therapeutics.
25.	<i>Zanthoxylum alatum</i>	Timber, Tirmira, Timri, Tumru	Decoction of tumru bark and fruits are used as stimulant in digestive system.

Table 7.6 Important medicinal plants of Rohru Division

The tradeable NTFPs with commercial potential includes Kuth, Atish, Karu, Chiraita, Ban Kakidi, Kashmal, Walnut roots/ barks and other such products which are harvested by right holders, collected by MFP contractors and sold in markets of plain areas like Dehradun, Amritsar, Chandigarh and Delhi. The removal of NTFP from forest occur in 4 year cycle as per the 4 year programme of extraction of NTFPs allowing forest floor to regenerate the NTFPs and ensure sustainability in biological resource. The following table summarizes the recorded removal of NTFP:

Sr.No.	Name Of Range	Fy/ YEAR	Permit issued for transit of produce /Species	Quantity
1.	RFO Khashdhar	2023-24	Dhoop (Jurineamacrocephala=J.dolomoea)	300 kg
2.	Bashla	2024-25	Goochi (Morchellaesculenta)	50 kg
3	Dodra Kawar	2024-25	Berberis aristata (Daruhaldi)	10000 kg
4	Dodra Kawar	2024-25	Walnut bark (Juglan sregia)	10 Quintal
5	Dodra Kawar	2024-25	Kashmal (Berberies) Daru Haldi	9000 kg
6	Saraswati Nagar	2024-25	Knots/Pinusroxburghii (Chil Cones chilaru)	17000 kg
7.	Saraswati Nagar	2024-25	Knots/Pinusroxburghii (Chil Cones chilaru)	10000 kg

Table 7.7: Detail of NTFP removal recorded in Rohru Forest Division

7.5 Demand and Supply of Timber and Non Timber forest produce

There is a great demand for timber considering its extensive use in construction of houses, repair and other multifarious uses. The supply of timber is met from following sources:

- Timber Distribution to right holders
- Forest Corporation Timber Depots
- Imported Timber Sale Depots
- Timber Extracted from Private Land for Bonafide Use under Land Preservation Act

The most sought after timber is that of Deodar and Himalayan Blue Pine whereas imported timber is also witnessing increase in demand. There are a number of private saw mills registered under the Himachal Pradesh (Sale of Timber Act, 1968) within the tract the detail of which is annexed to this plan as Appendix-XXIII. A total of 64 saw mills are registered in the tract currently and there is a need to monitor the number of saw mill and reconcile them against actual requirement especially in the scenario of increasing availability of imported timber.

The detail of imported timber sale depots range wise and panchayat wise is also annexed to this plan as Appendix-XXIV in which it is clear that there is an exponential growth of imported timber business with the establishment of several imported timber depots. The establishment of imported timber depot is welcome as it provides a cost effective solution to timber availability while at the same time helping and aiding the conservation of native local forests.

Among wood based industries, the tract also has established cedar oil manufacturing unit registered with government of Himachal Pradesh. The unit named Aro Oil sources raw material in form of Deodar stumps from forests out of which the oil is extracted through the process of steamed distillation. The detail regarding cedar oil extraction is given in the table below:

Sr.No	Year	Name of Firm	Name of Range	Quantity of Stumps	Royalty Amount Deposited (in Rs.)	Rehabilitation and Planting Cost
1	2023-24	M/s Aro Oil international	Bashla	637	219375	

Table 7.8: Detail of cedar oil industry in Rohru Forest Division

7.6 Import and Export of Wood and Wood Products

In case of recorded removals from forests for timber distribution, the wood concerned is utilized within the tract only. Whereas, the timber harvested by HP Forest Corporation from Salvage lots is exported to their depot in Baddi from where it is auctioned off to highest bidder. Similarly, the timber harvested under FRA and FCA are also sold off through process of auction.

7.7 Import and Export of NTFPs

In case of NTFPs, there are NTFPs extracted and transported after taking permit of DFO for exporting it to outside market. The following table summarizes the detail of NTFPs harvested and exported out of the tract:

Sl.No	Name Of Range	Year	Name and address	Permit issued for transit of produce /Species	Quantity	ABS amount deposited (in Rs.)
1.	RFO Khashdhar	2023-24	Sh.Vinod Kumar S/O Sh. Hira Singh R/O Village Sheela Desh P.O Larot Tehsil. Chiraaon Diss tt Shimla H.P	Dhoop (Jurineamacrocephala=J.dolomoea)	300 kg	16605/- Sixteen Thousand Six Hundred Five Rupees Only
2.	Bashla	2024-25	Sh. Jojinder Singh S/O Sh. Kamla Nand R/O Village Sharog P.O. Arhal Trehsil Rohru Distt. Shimla H.P.	Goochi (Morchellaesculenta)	50 kg	15000/- Fifteen Thousand Only
3	Dodra Kawar	2024-25	Sh. Parmi Ram S/O Sh Bhag Dass R/O VPO Dodra Tehsil Dodra Kawar Distt. Shimla H.P.	Berberis aristata (Daruhaldi)	10000 kg	16000/+500/- = 16500/- Sixteen Thousand Five Hundred Only
4	Dodra Kawar	2024-25	Sh. Manjeet Singh S/O Sh.Deendiyal Singh R/O VPO Dodra Tehsil Dodra Kawar Distt. Shimla H.P	Walnut bark (Juglan sregia)	10 Quintal	30000/- Thirty Thousand only
5	Dodra Kawar	2024-25	Sh. Parmi Ram S/O Sh Bhag Dass R/O VPO Dodra Tehsil Dodra Kawar	Kashmal (Berberies) Daru Haldi	9000 kg	14850/- Fourteen Thousand Eight

			Distt. Shimla H.P.			Hundred Fifty Only
6	Saras wati Nagar	2024 -25	Kedar Singh S/O Late. Sh Dhani Ram R/O Village Chajian P.O. Tikkari Teh. Nerwa Distt. Shimla H.P.	Knots/Pinusro xburghii (Chil Cones chilaru)	17000 kg	20400/- Twenty Thousand Four Hundred Only
7.	Saras wati Nagar	2024 -25	Kedar Singh S/O Late. Sh Dhani Ram R/O Village Chajian P.O. Tikkari Teh. Nerwa Distt. Shimla H.P.	Knots/Pinusro xburghii (Chil Cones chilaru)	10000 kg	12000/- Twelve Thousand only

Table 7.9: Detail of NTFP extracted in Rohru Forest Division

7.9 Valuation of the products

The wood based products are valued as per the notified market prices of HP State Forest Corporation whereas the market rates of NTFP are notified by State Biodiversity Board. Both the wood and NTFP market rates indicate an increase in the price of wood and non wood based products in the tract.

Chapter-8

Maintenance and Enhancement of Social, Economic, Cultural and Spiritual Benefits

The National Forest Policy of 1988 recognized the participation of local community in forest management. The first guidelines of JFM were issued in 1990 by the MoEF, Govt. of India and thereafter Joint Management of Forests hand in hand with communities have been part and parcel of forest management in the country. This is founded on the principle of sustainable forest management in which forest produce and eco system services sustain life and livelihood and the forests are managed in partnerships with community towards this purpose. It tends to create a sense of ownership and shared responsibility among local right holders with forest department departing from the colonial mode of management and forest protection.

8.1 Number of JFM Committees and status of their empowerment

In line with the National Forest Policy 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. 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 on the basis of the above notification. On the basis of this notification, Forest Development Agencies were formulated and JFMCs were formulated in forests for protection of forests, enhancement of green covers and for execution of soil moisture conservation in forests.

In Rohru Forest Division, the following Joint Forest Management Committees are formulated in various forest ranges of the tract:

Sr.No.	Name of Range	Name of VFDS	Area of Operation	Current Status (Active/Inactive)
1	Saraswati Nagar (Batch I & IV)	Chetna VFDS Badiar-Bajhanu (Batch-I)	20 Ha (10PFM mode) 10 (Departmental Mode)	Active
2	Saraswati Nagar (Batch I & IV)	VFDS Chajipur Valley (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
3	Saraswati Nagar (Batch I & IV)	Jagriti VFDS Shallar – Nandpur (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
4	Saraswati Nagar (Batch I & IV)	Prerna VFDS Ruhil- Malog (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
5	Saraswati Nagar (Batch I & IV)	Sansog Dhakrantu (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
6	Saraswati Nagar (Batch I & IV)	JakhoriPujarli (Batch-IV)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active

7	Jubbal (Batch III)	Jai Jaga Mata VFDS Maltheshwari (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
8	Jubbal (Batch III)	Jaga Mata VFDS Kaina (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
9	Jubbal (Batch III)	Jai Kali Mata VFDS Parali (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
10	Jubbal (Batch III)	VFDS Giri Ganga (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
11	Khashdhar (Batch II)	VFDS Gaonsari (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
12	Khashdhar (Batch II)	VFDS Rohal unit-I (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
13	Khashdhar (Batch II)	VFDS Rohal unit-II (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active

14	Khashdhar (Batch II)	VFDS Sindasli (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
15	Khashdhar (Batch II)	Jai DevtaPawasi VFDS Dali (Batch- III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
16	Khashdhar (Batch II)	Jai DevtaGaudasi VFDS Dhakgaon (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
17	Khashdhar (Batch II)	Maa Durga VFDS KhindariKhoptwari (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
18	Dodrakwar (Batch III)	VFDS Jakha	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
19	Dodrakwar (Batch III)	VFDS BarasarJaskoon	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
20	Dodrakwar (Batch III)	Jai DevtaJakh VFDS Dodra	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active

21	Dodrakwar (BatchIII)	Jai kewarjakh VFDS Danderwari	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
22	Dodrakwar (BatchIII)	Rupin VFDS KEWAR	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active

Table 8.1: List of VFDS under JICA project in Rohru Forest Division

The JICA funded Forest Ecosystem Services and Forest Based Livelihood Project has been going on in 4 forest ranges of Rohru Forest Division. Under the JICA project, 21 VFDS groups have been constituted in various regions involving local people including women, socially and economically backward groups. The constituted VFDS are executing forestry activities like plantations and assisted natural regeneration along with soil moisture conservation in PFM mode. Further, each VFDS has 2 Self Help Groups constituted under its umbrella. Each of the self help group is given training and skill development in various skills like tailoring, mushroom cultivation, medicinal plant cultivation, vermi compost etc. The list of self help groups formed under JICA project along with the respective income generating activities is given in Appendix -XXVII in Volume-II of this plan.

It is to be highlighted here that the potential of JICA project was more profound in socially and economically backward regions of the tract wherein people come forward to participate. However, 2 of the chosen forest ranges under JICA project i.e. Jubbal and Sawra forest range has a socio-economic composition constituted by affluent and wealthy residents limiting the project potential. In these ranges, the VFDS and SHGs are not active and are virtually defunct except for certain isolated cases like in Parali SHG. This particular group has achieved success in mushroom cultivation. The potential of VFDS and SHGs for forest based community livelihoods seem more pronounced in forest range of Dodra Kwar and to a lesser extent in parts of Khashdhar. The project missed an opportunity by utilizing the vast medicinal and aromatic plant potential in the Khasdhar Forests.

Apart from the JICA project, there were other schemes which laid emphasis on Joint Forest Management or Forest Based Community Livelihoods like the ‘Samudayik Van Samardhan Yojana’, ‘Jan Sampridi Van Sampridi Yojana’. Under the latter scheme, 14 Community User Groups were formed in Rohal Village in Khashdhar forest range. Each of these groups were allocated 1 Ha forest land for raising of medicinal plants and a central nursery was provided for the villagers. The groups were also provided with seed money for raising of plants. The CUGs formed in Rohal has worked promisingly in the scheme and this has been able to provide substantial forest based livelihood intervention for people of Rohal and Tagnu Janglik. It is expected that such interventions which are married to forest landscapes can help revitalize forest based economy concept and enable community participation for forest conservation.

8.2 Status of Empowerment of JFMCs/ VFDS

The VFDS have clear organizational framework with an elected President. The concerned Deputy Range Forest Officer is the member secretary. A Joint account is maintained by both the Block Forest Officer and elected President. An executive committee of elected members involving women representation is put in place to manage day to day affairs of the VFDS and the General House meets once in 6 months to discuss aspects related to forest management.

The concept of VFDS/ JFMC/EDC is not well established in the tract with people not well aware of roles, rights and responsibilities unlike in southern states where these institutions function like well oiled machines. These institutions are hardly empowered with decision making powers centralized and not meaningfully decentralized. Further, the staff capacity in managing such institutions are also not sound enough.

The major point is the fact that the tract is having a very unique socio economic profile in which large parts of the tract are occupied by wealthy and affluent households who have reaped the benefits of advanced horticulture and apple production. With the current demography and socio-economic profile, there is little dependence on the forest or eco system services as perceived by the residents. Many of the right holders are also not full time residents but visit once in a while during the harvest, pruning, spraying season. Owing to these reasons, there is a significant lack of interest in the tract amongst people when it comes to forest management and sustainable utilization of forest produce. This is a major road block in empowerment of social forest based institutions at the local level. However, these institutions can take shape at specific sites like in Dodra Kwar Forest Range and parts of Khashdhar Forest Range. Further, the

objective of these institutions can be moulded in line with eco tourism to create more meaningful institutions

8.3 Labour Welfare

The labour engaged in the tract is mostly of migrant nature especially from Nepal and few from East India. There is almost no local labour available except in remote area of Dodra Kwar Forest range considering the affluent socio-economic profile of the region. The labour engaged for forestry activities are provided minimum wage as per the approved daily wage rates. They are engaged in all forestry and civil works like plantation, raising and maintenance of plants in nursery, soil moisture conservation, logging etc.

8.4 Use of indigenous knowledge

Medicinal uses of plants: Elderly people know about use of various medicinal plants for curing of various diseases found in the forests of Rohru. Local community especially villagers use these plant species as food, medicines and for daily needs. The below mentioned table shows plants used in various purposes by the local community of Rohru Forest Division.

S.No.	Botanical Name	Local Name	PartUsed	Uses
1.	<i>Agave Americana</i>	Rambans	Leaves	Fibre used in making articles & Fencing
2.	<i>Ageratum conyzoides</i> L.		Leaves	Leaf paste is used in small cut as a wound healing
3.	<i>Arundinaria fulcata</i>	Bans	Culms	Bamboo used in making baskets, mats and hats. Culms used as fencing.
4.	<i>Berberis aristata</i>	Kashmal	Flower	Plants are reported to be blood purifier, cooling, laxative, diaphoretic, stomachic, tonic and for affections of the eye. Also useful in cholera, diarrhea, dyspepsia, enlargement of spleen, intermittent fevers, piles, rheumatism, skin diseases, stomach disorders, ulcers and vomiting During pregnancy also used in acidity.

5.	<i>Berberis lyceum</i>	Kashmal	Tender Shoot, Fruits	Ripe fruits edible. Tender shoots chewed for curing skin diseases and as a blood purifier. Plants are used as an antidote for poisoning, antimalarial, antiseptic, blood purifier, carminative and febrifuge. Also used in bleeding, chronic diarrhoea, ear problems, enlargement of liver and spleen and urogenital disorders.
6.	<i>Boenninghausenia albiflora</i>	Pissumar Booti	Aerial Plant Parts, Leaf	Aerial plant parts good for healing wounds. Leaf juice used as antiseptic on wounds, externally applied to forehead to relieve head ache. The leaves are also applied externally in the treatment of scabies.
7.	<i>Cannabis sativa</i>	Bhang	Leaf, Seed, Bark	Seeds edible, used in chronic pain and muscle spasms, reduce eye pressure in people who have glaucoma.
8.	<i>Cedrus deodara</i>	Devdaru, Devdar	Wood	Wood is carminative, diaphoretic and diuretic. Also given in fever, flatulence, heart palpitation, paralysis, pulmonary troubles and urinary diseases.
9.	<i>Centella asiatica</i> L		Whole plant	It is grinded and juice is used to drink for the treatment of Stomach problem and sometime cooked and eat.
10.	<i>Daphne pyracea</i>	Gandari	Leaf	Considered laxative and helps in reducing fever.
11.	<i>Erigeron Canadensis</i>	Choproo	Flower	Flower used to stop bleeding and for diarrhea and dysentery.
12.	<i>Ficus Palmata</i>	Phedu	Fruits & Leaves	The latex of the plant is used to take out spines lodged deeply in the flesh, also it is a fuel wood, Fruits edible.
13.	<i>Fragaria nubicola</i>	Aakhe	Fruit	The juice of the plant is used in the treatment of profuse menstruation. The unripe fruit is chewed to treat

				blemishes.
14.	<i>Girardinia diversifolia</i>	Jarahan,Bic hhubuti	Fruit,Root	Root juice used to treat constipation; fresh leaf juice applied externally in the treatment of Headaches and swollen joints.
15.	<i>Pinus roxburghii</i>	Chil	Wood	Fuelwood
16.	<i>Prinsepia utilis</i>	Bhekal	Fruits	Fruits are edibles; edible oil is extracted from its seeds. Seed oil is also used for illumination by villagers. Villagers use this shrub for fencing around fields.
17.	<i>Pyrus pashia</i>	Shegul	Wood	Rootstock is used for grafting pear. Walking sticks are made of it. A good fuel.
18.	<i>Rubus ellipticus</i>	Kingor	Fruits	Fruit berry edibles and used in making berry juices.
19.	<i>Rumex hastatus</i>		Whole plant	Edible. Various ailments including GIT ailments, cuts, wounds, bleedings, as appetizer, as anthelmintic, in snake bites, blood pressure, tonsillitis, sore throat, as flavoring agent, carminative and diuretic
20.	<i>Urtica dioica</i>	Bichubuti	Leaves	Leaves are used as cooking

Table 8.2 Use of plants and their parts by the local community of Rohru

ii. Indigenous Knowledge of Handicraft: The remote villages of Dodra and Kwar have documented indigenous practices like basket making based on forest produce which can be utilized to promote their income generation.

Apart from the above, there is a need to properly document traditional and indigenous knowledge especially considering these knowledge is going extinct with the new generation least interested or bothered to conserve the traditional knowledge owing to increased affluence and road connectivity. During the period of this working plan, there is a need to clearly document traditional and indigenous knowledge in order to conserve and promote them in accordance with sustainable forest management.

8.6 Extent of Cultural /Sacred Groves

The forests of the tract have rich spiritual and cultural importance with the 'Devta' culture flourishing in the tract. Each village in the tract has their own Devtas or deities which are worshipped for prosperity and peace in the village. In many cases, the historical heritage temples housing the deities falls in forest land and on account of the same, the forests also gain sacred meaning.

The forests of Giri surrounding the Giri ganga temple, the forests of Kharshali adjoining the Kharshali Mata temple, the forests adjacent to Dodra village are some examples of cultural/ sacred forest which are revered and respected by the local people. The following list summarizes the list of such sacred sites in the tract:

Sr.No.	Range	Panchayat	Village	Name of Forest	Name of any temple/ shrine (if any)
1	Jubbal	Shilli	Snaba	DPF Giri 5c	Giri Ganga Mandir
2		Parali	Kharapather	UF Ori	Kali Mata Mandir
3		Barthata	Mural	UPF Mural	Jakh Temple
4		Jai Pidi Mata	Rampuri	UPF Rampuri	Narsingh Mandir
5		Jai Pidi mata	Rampuri	DPF Rampuri	Temple
6		Shilli	Kohlara	DPF Giri	Kali Mata Mandir
7		Badhal	Badhal	UPF Badhal	Kali Mata Mandir

Table 8.3 List of some sacred sites in Forest Areas

8.7 Important Ecotourism places in the Division

The tract dealt with in the plan is having immense eco tourism potential in form of hiking, trekking, pilgrimage and natural sight seeing. With increasing road connectivity, the tract is attracting a large number of visitors every year with a clear increasing trend in visitors flocking to the various sites. The tract also has potential to attract different kinds of visitors like the young visitor who is adventurous and likes to visit pristine places go on various treks in the tract whereas family or elder groups prefer visiting sites accessible by car.

Eco Tourism is a philosophy involving components of local livelihood and income generation, nature awareness and conservation education for the visitors and ensuring sustainability of the nature and environment with minimal ecological footprint. With growing visitors, there is a danger that eco-tourism will leave behind the principle of sustainability and lean towards consumptive tourism over and above carrying capacity of eco-tourism sites. In the tract, such tendencies of tourism are seen in ecotourism sites like the Chanshal Pass and Giri Ganga temple where vehicular access is there for tourists. This results in large number of visitors above carrying capacity of the place. As a result of this, there is a strain on natural resources and the issue of parking, sanitation and solid waste management which needs to be addressed immediately.

A second bottleneck of the ecotourism sites is the lack of local participation in management and facilitation of ecotourism. There are some local villagers who threaten to corner the benefits of increasing visitors in an unorganized fashion paying little heed to the ecological impacts. These include the mushrooming of temporary Dhabas/ cafes in Giri Ganga, Chanshal and the unauthorized camping that takes place in forest areas. Further, in certain sites, the local villagers because of their affluent backgrounds are not ready to participate in management of eco-tourism as there is little incentive to keep them engaged in activities.

The current framework of promotion of ecotourism involves a state level society i.e. the Himachal Pradesh Eco Tourism Society (HPECOSOC) headed by CEO HP ECO SOC who is an APCCF level officers. Under the umbrella of HP ECO SOC, there is a circle level ECO SOC headed by the Conservator of Forests, Shimla Forest Circle. The Governing Board of the Circle Level ECO SOC is tasked with managing the ecotourism sites and approving funds for the same. At the division level, there is a supervision committee of the HP ECO SOC which manages day to day affairs with the DFO of the division being the Executive Secretary who takes the major executive decisions of managing ecotourism.

The eco tourism sites managed in the tract has potential to generate revenue from the following streams:

- **Issuing of Permits for Trekking/ Hiking:** The tract has several scenic trekking routes which are widely sought after by trekking enthusiasts and hiking companies. The major trekking routes include Rupin Pass Trek, Chander Nahan, Buran Ghatti, Moral Danda, Giri- Kuppad, Kharshali-Saru Lake trek. There are national level companies like the India Hikes which operate in these routes after taking the permit.
- **Operation of Camping Sites:** The forest department has developed camping sites in certain scenic locations by providing fencing, temporary toilets and kitchen. The operation of these camping sites can also help fetch revenue for the HP ECO SOC
- **Rest Houses:** Certain forest rest houses and rooms are kept for online booking under HP ECO SOC. The revenue earned from the booking of the rest houses also lie towards the HP ECO SOC.
- **Camping Permits:** The hiking groups apply for camping permits in forest areas which are issued by DFO and the permit fees for camping is also a revenue source for eco tourism.
- **Operation of Eco Shops:** The sites have potential for eco shops to provide souvenirs and eco friendly refreshments to the visitors which is another revenue source under eco tourism
- **Ticketing of Sites:** Currently, no fee is charged from visitors in most sites like Chanshal, Giri Ganga and Kharshali Lake. A ticket fee can be levied in all these sites to generate revenue in order to sustainably manage the area.

Among the above revenue streams, the major source of revenue is from the permit fees of trekking and camping considering the high footfall of trekkers in the region. However, with the advent of ticketing, that can be another significant revenue stream for eco tourism. As per the State Policy of Eco Tourism, 60% of the revenue generated shall lie towards the Circle Level HP ECO SOC, 20% shall go towards the State Level ECO SOC and 20% shall go to the State government.

Every year, the supervision committee at the division level prepares the Annual Plan of Operation on basis of revenue generated and seeks approval of Circle Level and State Level ECO SOC to execute the activities. It is presumed that if conducted smoothly, the ecotourism activities in the tract has the potential to generate 1 crore rupees revenue even while carrying out sustainable ecotourism activities.

The following are the notable eco tourism sites in the tract:

Sr No	Year	Range	Name of ecotourism Site	Activity	Revenue (in Rs)
1	2022-23	-	-	Camping/ Hiking	584125/-
2	2023-24	Dodra Kwar	Rupin Pass		3,80000/-
		Khashdhar	Buran Ghati		5,79500/-
		Jubbal	Giri Ganga		49000/-
Total					1008500/-
3	2024-25	Dodra Kwar	Rupin Pass	Camping/ Hiking	752500/-
		Khashdhar	Buran Ghati		1240000/-
		Jubbal	Giri Ganga		11700/-
Total					2004200/-
4	2025-26	Dodra Kwar	Rupin Pass	Camping/ Hiking	825500/-
		Khashdhar	Buran Ghati		921300/-
		Jubbal	Giri Ganga		49500/-
Total					1796300/-

Table 8.4: Revenue generated from Eco Tourism Sites under Rohru Forest Division

Detail of Revenue generated from Gate Ticketing

Sr.No..	Name of Site	Revenue generating during the year 2025-26 (in Rs)	
		May 2025	June 2025
1	Chandernahan	21000	1800
2	Dodra Kwar	10800	33500
3	Mural Danda	4900	3900

4	Giri ganga	39900	85400
5	Chanshal(Larot)	22000	72400
	Total	98700	197000

Table 8.5 Renue Generated from Gate ticketing in Rohru Forest Division

The aforementioned sites have been developed under the Nai Rahein Nai Manzilein Scheme of HP Tourism Department in which the Mandli FRH compound, Larot Camping Site, camping gear procurement were executed. The following are the detail of activities carried out for eco tourism in the tract:

Sr.No.	Range	Name of Eco Tourism Site	Brief Detail on Amenities Developed	Total Expenditure Incurred (in Lakh Rs)
1	Khashdhar	1. Kharshali lake	Restoration of heavily silted natural water body at kharshali and its development as eco-culture site.	39.90
		2. Development of camp site at Log hutMandli.	Protection of Log Hut Mandli from Pabbar River & development of camp site at Log hut Mandli	37.80
		3.camp site at Larot	development of camp site at Larot	3.90

		4. Log hut Mandli.	upgradation of Log hut Mandli.	9.80
		5. Workshop on Chanshal Eco tourism conduct at Log hut Mandli	Workshop on Chanshal Eco tourism conduct at Log hut Mandli in Co-operation withv Deptt. of Tourism,HP	.0097
		6. Kharshali	Camp site Kharshali	2.81
		7. Camping site/Trekking route	Dayara to Chandernahan	31.66
		FRH-Larot	Upgrdation of FRH-Larot	0.40
		Total	12647912.00	
2	Rohru	1. Mural Danda	Camping site/Trekking route Workshop on Chanshal Eco tourism conduct at Log hut Mandli	34.30
		2. FRH Rohru	Upgradation of FRH-Rohru	10.0
		Total	4430481.00	
3	Dodra Kwar	1. Rupin Pass	Camping site/Trekking	39.99

			route in Rupin Pass	
		2.Bhararasar Lake	Camping site/Trekking rout Bhararasar Lake	44.0
		3.FRH- Dodra	Upgradation of FRH-Dodra	9.99
		4. FRH-Kawar	Upgradation of FRH-Kawar	9.98
		5.FRH-Jakha	Upgradation of FRH-Jakha	9.88
		Total		113.862
4	Jubbal	1.FRH-Kharapather	Upgradation of FRH-Kharapather	19.96
5	Bashla	5.FRH-Khadrala	Upgradation of FRH-Khadrala	19.56
1	Procurement of Material related to ecotourism through Gem.			64.92
2	Website building.			15.90
3.	Survey of all sites vise, trekking photos and location of camping sites through professional.			2.81
	Total Amount (in Lakh Rs)			407.83

Table 8.6: Expenditure on Eco Tourism sites in Rohru Forest Division

8.7 Social Customs relevant to Forests

Rohru Forest Division has a special cultural connectivity with the forests as the natural places have defined the environment of communities in the region throughout time. The Hatkoti Temple and other temples in Rohru on the bank of river Pabbar are great examples to define social customs and the forests functions, tangibly and intangibly. Forests are integral part of religion, medicine, language, history, art, politics, and even social structure itself. Forest trees (particularly Deodar or Ficus trees), shrubs and herbs are seen as abode of the spirits of ancestors as well as those of the newborn. At the same time the villagers view some of the trees with evil spirits. The soothing effects and patience in humans is often ascribed to the talisman of *Datura metel*, a shrub in Rohru landscape associated with Lord Shiva.

Fairs and festivals are common place in the tract. The major fairs held in the tract include the Gowas Fair, Dalgaon Bhunda Fair which sees large scale participation from local villagers and people from far and wide. This congregation of people naturally puts pressure on forests for fuelwood, sanitation, water and camping. However, with the advent of roads, it is possible that many of these bottlenecks can be managed by providing portable water, LPG cylinders and portable toilets. There is a need to step up coordination with district administration in this regard.

8.8. Status of compliance of Forest Right Act (FRA)

No individual or community rights have been granted to any ST or OTFD community living in forest areas in the tract. The process of recognition and vesting of forest rights as mentioned in the forest rights act has to be completed by the Gram Sabha. On the basis of the act, the Gram Sabha must invite notice for claims and the claims must be verified by SDLC and DLC under FRA. However, till date, no such claims have been made of individual or community forest rights under Forest Rights Act, 2006.

The process of recognition and vesting of individuals and community forest rights under FRA, 2006 has been completed for all revenue villages in the tract at the level of DLC of Shimla District in the year 2022 in which no claim was put forward by any individual, Gram Sabha or SDLC. The complete proceedings of the DLC dated 28.01.2022 is given in the Appendix-XL in Volume-II of this working plan.

8.9 Other Rights & Concessions

Large parts of the tract dealt with includes Undemarcated Protected Forests, Alpine Pastures and Panwis. These areas are critical for being grazing grounds of local and migratory grazers. The various rights and concessions handed out to local villagers and right holders in the tract include:

- **Grazing and Fodder Collection**
- **Fuel wood Collection**
- **Lopping of Species up to 1/3rd of the crown**
- **Salvage Timber for construction and repair of house/ cowshed**
- **Timber for cremation**
- **Access to paths**
- **Collection of NTFPs from right holding forests**

8.10 Dependency of Local people on NTFP

The matters regarding utilization of NTFP by villagers, right holders and contractors was discussed in detail in the previous chapter. The dependence on NTFP is particularly prominent in the ranges of Khashdhar and Dodra Kwar. The registration details of MFP contractors who sell and store NTFPs are also mentioned therein. The NTFPs are extracted in 4-year cycle from forest ranges and transit permit issued under Himachal Pradesh Forest Transit (Land Routes), 2013 along with Access and Benefit Sharing fees collected as per Biodiversity Act, 2002 is made with regard to NTFPs.

Chapter-9

Adequacy of Policy, Legal and Institutional Framework

9.1 Existing Policy and Legal Framework and their compliance

9.1.1 Constitutional Framework

The Constitution of India makes clear directives and duties regarding forest protection and wildlife conservation. The following are some of the constitutional directives in this regard:

1. **Article 48:** The state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country
2. **Article 51A:** It shall be the fundamental duty of citizen of the country to protect and improve the natural environment including forests, lakes, rivers and wildlife to have compassion for living creatures
3. **Seventh Schedule:** Forests are placed in concurrent list enabling both parliament and state legislatures to make laws on subject governing forests.

9.1.2 National Policy on Forests

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 and 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 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 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 programme of afforestation and tree-planting on all degraded and denuded lands in the country. The policy also admitted that natural forests that serve as a gene pool resource and help 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 are

responsible for converting their biological diversity and using them in a sustainable manner.

9.1.3 Legal Framework

The legal framework governing the forests of the tract include the following legislations and rules:

- **Indian Forest Act, 1927:** This principal legislation is the driving force that recognizes Reserve Forest, Protected Forests and Unclassed Forests after government notification. It protects these notified forests from illicit felling, encroachments, clearing or breaking up, diversion and other such ill effects. It provides field functionaries with authority to take cognizance of forest offences and enforce the law.

The state legislature has made key amendments to the principal legislation giving crucial powers to DFOs who are authorized officers for confiscation of vehicles involved in offences under IFA. The Indian Forest Act, 1927 (Himachal Pradesh IInd amendment 1991) puts in place procedure for confiscation of vehicles under Section 52A of the act. The Section 52 B further puts a bar on jurisdiction for other court in matters involving vehicle confiscation. The powers under 52A have greatly strengthened arms of law with the DFOs and ensured that strict action can be taken against offenders.

- **Forest Conservation Act, 1980/ Van Sanrakshan Evam Van Samvardhan Adhiniyam:** These legislations have been the corner stone to prevent ill thought forest diversions for non forest purposes. The FCA has put in place a clear institutional structure of Nodal Office, Project Screening Committee, Regional Office and Central Government for facilitating forest diversions. It has also built in the principle of compensatory afforestation through Compensatory Afforestation Management and Planning Authority (CAMPA) for providing compensatory afforestation in other landscapes with a view to afforest scrub lands in lieu of diversion. The Net Present Value of diverted forests are also deposited by the user agencies diverting forest land.
- **Himachal Pradesh Public Premises and Land (Eviction and Rent Recovery) Act, 1971:** This principal legislation is the backbone of forest protection in the tract given it delegates powers of collector court to DFO in case of forest land enabling swift action against encroachment. It provides powers to DFOs to take cognizance of encroachments upon

Challan by Range Officers with regard to encroachment. The Qanungo and Patwari posted in the division office demarcate the said land and assist range officers in preparing the case file under the Act. The DFO cum Collector Court conducts the proceedings under act and provide verdict enabling eviction of encroachers.

- **Forest Rights Act, 2006:** The Section 3(2) of the Forest Rights Act, 2006 provides for diversion of up to 1 Ha of forest land involving not more than 75 trees for 13 essential non forest activities including road subject to Gram Sabha resolution. This legislation has been a double edged sword with initially far flung villages gaining much needed road connectivity due to the said act. However, there is an increasing tendency to seek a free pass through forest land to provide multiple connections to apple orchards. There is no clear guideline or SoP in place at state level with regard to according approval for diversions. This vacuum of instructions/ directives/ guidelines has adversely affected the implementation of the Section 3(2) diversions leading to rampant misuse and threatening the existence of forests surrounding apple orchards. There is a need to fix urgently the criteria for forest diversions under FRA in terms of number of beneficiaries, maximum distance of proposed road from existing road, maximum land ownership of beneficiaries etc.
- **Himachal Pradesh Forest Produce Transit (Land Routes), 2013:** This delegated legislation notified by the state government is crucial to forest protection given the legal backing it provides against illicit transport of forest produce including timber. The power delegated to forest officers under Rule 12 and Rule 14 of the rule helps forest staff to detect, take cognizance and make effective action against illicit transport of forest produce enabling protection of forest wealth and biodiversity.
- **Wildlife Protection Act, 1972:** The legislation is a powerful tool for field functionaries to tackle offences involving wild animals and birds including hunting, poaching, smuggling of wildlife articles etc. However, there is need to build capacity of staff with regard to enforcement of legislation particularly with regard to detection of the offences under the law.
- **Biodiversity Act, 2002:** This legislation is crucial in the tract given it gives vast powers to protect biodiversity from exploitation by foreign players and non right holders. The tract is a rich reservoir of valuable NTFPs and other biological produce such as maple knots, Rakhal barks, barks of walnut, bhojpatra, Nag Chatri, Dhoop etc. There have been incidents of smuggling of these products in which effective action can be

taken under Biodiversity Act. In the year 2024, a Nepali gang involved in Maple Knots smuggling was busted by the division utilizing this particular legislation. The state of Himachal Pradesh has also notified the Biodiversity Rules under this legislation for effective implementation.

- **Land Preservation Act, 1971:** This legislation deals with all tree felling in private land including for bonafide use, for non forest government land and those executed under 10 year felling programme.
- **Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2015:** These rules are critical for the tract as the Pabbar river flows through the tract depositing valuable minerals in form of sand and stone. The area is greatly vulnerable to illicit mining and mineral transportation. Further, large parts of the river land come under 1952 notification making it protected forests under Section 29 of the Indian Forest Act. In addition, there are large parts of private land which are interspersed with forest land. The said rule or notification also authorizes all forest officers right from forest guard level to take cognizance of illicit mining carried out and illicit mineral transportation to take suitable action as per law. Hence, the forest functionaries are able to utilize the Indian Forest Act, 1927 and this legislation as per land status in order to effectively safeguard the river system and prevent unauthorized lifting of mineral.

The above mentioned legal framework is the basis of forest management and law enforcement in the tract. There is a need to fill the policy and legislation gaps particularly with regard to forest diversions under FRA, 2006 in order to safeguard the forests.

9.2 Status of approved Working Plan and Compliance

The previous approved Working Plan was written for the Forest Divisions of Rohru and Jubbal by Sh. Ajay Srivastava, IFS. The working plan was written for the period from 1994-2008 after which it was extended further. The prescriptions of the plan and their compliance is given in the below mentioned table:

Sl.No.	Prescription	Working Circle	Status
1	Felling/ Removal under Irregular Shelter Wood System	Deodar-Kail, Spruce-Fir, Chil	Not implemented due to the ban on green felling by Honourable Supreme Court of India Only salvage removals carried out in all working circles
2	Plantation	Plantation Working Circle	Partially implemented with complete detail of plantation carried out annexed to this plan
3	Closure on Grazing	Grazing (Overlapping) Working Circle	Partially implemented with many areas closed from grazing under plantation and ANR
4	Soil and Water Conservation	Protection cum Rehabilitation	Partially implemented by construction of check dams, check walls, water ponds, WHS. Still further scope exists for soil and water conservation
5	Construction of New Buildings	Miscellaneous Regulation	Few buildings constructed like Inspection Hut Pujarli. However, many of the buildings are not constructed
6	Maintenance of Forest Boundaries	Miscellaneous Regulation	Not done as per the program provided.

Table 9.1: Prescription Status of Previous Working Plan

9.3 Number of Forest offences

The following are the list of forest offences which happen in the tract;

1. **Illicit Felling**
2. **Mining**
3. **Poaching/ Hunting**
4. **Encroachment**
5. **Lopping**
6. **Grazing in Plantation Area**
7. **Kindling of Fire**
8. **Unauthorized access and transit of biological resource**

The detail of all such forest offence cases detected are provided in the appendix –XII, XIII and under the threats section of chapter 3. Among all the offences, encroachment is the most widespread and significant offence which needs to be reined in for forest protection.

9.4 Status of Research and Development:

Research and development is required in the forest division for improvement, management and development of forests in a more inventive and scientific way to obtain goods and services on a sustained basis. The following forestry research activities are being carried out on a priority basis in collaboration with Himalayan Forest Research Institute, Shimla an institute under ICFRE.

- **Establishment of Modern Nursery in Bashla:** A modern nursery is under establishment in Bashla with components of Solar Fencing, Poly House, Root trainers and other aspects being installed in the nursery

9.5 Human Resource Capacity Building efforts

The State Forest Department of Himachal Pradesh has successfully implemented capacity building programmes for the frontline staff and officers for the management of forest and wildlife. It is not only the foresters, but the local people and NGOs are also contributing to protection and improvement of degraded forests. Taking these programs forward and based on the learning

from the past, programs have been designed for coming years. The training is imparted in using modern techniques in forest and wildlife management practices like the use of GIS and remote sensing, improvement in services by using Information Management System (IMS) and other and scientific knowledge. The officers are sent to reputed institutions like FRI, ICFRE, IGNA, FSI, IIFM, WII etc. for attending trainings by the forest divisions for capacity building.

The frontline staff are trained by Forest Training Institute, Chail whereas the recruited Range Officers are trained in different academies across the country. The central training institute for all forest functionaries is the Himachal Pradesh State Forest Academy in Sundernagar, Mandi. Apart from the training institutes, multi disciplinary trainings are conducted routinely for field staff. This involves modules of wildlife rescue, chemical immobilization, forest law enforcement, data collection using modern technology, drone/ UAV based monitoring and nursery propagation of plants.

9.6 Forest Resource Accounting

A number of tangible benefits are derived by the stakeholders from the forests. Bamboo and miscellaneous forests meant their livelihoods, food articles, medicinal plants, fuelwood source for making handicrafts, cots, hunting sticks, wood for agricultural and household uses and many other reported and unreported uses. The farmers in the area are still using bamboo, agave and *baikal* bushes for fencing agricultural fields and home yards. Forests are still being used as grazing lands and unlimited source for collection of fuelwood. However, the public by and large are not mindful of the intangible benefits of these forests, the reason for antipathy and hostility. Timber is used for house construction and for making agricultural implements. Following forest products are being used by the people who live proximity to forests of Rohru division:

Sr. No.	Forest Produce	Uses
1	Timber and wood	House construction and agricultural implements, fuel wood.
2.	Bamboos	Fencing, making cots, baskets and other items.
3.	Grasses & leaves	Fodder for cattle& Cattle Mattresses
4.	Medicinal Plants	Traditional use of medicinal plants by local people for remedies of various diseases.

Table 9.2: Utilization of Forest Produce

The intangible benefits include eco system services of water provisioning, carbon sequestration, soil replenishment, cultural and aesthetic services, eco-tourism, biodiversity conservation. There has been no effort taken thus far to quantify these intangible benefits. The assistance of a specialized agency is required in this regard to quantify intangible benefits arising from forest and provide a net present value in terms of economic benefit provided by the forests in terms of intangible benefits.

9.7 Budgetary allocation to forestry sector

The non –plan and plan allotment budget and expenditure for the past 5years in Rohru forest division is indicated in table below:

Sr.No.	Year	Non Plan& Plan	
		Allotment(in Rs.)	Expenditure (in Rs.)
1	2020-21	113768815	113051392
2	2021-22	118921836	103130630
3	2022-23	135759713	134914063
4	2023-24	114894354	107252251
5	2024-25	113761935	113381183
	Total	597106653	571729519

Table 9.3: Year Wise Detail of Budgetary Allocation

The budgetary allocation is made under different schemes for various activities of afforestation, soil moisture conservation, capital works, maintenance, fire protection, publicity and eco tourism.

Sl. No.	Year	Plantation (in Rs.)	Nursery (in Rs.)	Building and Capital Works (in Rs.)	Maintenance Works of Roads, Buildings, Paths (in Rs.)	Fire Protection and Related Works (in Rs.)	Wildlife compensation (in Rs.)	Soil Moisture Conservation (in Rs.)	Consolidation and Demarcation (in Rs.)	Eco Tourism (in Rs.)
1	2015-16				707000					
2	2016-17	1997600	100000	3223000				4462000	0	0
3	2017-18	6621850	1157500	2200000				3620602	0	
4	2018-19	3809985	3801200	2200000	30000	145000	0	7376200	0	4615477
5	2019-20	2781400	2858382	974060	800000	505300	219000	2576900	0	4429637
6	2020-21	5173171	3500000	1898000	4050000	195000	489000	7047140	0	
7	2021-22	4846893	2250803	3936838	4699295	60000	334500	8416288	0	

8	2022-23	2743500	974320	5231727	4620428	140000	472500	6032992	0	
9	2023-24	5602400	2594193	3502600	458374	233000	471300			

Table 9.4: Sector Wise Detail of Budgetary Allocation

Taking a look at the budgetary allotment in past few years, there is a revealing finding that some activities have cornered a lion share of the budget whereas other activities remain ignored. There has been a significant share of budget for soil moisture conservation compared to other activities. There has been very little budget allotted towards consolidation and demarcation although this was a very important activity considering the threat of encroachment and the need to secure forest boundaries. Similarly, wildlife monitoring and conservation has also been consistently ignored in past budgets. There has been a lot of spending on nurseries although the outcome in this regard is not satisfactory.

9.8 Existence of Monitoring, Evaluation, assessment and reporting mechanism

Monitoring and Evaluation of plantations and other forestry field works is crucial to assess the outcome of these works. An instruction manual for monitoring and evaluation of plantations, salvage checking, soil & water conservation works, nurseries and other field works has been issued vide Technical Order No. 01/2018 dated 24-03-2018 by Pr. Chief Conservator of Forest (HoFF) HP. The Mandatory Field Touring regime by the field officers prescribed in the instructions manual is based on the Pr. Chief Conservator of Forest, HP's letter No. Ft/3 17/66(PA) dated 04-05-1994, FC-cum-Secretary (Fts)'s No. Fts. -1 (B) (15)-20/87-II dated 20 04-2001 and Pr. Chief Conservator of Forest (HoFF) HP's No. Ft. 3-17/66(PA)-II dated 15-02 2007 with some changes in the reporting formats.

9.9 Public Awareness and Education

The growing environmental issues worldwide have made it necessary to embrace Environmental Education and Public awareness to forest sustainability process. Environmental Education focuses on regenerating man's interest in preservation, conservation and improvement of the environment before it is too late and reaches the point of no return. Public awareness on appropriate environmental behavior, organized events and programs for

environmental education trainings, conferences and so on, as regards the environment and sustainability will lead to an improvement in the sustainability culture of individuals, as well as improve overall economic growth and development. The goal of public awareness is to increase ability and attitude for forest conservation and improvement. Informal education can be given to any of the age group stakeholders. Participatory objective will ensure that everybody become actively involved in solving forest protection problems at all levels rather than leave the solutions to only to foresters.

Publicity and Extension in the H.P. Forest Department is looked after by the Publicity Forest Division at Shimla. The Division strives to create publicity & awareness and dissemination of information & education amongst masses regarding the need for protection and conservation of forests, wildlife and environment and also to project the policies and programmes of Forest Department in this direction and thereby enlisting people's support and participation in these programmes, which is so vital for their success.

Publicity Forest Division undertakes various activities like installing exhibitions in International, National and State level Fares, organizing awareness programmes in schools & colleges and panchayat/village levels. Other activities of this division are production and distribution of publicity and awareness material such as posters, fliers, pamphlets etc.; displaying hoardings, cataloguing various developmental programmes and activities of department and a host of similar activities besides advertising the departmental policies and programmes in radio, TV, print and electronic media.

Various strategies have been adopted by the forest department for the public awareness towards forest protection and improvements of ecosystem services.

- Organizing joint meetings of villagers with officials of forest division to convey awareness of ecosystem services provided by the forests.
- General body Meetings of each member of the Village Forest Committee in relation of various issues of VFSs.
- Sensitize public in Forest Fire Management and organize mock drills exercises.
- Educate public how to avoid man –animal conflict and protection of wildlife.

- Celebrating plantation activities with school children and involving other organizations in Van Mahotsava celebration.
- Forest education and awareness is provided through arranging forest exhibitions, nature camps and user-seller meets in different places of the division.
- 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.
- Celebration of Forest Day, Biodiversity Day, World Environment Day, Wildlife week etc.

9.10 Adequate manpower in Forest Division

The Rohru Forest Division was created with effect from the 1st June 1952 vide Revenue Department's Memo No.-CPF/52-3108R dated the 15th May 1952. The Division is under the charge of a Deputy Conservator of Forests with headquarters at Rohru. The division has under it 7 forest ranges which are further divided into 17 blocks and 63 forest beats. The table 9.6 below shows the strength of the existing strength of staff.

Sl. No.	Post	Sanction Strength	Existing Strength	Vacant
1.	DCF	1	1	0
2	ACF	2	0	2
2.	Forest Rangers	8	6	2
3.	Dy. Ranger	25	19	6
4.	Forest Guard	75	63	12
5.	Kanungo (On Deputation)	1	0	-
6.	Patwari (On Deputation)	1	0	-

7.	Superintendent Gr-II	1	1	-
8.	Sr. Assistant	3	1	-
9.	Clerks/ Junior Asst.	6	4	-
10.	Driver	1	1	-
11.	Chowkidar	5	6	1
12.	Forest Worker	38	21	17
13.	Maali	5	3	2
14.	Peon/Khalasi	13	5	8
15.	Maali cum Nursery Workers/ Plantation workers	2	2	-
16.	Chowkidar cum cook (FRH, Hut)	1	1	-
17.	Dak runner	1	1	-
18.	Sweeper	2	1	1
19.	Multi Purpose Worker	4	5	1
20.	Mule Man/ Syee	1	1	-

Table 9.5: Detail of Staff Position in Divisional Establishment

The division has been adversely affected by the delayed promotion of forest guards to deputy rangers on account of which large number of forest blocks are lying vacant. This has led to an acute shortage of staff at deputy ranger level effectively eliminating one ladder of the hierarchy in its entirety.

Chapter-10

Five Years Plan

After independence, India chose a centralized process of planning for the equitable development of Indian states and its people. From original formulation through a successive modification to parliamentary presentation, plan-making in India has evolved as a responsive democratic political process. The culmination of the same in the 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 an assessment of all resources of the country, augmenting deficient resources, formulating a 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. 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. 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 the growth rate of agriculture to enable other sectors to move forward.

During the period of the first 3 five year plans, Durga Prasha's Working Plan (1954-1968) and Satya Vrat Plan (1951-65) were implemented in the Rohru and Jubbal Forest Divisions respectively. The focus during these plans was on sustainable yield and timber extraction which was executed through combination of different silviculture systems. In this regard, these plans were helpful in enabling the huge timber requirement that was an outcome of industrial and agricultural growth envisaged in the first 3 five year plans.

The Fourth 5 year plan focused on increasing forest productivity and shifting to high value fast growth species. It also aimed to conserve grazing grounds for needs of the local population of the tract. The Fifth and the Sixth Plans focused on increasing national income, modernization of technology, decrease in poverty and unemployment and controlling the 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 the 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 emphasised on social sector viz. education, health and infrastructure development with a share of public participation. The tenth plan further emphasized the social indicators as the targets such as the reduction in gender bias, reduction in infant and maternal mortality and access to potable water, and cleaning of major rivers.

During the 5 year plans from 1969-1994, the Ghildyal's plan was in operation in the tract. It can be seen that the tract owing to climatic constraints did not move towards fast growing exotic species which in the long run was the right call. The plan prescribed removals in form of silviculture fellings but it could not be executed fully due to the ban on green felling.

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 forum.

The Twelfth Five Year Plan (2012-17) seeks to have a 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 increasing green cover by 1 million hectares every year during the Twelfth FYP. It also has the target to reduce the emission intensity of GDP in line with the target of 20 per cent to 25 per cent reduction over 2005 levels by 2020.

During the past 5 year programs from 1994 till date, the plan of Sh. Ajay Srivastava was operational in the landscape. This plan prescribed silvicultural felling under shelterwood system. However, with the advent of ban on green felling, this plan was also not executed fully to meet the timber removal forecasted. The other miscellaneous prescriptions in terms of forest boundaries, fire protection, building construction have been followed to an extent.

Chapter-11

Past Systems of Management

11.1 General History of Forests:

11.1.1 There are no records available which could throw the light on the early history of these forests before 1864. It is, however, admitted that no system of conservancy of forest was in force. Shifting cultivation was practiced on a large scale, and the forests were gradually destroyed for agriculture and horticulture purposes. With the increase in population, agricultural land, fuel and grass became more acute. This led to a very heavy and constant pressure on the adjoining forests and resulted in depletion of vegetation both in extent and quality. Annual burning of forests for new and tender blades of grass, led to the destruction of fire tender species. In such acute circumstances, necessity towards forest conservancy was realized during later half of the century. But there is ample evidence to show that they were subject to frequent forest fires and practice of shifting cultivation.

11.1.2 The rate of destruction increased more when the local Zamindars apprehended the taking over of management of their forests by the Government. The Forest Department had to take over the charge of managing the maltreated forests. Among the tree species Oak, Chil, Deodar, Kail and Fir suffered most, the reason being their utility for timber and domestic purposes.

11.1.3 System of revenue collection

The Zamindars had the revenue collected through their agents. These employees of the zamindars used to collect money from the tenants at a fixed rate. They used to deposit the collected amount with the tahshildars who in turn used to remit the amount to the Zamindars. Each Zamindar had fixed up a schedule of rates for different kinds of forest produce, according to which his employees collected money from the persons for removing forest produce.

11.2 Management under the Forest Department

From 1864 to 1949 the forests of the Bushahar Stats of which the forests of this division were part, were on leave with Punjab Govt. and managed by Punjab Forest Deptt. And from 1949 onward the forest was placed under management of HP Forest Deptt. Before 1969 forests were placed managed under Pabbar Valley (1,17,094.06ha), Jubbal (14,927.26ha) and Throach Rawingrah, Dhadi(13,961.39ha) working plans and overlapping logging working scheme for

Chhachpur forests. Now all these areas are reorganized and allotted under different forest ranges and part of Rohru Forest Division.

11.3 Past System of Management and their Results

From 1969 to 1994 the management of forests was carried out under B.N. Gildiyal's working plan. Before 1969, forest was managed under Pabbar Valley (1, 17, 094.06 ha), Jubbal (14927.26 ha) and Tharoach Rawingarh Dhadi (13961.39 ha) working plans and overlapping logging working scheme for Chachapur Forests.

11.3.1 Pabbar valley forests were brought under management in 1864 and the history of management is narrated in detail in Kitchingman's plan (1924-34). The management practices of the first 60 years can be conveniently be described by 3 periods of the 20 years each.

(a) In the first period (1864-1883) the forests were inspected by the Minniken, Dietrich Brandis, William Schilich, Moir and Fisher. The period was rightly termed as 'Inspection Period' by Kichingman when Deodar was removed both by the contractor and villagers without caring for regeneration.

(b) In the second period (1884-1903), the management was carried out almost on the same lines as for the first period. Report of Moir of 1884 brings out following points:

- (i) Conditions were favourable for the reproduction of Deodar and Kail.
 - (ii) Damage done by fire was considerable on account of Karali cultivation
 - (iii) Damage of poles and saplings by Gujjars was increasing.
 - (iv) The control and conservancy of forest since 1880 was entrusted to the charge of two Forest Guards only, who could not exercise proper control. He suggested that the foresters must be appointed.
- (c) During 1901, Minniken wrote a preliminary working plan report and a start was made with special work of improvement. The control of fires and 'Karali; cultivation was responsible for increasing the area under kail.
- (d) In the third period (1904-1923), Fisher made an observation that kail is a light demander species and required to be control under Shelterwood Group system. He suggested that yield in PBI area be fixed by area with a volume check. George Hart (1916) Inspector General of Forests stressed that groups of

Deodar and Kail of 30 cm diameter and below found in PBI be allotted on the basis of the crop. Excessive felling did not take place; requirement was still very low. Regeneration was completely neglected.

11.3.2 Kichingman's Plan (1924-34): The scientific management was started with Kichingman's plan. He prescribed artificial regeneration in blanks caused by fire of 1921. The forests of Deodar Kavar were prescribed for selection fellings. The system of management and marking rules were generally suitable, but not on steep areas. The natural regeneration of Kail was excellent throughout but received a serious set back by fire in 1930.

11.3.3 Aggarwal's Plan (1935-53): In this plan, 13,128 ha of UFs were dealt with, but in case of UFs intensive management was prescribed for 4,666.84 ha only. The UFs were mapped but no boundaries were marked on the ground. Four working circles viz., Shelter wood, selection, Fir and Protection were carved out.

11.3.4 Durga Prashad's Working Plan (1954-1968): It brought an additional area of 24510.93 ha of UFs and thus covered total area of 44450.61 ha of UFs. 13182. 67 ha DPFs covered earlier were continued. Shelter wood, Selection and Protection Working Circles were continued.

11.3.4.1 Shelterwood Working Circle: Suitable Deodar and Kail areas were transferred from Selection WC of previous plan to this Working Circle. As results of this, the area increased to 8210.16 ha from 6795.89 ha in Aggarwal's plan. The rotation was fixed at 150 years with a regeneration period of 30 years with 5 Periodic Blocks, PBI, II and V were definitely allotted, while PB III and IV were merged into PB Inter. The forests were continued to be worked under Punjab Shelterwood system with special reference to selection marking on the broken and steep grounds and retention of compact blocks of the immature crops.

11.3.4.2 Selection Working Circle: The forests have been worked under the ' Punjab Shelterwood System' which permits shelterwoodfellings on gentle slopes. The total area was 23557.76 ha with two felling series viz.,

(a) Commercial Felling Series

(b) Right Holders Felling Series

(a) Commercial Felling Series: This felling series comprised 17046. 92 ha forests and these were exploited for export of Deodar and Kail. Thinning in young crop was prescribed.

(b) Right Holder Felling Series: The forests (6510.84 ha) with object to meet right holder's demand were allotted to this Felling Series. No commercial sales were therefore made.

In Selection Working Circle, the entire area was gone over at least once in felling during plan period. On this whole, felling was too conservative and this resulted in failure of regeneration.

11.3.4.3 Protection Working Circle: The remote and irascible forests under Kharsu and alpine pasture were allotted to this circle. The area of the working circle was 84016.78 ha.

11.3.4.4 Results of Management: The yield was as follow:

Working Circle	Species	Yield Prescribed (m3)		Removals in 15 years	Deviation
		1 year	15 Years		
Shelterwood					
	Deodar	1904	28560	25994	-2566
	Kail	5768	86520	107550	+ 21030
	Spruce/Fir	2072	30405	32649	+ 2244
Selection	Deodar	130	1950	763	-1187
	Kail	500	7500	4977	-3523
	Spruce/Fir	5000	75000	40737	-35263

Inspite of over felling of Kail in PBI of shelterwood working circle, the opening of the canopy had not been adequate in almost in all the area. This shows that yield was prescribed on lower side.

11.3.5 Jubbal Forests (14927.26 ha):

These were managed in the following Working Plans:

Coventry's Plan (1900-1925)

J.Singh's Plan (1925-1950)

Satya Vrat Plan (1951-1965)

Kaul's Plan (1966-1969)

11.3.5.1 Selection cum Improvement Felling with no prescription for regeneration.

11.3.5.2 J. Singh constituted Regular, Selection, Un-regulated and Civil Works Circles. Felling of Kail and Deodar were in accordance with the prescriptions, but in case of Fir/Spuce, there have been heavy felling under Selection Working Circle during second world war.

11.3.5.3 Satya Vrat constituted Shelterwood, Selection, Group, Protection and Fodder Working Circles. The forests allotted to PBI were not regenerated successfully. There was no over felling of any principal species. During the period special works of improvement received proper attention.

11.3.6 Kaul's Plan (1966-69): Constituted shelterwood, Selection, Improvement, Broadleaved (over lapping), Oak (overlapping) WC

11.3.7 Tharoach Rawingrah Dhadi Forests: 13961.39 ha of forest was managed under Coventry plan (1901-1931), Khanna plan (1931-1956), Pring plan (1938-1958), Clutter buck plan (1900-1920), Howard plan (1920-1931), Hamilton plan (1930-1959), Hopkin plan (1928-1937), Maya plan (1905-1934), Monoro plan (1941-1955), Saighal plan (1935-1965). Howard prescribed management of Deodar and Kail under conversion to uniform system but without any success.

11.3.8 Uttar Pradesh Enclaves: Chhajpur 14 (a), 14 (b), 15 and Batar RF remained under management of UP Forest Deptt and were under Chakrata working plan by Clutterbuck, Howard and Hamillton till 1926.

11.3.9 Upadhya plan(1958-59 to1972-73): In this WP Deodar, Chil and Selection WC were constituted and prescriptions were generally the same as for Durga Prasad plan.

11.3.10 Ghildyal Plan (1969-70to1993-94): In this plan the following seven working circles were formed:

A-Regular Working Circle (19528.85ha)

B-Fir Working Circle(17193.36ha)

C-Chil Working Circle(895.97ha)

D-Plantation and Improvement working Circle(3323.19ha)

E-Protection Working Circle(105082.62ha)

F-Grazing (Overlapping)Working Circle.

G-Broad leaved (Overlapping) Working Circle .

These WCs can be summarized in tabulated form as below:

Working Circle	Regular WC	Fir WC	Chil WC	Plantation and Improvement WC	Protection WC	Grazing (overlapping WC)	Broadleaved (overlapping WC)
Area (in Ha)	19528.25	17193.36	895.97	2323.19	105041.34		
Felling series	Two 1. commercial 2. Right holder	Three 1. commercial 2. logging 3. packing	One	-	-	-	-
Silviculture system	Indian Irregular Shelterwood System (IISS)	IISS	IISS	-	-	-	Selection system
Rotation period	120	120	100	-	-	-	-
Regeneration period	30	30	25	-	-	-	-
Exploitable dia in cm	40	40	40	-	-	-	40
PB	1,11,111,1V	Four 1, PB(U)	1, PB(U)	-	-	-	-
Felling prescribed	PB-1	PB-1	PB-1	-	-	-	-

Annual yield prescribed	17860 m3	42140	800	-	-	-	-
Actual removal	Excess	Less	Less	-	-	-	-

Table 11.1: Detail of Working Circle in Previous Plan

A. Regular Working Circle: In this WC, the yield was prescribed only for PB I and there was deficit removal in PB I but overall excess removal due to excess removal from other PBs and right holders series. It was futile to divide WC into two felling series as it was not possible to mark T.D trees only in forests allotted to right holder 'series'. Due to ban on green felling, silviculture operations prescribed were not followed and felling was mainly of salvage markings and right holders demand. Excessive felling was done from PB II, III, IV as no yield was prescribed for them. Although the removal were in excess of prescribed yield and there was less than the increment indicating yield was prescribed on lower side. In nutshell silvicultural felling did not take place so the desired testament was not given to the forests.

B. Fir Working Circle: It was worked under Shelterwood system which allows retention of compact group of immature stock as advance growth. This WC was divided into three felling series. Only PB I was definitely allotted and remaining PBs were merged and designated as PB un-allotted (PB-U). Commercial felling series was exploited departmentally through contractors and removal was less compared to prescribed yield in PB I and excess in PB-U leading in overall deficit removal. Logging felling series was exploited through mechanized logging by HPSFC. Felling in PB I in case of Deodar and Kail was less than prescribed while excess in Fir / Spruce and in PB-U felling was in excess as no yield was prescribed for this. Hence resulting in over all less removal in deodar and excess removal in fir / spruce. Packing case felling series was to meet requirement of saw millers for apple packing cases and there was less removal in PB I and excess removal in PB-U with overall less removal in this series.

In nutshell it can be stated that felling in PB I was less and more in PB-U with overall deficit removal of all species in this series as felling was done in PB I areas only for first 10 years. Hence felling was conservative which resulted in increase in overmature crop and proper opening was not created and therefore natural regeneration remain deficient. Further due to complete ban on green felling, silvicultural operations prescribed were not followed which led

to increase in proportion of over mature crop and quality of forests deteriorated with little pace of regeneration of fir and spruce.

C. Chil Working Circle: It was worked under Shelterwood system. Only PB I was definitely allotted and remaining PB s were merged and designated as PB Inter. Rotation period was fixed for 100 years with regeneration period of 25 years. Three types of felling i.e. seeding; secondary and thinning cum improvement were prescribed but not done. Due to complete ban on green felling, silvicultural operations prescribed were not followed. Due to fire and grazing and lack of proper opening of canopy, regeneration remained deficient. Control burning was not done and fire lines remained in bad shape.

D. Plantation and Improvement Working Circle: Forests allotted to this WC were UF with inferior tree growth but potentially fit for raising good tree crop. It was constituted to raise fast growing species in degraded areas to provide fuel, fodder, small timber and other forest produce to meet bonafide local demand of the peoples along with protection of hillside against soil erosion and beautify the areas. Plantation programme was laid down but was not implemented as prescribed as this area was close to human habitation and area was open, Nautors were granted liberally from these areas prior to FCA, 1980. Large extent of area was cleared and encroached and converted into apple orchard and agricultural fields and objects of management could not be fulfilled. However, sowing and planting was done in many areas but it was not possible to assess the exact area planted as record was poorly maintained.

E. Protection Working Circle: This WC comprised alpine pasture at high elevation, Panwis or grassland and some wooded area. The forests allotted to this WC were situated on precipitous slope where working on concentrated regeneration principles was not feasible with object to protect hill sides from denudation and to undertake soil & moisture conservation measures along with improving existing flora by natural and artificial regeneration. No felling was prescribed except to meet right holders demand. As per WP prescriptions 810 ha was to be planted. However, no desired improvement came out in these forests as no specific measures were suggested to achieve this object and areas which needed soil & moisture conservation works were not specified.

F. Grazing (Overlapping) Working Circle: The object of management was to examine and evaluate the existing grazing incidence and available forage. Grazing by local and migratory cattle, sheep and goats increased as it was not checked and regulated and plantation was damaged and regenerations failed miserably. Grass production could not increase due to ineffective closures. However, this plan assessed and evaluated grazing incidences and available

forage. The plan gave gist of grazing rights by no. of cattle. Village wise and forests wise, it also mentioned bilateral arrangement for Gaddi and resident and migratory Gujjars. The Gujjars have no recorded rights in the area but are allowed grazing as a matter of concessions. The plan assessed that out of total geographical area of 145982 ha, about 130500 ha is available for grazing and there are 104570 cow units in the area and at the rate of 2 ha/ cow unit, the required area should be about 200000 ha against which only 130500 ha is available. No studies were made to assess the availability of grass/ forage from different areas and it was estimated that about 1 to 2 ton of dry matter/ ha is available from different areas.

G. Broad leaved (Overlapping) working Circle: This WC continued the areas which carry important broad leaved species with object to ensure their regeneration, attaining sustainable yield and to meet demand of industries. Selection system was prescribed with felling cycle of 25 years. Trees were felled but not recorded in control forms and prescriptions of WP. As those were not followed. *Taxus Spp.* trees were heavily lopped and plantations were carried as per fund available and not as per prescription of WP.

11.3.11 Ajay Srivastav' working plan (1994-95 to 2008-09) : In this plan the following seven Working Circles were formed.

A-Deodar-kail Working Circle(12100.82ha)

B-Fir-Spruce Working Circle(16451.09ha)

C-Chil Working Circle(1137.33ha)

D-Plantation working Circle(4949.68ha)

E-Protection cum Rehabilitation Working Circle(110899.75ha)

F-Grazing Overlapping Working Circle.

G-Wildlife (Overlapping) Working circle.

These WCs can be summarized in tabulated form as below:

Working Circle	Deodar-Kail WC	Fir-Spruce WC	Chil WC	Plantation WC	Protection cum Rehabilitation WC	Grazing (overlapping WC)	Wildlife (overlapping WC)
Area	16451.09	17193.36	1117.33	4949.68	110899.75		
Felling series	Two 1. Rohru 2. Jubbal	Two 1. Rohru 2. Jubbal	One 1. Jubbal	-	-	-	-
Silviculture system	Indian Irregular Shelterwood System (IISS)	IISS	IISS	-	-	-	-
Rotation period	120	120	100	-	-	-	-
Regeneration period	30	30	25	-	-	-	-
Exploitable	60	60	50(PBIO	-	-	-	-

Dia in cm			40(PBIV)				
PB	1,11,111,1V	Five 1, PB(U)	1,11,111,	-	-	-	-
Felling	From all PB	PB-1	PB-1, IV	-	-	-	-
Annual yield prescribed	1.17500 m3 2.7800	1.23000 2.5000	1.600 2.200	-	-	-	-
Actual removal	-	-	-	-	-	-	-

Table 11.2: Detail of Working Circle Summary in Ajay Srivastava's Plan

A. Deodar/Kail working Circle: The crop consists of pure Deodar or Kail or a mixture of these species. Kail constitutes more than 50 % of all spp. Deodar is predominantly middle aged with moderate stocking. In previous plan, it was worked under Indian Irregular shelterwood system proportion of working plan were not followed due to ban on green felling due to which prescription of working plan were not followed and only salvage removals were carried out. Yield was prescribed for all PBs but it was not followed. This has resulted in irregular removal and resulting in over stocking of mature trees with poor regeneration. No thinning operation could be followed resulting in reduction in growth of trees. Therefore, special objects of management could not be achieved due to the moratorium on green felling.

B. Fir/Spruce Working Circle: Dominant species is Fir and accounts for 50% of entire growing stock and other spp. are Spruce, Deodar, Kail along with Kharsu, Birch, Walnut, Horse chestnut and Mapple etc. trees of 50-100 cm dbh accounts for more than 60% of entire growing stock. It was worked under Indian Irregular shelter wood system. Felling was prescribed only for PB-I and only salvage marking in PB unallotted. Artificial regeneration, closure of area and weeding was prescribed which were not strictly followed. Due to complete ban of green felling, regeneration felling and other silvicultural operations prescribed in Working plan were not followed which led to proportion of over mature crop increased and quality of forests deteriorated. As felling was too conservative and proper opening was not created, therefore natural regeneration remained deficient and the places where regeneration is good the annual increment is lacking in young crop due to lack of thinning operation.

C. The Chil Working Circle: Chil is the dominant species in all forests in this working circle and accounts for 90 % of growing stock. In majority of forests the crop is middle aged and ground cover is very thin because of heavy grazing. Trees of 30-50 cm dbh accounts for more than 70% of entire growing stock. It was worked under Indian Irregular shelter wood system. Yield was prescribed for PB-I and PB-IV. Sowing and planting were prescribed to assist nature regeneration along with weeding, bush cutting and closure along with resin tapping by Rill method. No grazing in closed areas was prescribed. For fire protection, control burning, fire lines, fire watchers were proposed. The prescribed felling viz seeding, secondary and thinning cum improvement felling were to be carried out but could not be done due to ban on green felling. Due to fire, grazing and lack of proper opening of crop, regeneration remained deficient, fire lines are not well maintained and control burning work not executed satisfactorily due to paucity of funds.

D. Plantation Working Circle: The Forests allotted to this working circle were un-demarcated forests and main object of this working circle was to raise plantation and prevent encroachment of forest. Site selection, sowing and planting technique were prescribed along with planting programme. Fencing, fire protection, maintenance of plantation record was prescribed but contrary to the objective of this working circle, the area suffered maximum. The forest allotted to this working circle were UF situated near human habitation and was under tremendous biotic pressure and large extent of area has been cleared of trees and converted into agriculture land or orchards. Plantation was executed partly in the circle but the full objective of management was not fulfilled.

E. Protection cum Rehabilitation Working Circle: This working circle comprises the areas which are not commercially exploitable due to inaccessibility difficult terrain and poor stocking. It includes areas of Panwis and alpine land besides UF & DPFs. Protection of hills from denudation and erosion by taking effective soil conservation measures, planting with suitable spp. and also scientific management of grazing requirement was prescribed along with protection of fodder spp. and other valuable B/L spp., no yield was prescribed from this working circle except salvage. Results of working plan were not satisfactory as all the prescriptions were not strictly followed. Closures of areas were not done. Most of the areas are over grazed as carrying capacity of alpine pastures could not have determined. Soil conservation works was not sufficient to check erosion. Very less attention was paid to development and scientific management of alpine pasture and grasslands. Plantation in these inaccessible and difficult terrains was also not done as prescribed. However, after upcoming of many HEP, soil conservation work and compensatory afforestation under CAT Plan, these areas are being paid more attention.

Further, the consolidation and demarcation programme, i.e. the construction of new boundary pillars and maintenance of old boundary pillars was largely ignored during the period of previous plan.

D. Grazing (Overlapping) Working Circle: It overlaps with all working circle and special object of management was to examine and evaluate grazing incidence and available forage so as to formulate strategy to reduce grazing pressure on forest and meet demand of local people. In addition to local people cattle, there are also migrating Gujjars. Incidences of grazing are not uniform all over the tract. Some areas near habitation are heavily grazed and remote areas are less burned with grazing. Grazing right by no. of cattle, village wise and forest is recorded in settlement report. Although rotational grazing, carrying capacity, closures of areas was suggested by working plan but it could not be enforced. Further no alternatives were given to local peoples to reduce grazing pressures by encouraging people to grow high yield variety of grasses, legumes and creating awareness among peoples. However, with time the number of local grazing livestock has reduced relieving the forests of the pressure. The focus should now be on the law enforcement of migratory grazers and ensure that they don't overshoot the permitted number of cattle units.

E. Wildlife (Overlapping) Working Circle: Due to its varied type of vegetation, this area is ideally suited for a variety of wild animals and birds as forests are distributed from low elevation to snow line and above. Efforts were made to control poaching incidences which have been appreciably reduced. No special efforts were done in this working circle. Wild life estimates should be carried out to have clear picture of wild life. Habitat management is another issue which needs attention to improve ecology of the areas. Awareness among the peoples, and for better understanding of importance of Wildlife.

F. Minor Forest Produce: The forest of this tract is rich in medicinal herbs, resin, grasses and nirgal etc. There is good scope of conserving and exploiting these valuable medicinal plants by standardizing their propagation techniques and also linking production to market export. Excessive extraction of herbs has adversely affected these areas. Collection cycle of 4 years for MFP was proposed in last working plan but could not be forced in totality. Further, the social institutional framework like Biodiversity Management Committees were not put in place to check the forest produce extraction.

11.8 Special works of improvement undertaken

The special works of improvement undertaken as per the National Working Plan Code includes building works, roads, paths and fire protection activities.

11.8.1 Fire Protection

The following fire lines were constructed in order to protect the forests from fire in the tract:

Sr. No.	Range	Name of Forest	Length of Fire Line
1.	Rohru	C.No. 47(a)Seri 47(b)	1.00km
2.		DalgaonC.No. 52 (c) Satigad C.No.48 (a) , Nasari C.No.48 (b)	1.5km
3.		Gowas C.No.82 (a)	1.00km
4.		Dabri 83b (ii) & C/No. 83 (c) Baggi	1.00km
5.		Lowerkot C.No.84 (b)	2.00km
6.	Bashla	C.No.31a(v) Jhaltu	1.5km
7.		C.No 31a(i) C.No 31a(iv)	1.km
8.		C.No 30c(ii) Malkhoon C.No. 30b(i) Bhalara	1.5km
9.		C.No 30 b(i) bhalara C.No 30a Bhalara	1.5km
10.		C.No 34 Sharog	2.km
11.		C.No 28a Kewli C.No 28 b Bajeshal	1.km
12.	Saraswati Nagar	ShashanC.No 7(a) DPF Kashta (ii)	8.km

Table 11.3: Detail of Firelines

11.8.2 Roads

During the period of previous plans, certain jeepable/ logging roads were constructed in forest area. The following table enlists the list of forest roads

LIST OF ROADS/PATHS CONSTRUCTED BY ROHRU FOREST DIVISION

S.No.	Name of Range	Forest	Length	Year of Construction	Cost of Construction
	ROHRU RANGE				
	a) MOTORABLE				
1)	Kansakoti - Gauna		6 Km.	N.K.	N.K.
2)	Rohru - Tikkari		25 Km.	N.K.	N.K.
3)	Rohru - Sungri		27 Km.	N.K.	N.K.
4)	Sungri - Khadralla		15 Km.	N.K.	N.K.
	b) JEEPABLE				
1)	Kui - Sungri		11 Km.	1971-72	40995-00
2)	Rohru - Bagi		6.11 Km.	1971-72	32423-00
3)	Sungri - Balotdralla		12 Km.	1972-73	29643-00
	c) BRIDLE PATH				
1)	Gauna - Rantari		3.85 Km.	1971-72	5113-00
2)	Baghi - Gosa		10 Km.	1925-26	3409-00
3)	Rohru - Gosa		18 Km.	1925-26	3409-00
	d) INSPECTION PATH				

1)	Sungri - Bretli		13 Km.	1921-23	3734-00
2)	Sungri - Khanola		12 Km.	1928-30	1275-00
3)	Seri - Dungsa		3 Km.	1949-50	800-00
4)	Devindar - Deoban		5 Km.	N.K.	N.K.
5)	Dalgaon - Dumreda		12 Km.	1965-66	28844-00
	BASHLA RANGE				
	a) JEEPABLE				
1)	Rohru - Bashla		14 Km.	1961-62 to 1970-71	88998-70
	b) BRIDLE PATH				
1)	Khadrala - Darshal		12 Km.	N.K.	N.K.
2)	Khadrala - Bashla		16 Km.	1905-07	N.K.
3)	Bashla - Kui		8 Km.	1927-28	2407-00
				1928-29	3900-00
					2100-00
	C) INSPECTION PATH				
1)	Khadrala - Bashla		12Km.	1925-27	286-00
2)	Bashla - Adhal		5Km.	1949-50	1000-00
3)	Bashla - Adhal		5Km.	1949-50	1000-00
4)	Baghi - Koti		21Km.	1949-50	999-00
5)	Bijashal -		1Km.	N.K.	N.K.

6)	Khangthri -		1/2Km.	N.K.	N.K.
7)	Blara -		1Km.	N.K.	N.K.
	TIKKAR RANGE				
	a) MOTORABLE ROAD				
1)	Khadrabale - Tikkar		19Km.	N.K.	N.K.
	b) JEEPABLE ROAD				
1)	Umladwar - Kharapathar		10Km.	1971-72	28724-()
2)	Tikkar - Kasahaini		3Km.	1971-72	26328-1)
3)	Balokhan - Jashlaghag		1.5Km.	1972-73	10000-()
4)	Saraichar - Tiloodhar		3.934	1973-74	13023-00
5)	Tiloodhar - Pujarni		3.44Km.	1979-80	15384-00
6)	Khadrala - Naksetli		11Km.	1967-68 to 1970-71	82304-00
	c) BRIDLEPATH				
1)	Shallan - Tikkar		9Km.	1928-30	5560
2)	Ganasi - Ori		13Km.	1956-57	20000
3)	UmlaDuwar - Tikkar		70Km.	1957-58	19057
4)	Sharauntha - Tikkar		2Km.	1978-79	5000
5)	Tikkar - Naksetli		2Km.	N.K.	5000

6)	Naksetli - Khalgar		2Km.	1980-81	N.K.
	d) INSPECTION PATH				
1)	Tikkar - Naksetli		8Km.	1943-44	536/-
2)	Sheel - Balokhar		5Km.	1945-47	900/-
3)	Bashla - Kathari		20Km.	1921-23	3734/-
4)	Khadralla - Naksetli		3Km.	1946-47	900
	KHASHDAR RANGE				
	a) BRIDLEPATH				
1)	Sandasu - Diudi		15Km.	1945-46	15265-00
2)	BeriDessa - Mathla		3Km.	1969-70	7002-()
3)	Saran – Kolehakutra		4.21Km.	1971-72	15890-(/0
4)	Badyara - Sheroli		6.8Km.	1971-72	21000-00
5)	Kharshali - Larot		18Km.	1921-23	278-00
6)	Kharshali - D.F.O. Hut		3Km.	N.K.	357-00
7)	Khashdhar - Kharshali		7Km.	1922-23	101-00
8)	Gosa - Dalli		8Km.	1929-30	276-00
9)	Dalli - Khashdhar		9Km.	1934-35	3750-00
10)	Sandasu - Khashdhar		9Km.	1942-43	3750-00
11)	Sandasu - Kharshali		7Km.	1944-45	750-00

12)	Larot - Tikkari		9Km.	N.K.	N.K.
13)	Larot - Chansil		12Km.	1965-66	52056-00
	b) INSPECTION PATH				
1)	Charoti - Chrigaon		6Km.	1937-38	13150-00
2)	Tikri-Diudi		10Km.	1944-45	950-00
3)	Charoti - Circular Path		10Km.	1949-50	N.K.
4)	Devidhar - Deoban		5Km.	N.K.	N.K.
5)	Gosa to Diswani via U.F.54comp		9Km.	N.K.	N.K.
6)	Thamti - Munaikdhar		5Km.	N.K.	N.K.
7)	Khashdhar - Telga		3Km.	N.K.	N.K.
8)	Jakhi - L-o.ot		20Km.	N.K.	N.K.
9)	Up in 3B abc		5Km.	N.K.	N.K.
10)	Compt 74 a to 74 b		4.5Km.	N.K.	N.K.
11)	Compt 77 b to 76		5Km.	N.K.	N.K.
12)	Telga Plantation (2') wide		6Km.	N.K.	N.K.
13)	Shelti Plantation (2')		3.5Km.	N.K.	N.K.
14)	Wani (2')		3.5Km.	N.K.	N.K.
15)	Baghi (2')		2Km.	N.K.	N.K.

16)	Lorkoti (2')		2Km.	N.K.	N.K.
17)	Urana (1')		1Km.	N.K.	N.K.
18)	Kandi (1')		4Km.		
19)	Telga (1')		5Km.		
20)	Khashdhar (1')		3.5Km.		
21)	Goas (1')		5Km.		
22)	Dabri (1')		3Km.		
23)	Baghi (3')		3Km.		
24)	Chipari (3')		3Km.		
	DODRA KAWAR RANGE				
	a) Bridle Path				
1)	Chanshal - Dodra		14Km.	1968-68 to 1969-70	22,422-00
2)	Kawar - Jakha		14Km.	1969-71	N.K.
3)	Jakha - Uraknal		4Km.	1971-72	N.K.
	b) Inspection Path				
1)	Chinaon Plantation (1') Wide		4/2 Km.	N.K.	N.K.
2)	Dhodu (1')		2Km.	N.K.	N.K.
	JUBBAL RANGE				
	a) Bridle Path				
1)	Chhatardhar - Jubbal		18 Km.	1918-**82- 83	20,068

2)	Jubbal - KharaPathar Via Deem		10 Km.	1921-22	3,900
3)	Sheel - Shallan		10 Km.	1927-28	3,900
4)	Tandali - Sheel		16 Km.	1944-45	2,900
5)	Tikkari Dhar - Rawingarh		8 Km.	1946-47	5,893
6)	Jubbal - Chhatardhar		16 Km.	1948-1962- 63	20,060-00
7)	KharaPathar - TikariDhar (Logg)		7 Km.	1962-63	75,683
8)	Jubbal - Tikkri		8 Km.	1978-79	2,000
	b) Inspection Path				
1)	Dagroth - Mandhol		3 Km.	1922	262
	SARASWATI NAGAR RANGE				
	a) MOTORABLE				
1	Chhachhpur - Panju		N.K.	N.K.	N.K.
2	Chhachhpur Comptts Via Compt No.13,12,11,9,10		N.K.	N.K.	N.K.
3	Chhachhpur Compt 4		N.K.	N.K.	N.K.
	b) BRIDLE PATH				
1	Chhachhpur - Rawingarh		8K.m.	N.K.	N.K.

2	Rawingarh - Anti		25K.m.	N.K.	N.K.
3	Sawra - Rohari		8K.m.	N.K.	N.K.
4	Rohani - Kawata		9K.m.	1962-63	39999/-
5	Katinda - Gittari		13K.m.	1968-70	28014/-
6	Kawata - Mandal		19.69K.m.	1972-74	1,04,997/-
7	Anni - Chhachhpur		5K.m.	1978-79	3,1000/-
8	Sawra - Mandle		8K.m.	1978-79	5,000/-
9	Gilari - Sarachili/Mandal		7K.m.	1978-79	5,000/-
10	Jhalta - Chansar		6K.m.	1980-81	22650/-
11	Chhachhpur - Dhansar		7K.m.	1988-89	90,000
12	Talra - Shashan		16K.m.	N.K.	N.K.
13	Talra - Anni Via Chhachhpur		20K.m.	N.K.	N.K.
C) INSPECTION PATH					
1	Ori - Jond		23K.m.	1905	825/-
2	Kashta - Sansog		8K.m.	N.K.	N.K.
3	Monidhar - Phansidhar		4.5K.m.	N.K.	N.K.
4	Chhachhpur Compt 19 to 22		6K.m.	N.K.	N.K.

Table 11.4: Detail of Roads, Paths in the tract

11.8.3 Building Works

During the previous plans, a large number of buildings were constructed for staff quarters, purposes of protection and other multifarious needs. The list of building works completed with regard to new capital works are enlisted as follows:

STATEMENT SHOWING THE FOREST BUILDINGS OF ROHRU FOREST DIVISIONS

S.No.	Name of Building	Location	Year of Construction	Cost of Construction (in Rs.)
ROHRU RANGE				
1	Range quarter	Rohru	1904	1104
2	Rest House	-	1905	1105
3	Inspection Hut	Kui	1921-22	854
4	Clerks Quarter for two Clerks	Rohru	1931-31	1011
5	Range Rest Room	Dalgaon	1933-34	150
6	Forest Guard Hut	Kui	1941-42	150
7	Stables	Rohru	1942-43	150
8	Divisional Store	-	-	150

9	Forest Guard Hut	Summerkot	1945-46	800
10	Forest Guard Hut	Dalgaon	1947-48	1150
11	Inspection Hut	-	1947-48	1150
12	Clerks Quarter	Summerkot	1961-62	4806
13	Peons Quarter	-	1962-63, 1963-64	4500
14	D.F.O Residence	-	1962-63, 1963-64	48508
15	A.C.F.	Rohru	1963-64	35195
16	Out House for F.R.H.	-	1963-64	1905
17	Garage	-	1964-65	2500
18	Clerks Quarter for 4 Clerks	-	1965-66	33300
19	Peons Quarter for 2 Peon	-	1966-67	11000
20	Range quarter cum Officer	-	1970-71	20000
21	Renovation of store quarter to Range Rest Room	-	1970-71	8625

22	Forester quarter	-	1970-71	9890
23	Out House with D.F.O residence	-	1970-71	6500
24	Rest Room	Bagi	1932-33	150
25	Inspection Hut	Goas	1938-39	671
26	Range Rest Room	-	1942-43	250
27	Forest Guard Hut	-	-	550
BASHLA RANGE				
1.	Bashla Range Rest House	Bashla	1909-10	500/-
2.	Forest Guard Hut	-	-	250/-
3.	Range Rest Room	Khadrala	1910-11	300/-
4.	Rest House	Bashla	1929	500/-
5.	Out House to Rest House with Kitchen	-	1929	1,000/-
6.	Stables	-	-	-
7.	Kitchen and Out House	Khadrala	1942-43	150
8.				

9.				
TIKKAR RANGE				
1.	Range quarter-cum office	Tikkar	1938-39	250/-
2.	Inspection Hut	do.	1943-44	1358/-
3.	Range Rest Room	Naksetli	do.	370/-
4.	Forest Guard Hut	Shatdu	1944-45	400/-
5.	Forest Guard Hut	Baghi	1946-47	490/-
6.	Inspection Hut	Tikkar	1945-46	711
7.	Range Rest Room	Baghi	1947-48	1000/-
8.	Forest Guard Hut	Naksetli	1949-50	987/-
9.	Forest Guard Hut	Ratmari	1979-80	28800
10.	Range residence	Tikkar	1979-80	40560
11.	Check post at Baghi	Baghi	1979-80	20700
12.	Forest Guard Hut	Tikkar	1946-47	711
13.	Forest Guard Hut	Pujarli-4	1985-86	55000

KHASHDHAR RANGE				
1.	Range Rest Room	Chirgaon	1941-42	250
2.	Rest House	-	-	1105
3.	Out House	-	1942-43	560
4.	Forest Guard Hut	Todsa	1945-46	800
5.	Forest Guard Hut	Chirgaon	-	800
6.	Forest Guard Hut	Diudi	-	800
7.	Stable	Chirgaon	1956-57	1606-00
8.	Inspection Hut (Log cabin)	Mandli	1961-62	9037
9.	Range Rest Room	Diudi	-	-
10.	Forest quarter	Chirgaon	-	4500
11.	Inspection Hut	Todsa	1963-64	7050
12.	Range Quarter cum office	Khashdhar	1919	3000
13.	Forester quarter	-	1919-20	1000
14.	Forester quarter	-	-	500

15.	Forest Guard Hut	Larot	-	500
16.	Range Rest Room	Khashdhar	1932-33	150
17.	Rest House	Larot	1946-47	5998
18.	Inspection Hut	Khashdhar	-	1000
19.	Forest Guard Hut	-	-	6000
20.	Out House	Larot	-	6000
21.	Forest Guard Hut	Khashdhar	1966-67	6500
DODRA KAWAR				
1.	Range quarter cum office	Kawar	1908	250/-
2.	Range Rest Room	Dodra	-	250/-
3.	Forest Guard Hut	Kawar	-	250/-
4.	Forest Guard Hut	Jakha	1947-48	801/-
5.	Inspection Hut	Kawar	1969-70	10,000/-
JUBBAL RANGE				
6.	DFO Inspection Hut	Sheel	1944-45, 46-47	1628/-+3100/-

7.	Forest Guard hut	Sheel	1946-47	728/-
8.	Inspection Hut	Muril	1958-59	8200/-
9.	Range quarter cum Office	Jubbal	1932	25085/-
10.	Peon Qtr	Jubbal	1962-63	2862/-
11.	Forest Guard hut	Kharapathar	1963-64	8644/-
12.	Mali Hut	Sanaba	1971-72	5719/-
13.	Forest Guard hut	Barhal	1979-80	41800/-
14.	Log cabin	Kharapathar	1986-87	394000+75000
15.	Type II Qtr	Jubbal	1986-87	245000
16.	Inspection hut (Additional Room)	Sheel	1987-88	31000
17.	Type II Qtr. 2 Set	Jubbal	1991-92	150000
18.	Forest Guard hut	Mandhol	1988-89	2,63,000
19.	Type II Qtr. 2 Set	Jubbal	1991-92	2,65,000
20.	Estimate of Marble Chips in FRH	Kharapathar	1994-95	46,200

21.	B.O.'Qtr.	Sheel	1995-96	2,27,000
SARASWATI NAGAR RANGE				
1	Inspection Hut	Rajpuri	1932	1160
2	Range Rest Room	Sangardab	1932	1160
3	Range Rest Room	Kawaltha	1932	1160
4	Forest Guard Hut	Mandal	1962-63	2964
5	Forest Guard Hut	Shashan	1962-63	2964
	Forest Guard Hut	Jhalta		2862
6	Forest Guard Hut	Kawalta		2862
7	Forest Guard Hut	Rajpuri		2862
8	Forest Guard Hut	Pandranu		2862
9	Inspection Hut	Shashan	1970-71	3760
10	C.P.	Pandranu	1975-76	10,000
11	Inspection Hut	Talra	1932	1160
12	Range Rest Room	Talra	1932	1160

13	Range Rest Room	Dhadi-Rawat		1160
14	Forest Guard Hut	Kudu	1985-86	55,000
15	Forest Guard Hut	Sawra	1985-86	51,950
16	Inspection Hut	Jaalta	1989-90	3,97,700
18	Forest Guard Hut	Dhansar	1991-92	1,25,000
19	Forest Guard Hut	Saraswati Nag	1991-92	1,55,540
20	A.C.F. residence	Saraswati Nag	1992-93	3,60,000
21	B.O.Qtr.	Pandranu	1992-93	1,69,000
22	B.O.Qtr.	Kudu	1993-94	1,90,300

Table 11.5: Detail of Forest Buildings in the tract

11.9 Past years Yield, Revenue generated and Expenditure

The year wise tabular depiction of yield is already mentioned for each working plan in the previous section. There is a substantial deviation from the prescribed yield in the previous plan owing to the moratorium on green felling. This has drastically reduced the yield removed and in turn led to loss in revenue generation. The aspects of expenditure with respect to special treatment are already discussed in previous section.

Chapter-12

Statistics of Growth and Yield

No fresh studies were conducted in the tract with respect to volume increment and the revision of volume tables. Hence it is prescribed to continue with volume table prescribed in Ajay Srivastava's working plan from (1994-2009).

12.1 Quality Classes:

The determination of site quality of various forests of Deodar, Kail, Chil, Spruce and Fir has been done in the working plan under revision and the same has been adopted as such.

Species	Quality Class
Deodar	I/II
Kail	I/II
Chil	I
Fir/Spruce	II/III

Table 12.1: Detail of Quality Classes of Major Species in the Tract

12.1 Volume Table for Species in the tract

The volume equations derived/ used by the Forest Survey of India was used to calculate the volume of forest crops. The following local volume table for Deodar, Chil, Kail and miscellaneous species was used to calculate tree volume is given below as adopted from previous working plan:

12.1.1 Conifers

Diameter Class		Volume (m ³)				
(in cm)	Class	Deodar	Kail	Chil	Spruce	Silver fir.
10-20	V	0.10	0.07	0.06	0.10	0.07
20-30	IV	0.30	0.35	0.30	0.32	0.30
30-40	III	0.60	0.70	0.85	0.70	0.72
40-50	IIA	1.30	1.60	1.60	1.58	1.60
50-60	IIB	2.10	2.42	2.95	3.02	2.85
60-70	IA	3.66	3.63	4.45	5.50	4.92
70-80	IB	5.50	5.10	6.02	7.30	7.30
80-90	IC	7.00	6.65	7.50	9.35	10.20
90-100	ID	8.25	9.75	9.65	10.92	12.85

Table 12.2: Major Species wise Volume Table

12.1.1 Broad Leaved

Sr No.	Species	Diameter Classes								
		IV	III	IIA	IIB	IA	IB	IC	ID	IE & Above
		20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & over

1.	Carpinus spp.	0.3	0.9	1.5	2.4	4.0	6.0	7.8	9.7	12.6
2.	Q. semecarpifolia	0.3	1.0	1.8	3.0	4.6	6.3	8.0	9.6	12.2
3.	Aesculusindica	0.3	0.8	1.7	2.7	3.9	5.6	7.1	9.0	12.0
4.	Juglansregia	0.2	0.8	1.5	2.5	3.8	5.1	7.2	8.9	11.3
5.	Alnusnepalangis	0.3	0.8	1.5	2.2	3.2	4.3	5.7	7.8	11.0
6.	Celtisaustrealis	0.3	0.7	1.3	2.2	3.3	4.6	6.3	8.0	11.1
7.	PopulusCilliata	0.3	0.7	1.4	2.8	4.9	6.8	9.0	11.1	14.5
8.	Acer Spp.	0.2	0.7	1.3	2.1	3.3	5.1	6.9	8.5	11.2

Table 12.3: Volume Table of Broad Leaved Species

12.2 Growing Stock of the Tract: The total volume of each species as calculated from enumeration data of sample plots is given below:

Diameter Class (cm)	Species Volume (in cu m.)					Other Miscellaneous spp.
	<i>Pinus roxburghii</i>	<i>Cedrus deodara</i>	<i>Pinus wallichiana</i>	<i>Picea smithiana</i>	<i>Abies pindrow</i>	
10-19	5086.52	30167	65161	26806.2	14796.475	52590.56
20-29	21292.41	132569	467445	123295	89814.199	62866.87
30-39	62004.287	266893	739621	326885	310191.04	175604.1
40-49	63088.6232	346070	1012301	796128	954783.2	333980.2
50-59	122135.631	395182	968898	1571370	1317032	269753.3
60+	247169.396	572025	1581566	7753717	6718527	1220010.21

Table 12.4: Growing Stock of Species in the Tract

12.3 Annual Yield Table

The provisional services of ecosystem provided by Rohru forest division are timber, fuelwood, bamboos and other NTFPs. It is difficult to quantify regulatory and supportive services like soil and water conservation, restoration of ecology, control of pollution, wildlife and many others provided by the forests. Since there is a ban on green felling in Rohru, the yield of timber was not prescribed in previous working plan period. Only salvage felling carried out wherein dried, dead, dying and decaying trees were removed. Timber is provided to the community under TD rights. The yield of timber with regard to salvage removal and timber distribution in the last 5 years is given in the table below:

Yield from Salvage Felling (in m³)

Year	Chil	Deodar	Kail	Rai	Tosh	BL	Total
2014-15	738.39	3521.01	10511.98	7077.36	2610.26		24459
2015-16	302.66	297.25	220.35	670.59			1490.85
2016-17		2720.31	11378.76	4741.5	6857.31		25697.88
2018-19	403.33	0	651.18	598.71	7413.83		9067.05
2019-20	224.89	382.57	1156.62	5739.48	4480.09	1.5	11985.15
2020-21		113.97	1506.38	3124.42	5634.11		10378.88
2021-22	375.75	263.31	256.93	2087.48	4446.25		7429.72
2022-23	4890.21	222.26	220.78	619.71	1385.84	60.66	7399.46
2023-24	14.92	79.46	185.19	2763.83	2898.89		5942.29
2024-25	461.58	108.59	553.28	1640.95	4242.78		7007.18

Table 12.5: Species Wise Salvage Yield in last 10 years in the Tract

Yield from Timber Distribution to Right Holders (in m3)

Sr No.	Division	Year	Deodar		Kail		Chil		Tosh		Rai/Fir		Total	
	Rohru		No	Vol	No	Vol	No	Vol	No	Vol	No	Vol	No	Vol
1		2014 -15	97	238.16	36	92.35	0	0	0	0	1	3.02	134	333.53
2		2015 -16	530	1521.5	261	761.4	0	0	1	4.92	4	17.04	796	2304.87
3		2016 -17	759	2364.2	470	1551.98	0	0	7	34.44	22	106.79	1258	4057.4
4		2017 -18	447	1260.2	363	1114.97	0	0	3	14.76	67	88.89	880	2478.84
5		2018-19	253	787.31	269	711.55	0	0	9	44.28	45	208.62	576	1751.76
6		2019 -20	155	481.82	166	529.31	0	0	4	19.68	3	10.1	328	1040.91
7		2020-21	194	594.65	352	1126.36	0	0	73	241.87	31	136.35	650	2099.23
8		2021-22	261	262.22	502	1638.28	1	4.45	38	188	54	213.68	856	2806.63
9		2022-23	197	611.64	297	1005.37	0	0	33	154.9	31	150.12	558	9922.03
10		2023-24	298	909.43	442	1772.612	0	0	43	191.25	81	353.77	864	3227.062
		Total:-	3191	9531.15	3158	10304.182	1	4.45	211	894.1	339	1288.38	6900	30022.262

Table 12.6: Species Wise Yield from TD in last 10 years in the Tract

12.4 Statistics of Species Wise Growing Stock

12.4.1 Growing stock of Deodar (*Cedrus deodara*):

The total growing stock of tract with regard to Deodar comprised in different working circles is given below:

Particular	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
No.	301671	441897	444822	266207	188182	78348	27505	8786	4393	4393	1766205
Vol (in m ³)	30167	132569	266893	346070	395182	286752	151280	61505	36244	36244	1742906

Table 12.7: Growing Stock of Deodar in the Tract

12.4.2 Growing Stock of Chil (*Pinus roxburghii*):

The total growing stock of tract with regard to Chil comprised in different working circles is given below

Particular	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
No.	84775	70975	72946	39430	41402	29573	11829	5915	0	0	356845
Vol (in m ³)	5086.5 2	21292.4 1	62004.2 9	63088.6 2	122135. 6	131598. 9	71211.2 8	44359.1 9	0	0	520776. 9

Table 12.7: Growing Stock of Chil in the Tract

12.4.3 Growing stock of Kail (*Pinus walichiana*):

The total growing stock of tract with regard to kail comprised in different working circles is given below

Particular	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
No	930866	1335559	1056601	632688	400371	233633	94460	20137	5493	6592	4716400
Vol. (in m³)	65161	467445	739621	1012301	968898	848089	481747	133908	53552	64270	4834992

Table 12.8: Growing Stock of Kail in the Tract

12.4.4 Growing stock of Fir (*Abies pindrow*)/Spruce (*Picea smithiana*):

The total growing stock of tract with regard to Fir/Spruce comprised in different working circles is given below

Particular	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
No.	471282	682823	898410	1101167	979992	874203	490984	250460	172772	151303	6073395
Vol. (in m³)	41602.7	213109.41	637076.50	1750910.87	2888401.55	4597627.18	3584179.98	2435390.45	2074429.13	1780617.14	20003344.91

Table 12.9: Growing Stock of Fir/Spruce in the Tract

12.4.5 Growing stock of miscellaneous species: The miscellaneous species comprised of broadleaves species mixed with conifer species like *Quercus*, *Rhododendrons*, *Juniperous* etc. The current growing stock of miscellaneous species is 2114805 cu m.

Particular	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
No.	262952. 8	314334. 4	250863	256907. 9	128453. 9	113341. 7	42314.2 4	27202.0 1	24179.5 7	21157.1 2	144170 7
Vol (in m ³)	52590.5 6	62866.8 7	175604. 1	333980. 2	269753. 3	374027. 7	215802. 6	187693. 9	205526. 3	236959. 7	211480 5

Table 12.10: Growing Stock of Miscellaneous Broad Leaved Species in the Tract

12.5 Diameter Growth and Volume Increment

The diameter growth and volume increment of the important species in the tract is adopted from previous working plan considering no study has been conducted in the tract prior to revision of working plan. The volume increment percentage as adopted from previous working plan is given in the table below:

Diameter in cm	Deodar	Kail	Spruce	Silver Fir	Chil
20-40	3.61	3.79	3.09	2.84	3.47
40-50	2.15	2.55	2.73	2.03	2.90
50-60	1.87	2.07	1.40	1.30	1.58
60-70	1.61	1.83	1.30	1.15	1.53
70-80	0.82	1.26	1.16	0.96	1.44
80-90	0.73	0.90	0.87	0.64	0.92
90-100	0.56	0.75	0.74	0.43	0.66

Table 12.11: Volume Increment of Major Species in the Tract

Statistics of Carbon Stock in Rohru Division

12.4.1 Methodology for calculation of carbon stock

For estimating carbon stock, different forest carbon pools (IPCC GPG (2003)) are required:

Components	Pools	Description
Living Biomass	Above ground biomass	All living biomass above soil including stem, stump, branches, bark, seeds and foliage
	Below ground biomass	All living biomass of live roots
Dead Organic matter	Dead wood	All non- living woody biomass not contained in litter, either standing or lying on the ground. Dead wood also includes dead roots and stumps larger than or equal to 10 cm in diameter.
	Litter	All non living biomass with a minimum diameter (5 cm) above mineral soil.
Soil	Soil organic matter	Organic carbon in soil upto 30 cm depth.

Table 12.12: Components of Carbon Stocking Calculation: Source-FSI, 2017

a) Aboveground biomass: Aboveground biomass was calculated by multiplying the Bole Biomass with Biomass Expansion Factor (BEF). Aboveground biomass = Bole Biomass x BEF. Where, BEF will be taken from IPCC Good Practice Guidance for LULUCF (2006).

b) Below ground biomass: Below ground biomass was calculated by using root-shoot ratio (R), adopted from IPCC Good Practice Guidance for LULUCF (2006). The “R” value of 0.24 (dimensionless) was used.

The living bio mass includes the addition of both above ground and below ground bio mass. In order to compute the living biomass in the tract, the growing stock species wise volume is taken. Based on the volume of each species, the Average Biomass Expansion Factor and the R/S ratio, the Below Ground Biomass is calculated. Consequently, the total living biomass is computed as below:

Sr. No.	Species	Volume (m3)	Specific Gravity	Woody Biomass (tonnes)	ABE F	AGB	R/S	BGB (tonnes)	Total Living Biomass (tonnes)
1	Deodar	1742906	0.7	1220034.2	1.3	1586044.5	0.24	380650.67	1966695.13
2	Kail	4831542	0.4	1932616.8	1.3	2512401.8	0.24	602976.442	3115378.28
3	Rai	10598201	0.4	4239280.4	1.3	5511064.5	0.24	1322655.48	6833720
4	Tosh	9404280	0.4	3761712	1.3	4890225.6	0.24	1173654.14	6063879.74
5	Chil	520777	0.4	208310.8	1.3	270804.04	0.24	64992.9696	335797.01
6	Kharshu	1101952	0.75	826464	1.4	1157049.6	0.24	277691.904	1434741.5
7	Other B/Ls	1663343	0.6	998005.8	1.4	1397208.1	0.24	335329.949	1732538.07
	Total	29863001		13186424		17324798		4157951.56	21482749.7

Sr.No.	Species	Total Living Biomass (Tonnes)	Carbon Content (50% of Total Living Biomass)	Carbon Dioxide Sequestered (Tonnes) Carbon Content x44/12	Carbon Dioxide (in Million Tonnes)
1.	Deodar	1966695.13	983347.6	3605608	3.605
2.	Kail	3115378.28	1557689	5711527	5.71
3.	Rai	6833720	3416860	12528487	12.53
4.	Tosh	6063879.74	3031940	11117113	11.12
5.	Chil	335797.01	167898.5	615627.9	0.615
6.	Kharshu	1434741.5	717370.8	2630359	2.630
7.	Other B/Ls	1732538.07	866269	3176320	3.176
	Total	21482749.7	10741375	39385041	39.385

Table 12.13: Calculation of Carbon Stocking in Tract

In this context, it assumes great importance in pursuit of national climate change targets and to mitigate global climate change that meaningful efforts are made to conserve the existing growing stock, restock encroachment affected areas and enhance the growing stock in low density forest patches wherever feasible.

PART II

FUTURE MANAGEMENT

Discussed and Prescribed

CHAPTER 1

Basis of proposals

The working plan of Rohru Forest Division covering 7 forest ranges over an area of 130568.241 Ha is a technical and scientific document with the objective to manage forest based on existing scientific literature and administrative data. It provides a long term vision for the management of forest based on 'Sustainable Forest Management' and 'Ecosystem Approach to Forest Management'. Data driven natural resource governance is the major objective of the working plan enabling continuity in forest management over a long period of time in line with overarching goals at national and international level i.e. to better forest productivity, enable biodiversity and wildlife conservation, foster forest based economy and community livelihoods.

1.1 General Objectives of management

The following shall be the main objectives of management set out to be achieved in the working plan and guide the prescriptions given in the chapters:

- **Forest Consolidation and Demarcation:** The foremost objective of management shall be the consolidation and demarcation of forest considering the fact that encroachment of forests is the single biggest threat to forest health and productivity
- **Forest Productivity and Sustainable Yield:** It shall be the aim of the working plan to enhance the productivity and carbon stocking potential of the forests through the practice of silvicultural systems prescribed to enable sustainable yield of timber and ensure efficient regeneration for forest health and vitality
- **Enhance Forest and Tree Cover:** There shall be concerted focus to identify open forest, scrub lands and encroachment evicted areas and to take up plantation based on site specific scientific attributes to enlarge the green cover
- **Restoration of Degraded Landscapes:** The plan shall have an action plan as per UN REDD plus programme to tackle the issue of Reducing Emissions from Land Degradation and Deforestation
- **Soil and Water Conservation:** To identify, map drainage lines, springshed, water shed and take up planned soil moisture conservation efforts at landscape level to rejuvenate dried up water resources and maintain perennial character of existing water resources.

- **Promotion of Sustainable Eco Tourism:** The plan shall lay out a vision for sustainable eco tourism by identifying potential eco tourism sites, defining the limits of carrying capacity and providing zonation concept of eco tourism
- **Forest Based Community Livelihoods and Participatory Management:** The plan shall aim to foster forest based economy by sustainably tapping the vast potential of Non Timber Forest Produce and Biological resources
- **Climate Change Adaptation and Mitigation:** In order to contribute to INDCs of Paris Climate Agreement affirmed by government of India, the plan shall seek to increase carbon stocks by taking up plantation in degraded and evicted landscapes
- **Documentation of Traditional Knowledge:** There shall be focus in the plan to document the indigenous knowledge of remote forest dependent communities in dealing with forest produce and their medicinal and other uses
- **Biodiversity Conservation and Monitoring:** An important objective of plan shall be to provide a vision for documenting the biodiversity in the tract, detail out sustainable extraction wherever required, enable protection of biodiversity from illicit extraction and smuggling and monitoring the biodiversity change through the use of preservation and biodiversity plots.

1.2 Method of treatment (Management Strategy)

The tract dealt with as already described in part 1 is having immense potential for forest and biodiversity conservation. There has been a long ban on green felling from the Honourable Court and as such silvicultural treatments prescribed have been confined to paper and not implemented on field. The tract despite having the potential of rich forest and biodiversity is threatened by encroachment and forest diversions. Further, forest fire is also emerging as a significant threat in recent years with changing climate.

The silvicultural treatment prescribed in the plan is with a strategy to open up the canopy for light demanding species like Deodar, Kail, Spruce, Fir etc. to enable regeneration for these light demanders and ensure that carbon stocking along with forest productivity, health and vitality improve. Along with this, salvage removal shall continue and timber distribution shall remain in place as per prevailing rules in state of Himachal Pradesh to provide for the increasing timber requirement of right holders.

The ecological requirements of forest necessitate the immediate addressing of threat of encroachment of forest with apple crop. In order to address this, the felling of apple crop and replacement of the apple crop with native species as per the prevailing elevation on the encroachment evicted land is a key requirement to restore ecological integrity and historical eco system. Similarly, biodiversity conservation requires that 4 year programme of NTFP extraction be enforced keeping in view stakeholder requirements and there be strict check on all unauthorized extraction. The drying of water sources and springs is a cause to worry and the ecological requirement would be to rejuvenate dying springs and document the water sources and take up water shed and drainage line treatment.

Another key ecological requirement would be to take up the degraded forest landscapes affected by forest fires, landslides/landslips and soil erosion. This involves various methods of treatment for conserving the soil and enable moisture retention in forest floor.

Eco Tourism potential and the enabling of it in a sustainable manner for local livelihood generation, nature awareness and conservation education is another requirement that goes hand in hand with forest conservation especially considering the tract in hand has already numerous eco tourism sites of immense popularity and potential among avid trekkers, nature enthusiasts and pilgrims.

1.3 Constitution of Working Circles

The following working circles are prescribed to manage the tract in accordance with national and state level policies, existing legal framework, stakeholder requirements and natural resource landscape available:

Sr. No.	Working Circles
1.	Deodar-Kail Working Circle (Normal)
2.	Fir-Spruce Working Circle (Normal)
3.	Chil Working Circle (Normal)
4.	High Altitude Broad Leaved Working Circle (Normal)
5.	Forest Protection(Overlapping) Working Circle

6.	Grassland Conservation (Overlapping) Working Circle
7.	Plantation (Overlapping) Working Circle
8.	Evicted Area Rehabilitation (Overlapping) Working Circle
9.	Ecotourism (Overlapping) Working Circle
10.	Biodiversity Management and Conservation (Overlapping) Working Circle
11.	Participatory and JFM and community forest management (Overlapping) Working Circle
12.	Wildlife Protection (Overlapping) Working Circle
13.	Soil Conservation And Water Resource Management (Overlapping) Working Circle
14.	Infrastructure Development And Maintenance Working Circle (Overlapping) Working Circle

Table 1.1: Constitution of Working Circle

- **Deodar-Kail Working Circle:** This working circle will include all compartments in which Deodar and Kail forests are found as dominant species either as pure crop or mixed crop. The total area prescribed to be allotted under this working circle is 28008.2729 Ha. The previous working plan also had the same working circle. The main justification for constitution of this working circle is that Deodar-Kail forest types are the most predominant in the tract enabling their consolidated management. Further, the object of such management is to enable sustainable yield and adequate regeneration for forest productivity, health and vitality.
- **Spruce/ Fir Working Circle:** This working circle will include all forest compartments which are predominantly dominated by Spruce and Fir which are conifer species found associated above the tree line dominated by Deodar and Kail. The total area prescribed to be allotted under this working circle is 39135.126 Ha. The main justification for constitution of the working circle is the fact there are several altitudinal elevations where these forests are found associated in the tract enabling their consolidated and uniform management. Similar to Deodar and Kail, these are also

light demanding species and although the timber is not so valuable in comparison to Cedar and Blue Pine, the management here is with a view to ensure sustainable yield placing more emphasis on adequate regeneration given that it is discernably noticed that regeneration is much more deficient in these forests compared to Deodar-Kail forests.

- **Chil Working Circle:** This working circle includes all forest compartments with Chil Pine (*Pinus roxburghii*) being the dominant species accounting for 90 % of growing stock. In majority of forests, the crop is middle aged and ground cover is very thin because of heavy grazing. The total area of the working circle as prescribed in this plan comes to 3745.887 Ha. The main justification for management is the presence of a consolidated forest type which is having unique ecological characteristics necessitating a typical management or working. This includes the sustainable extraction of resin based on rill method of extraction, removal of salvage timber and fire protection efforts given the heightened sensitivity of the working circle to forest fires.
- **High Altitude Broadleaved WC:** The tract above the Spruce-Fir conifer tree line supports a wide variety of broad leaved vegetation and oak species. These include species like *Aesculus indica*, *Taxus contorta*, *Alnus nitida*, *Betula utilis*, *Juglans regia* which are often found as mixed crop on the basis of elevation. Among Oak species, *Quercus semicarpifolia* (*Kharshu Oak*) is found at the highest elevations as climax species whereas *Quercus dilatata* is found in lower elevations. Rhododendrons are found mixed with coniferous species.

This working circle is constituted with a view to manage the high altitude broad leaved and Oak species considering their importance in sustenance of wildlife and maintaining ecological integrity. These high altitude species are also under threat of climate change with increasing tendencies of declining regeneration leaving them on threatened category (e.g. Rakhal or *Taxus contorta*). The regeneration of these species are also badly affected due to biotic pressure of lopping and grazing. The main object of management in this working circle will be the conservation of the RET species and floral biodiversity and initiating ex situ conservation efforts wherever required.

- **Evicted Area Rehabilitation (Overlapping) Working Circle:** This is a crucial working circle constituted considering the specific conditions in the tract which is ravaged by forest land encroachments for raising fruit

orchards. Many of the encroachment areas have been evicted and these areas need to be taken up for consolidation and raising of native tree plantations.

In this context, the constitution of this working circle is important to ensure there is no re encroachment and to restore the ecological integrity of this evicted area to status pre encroachment. The main object of management shall be retaining of the area and its rehabilitation in accordance with the adjacent forest landscapes.

➤ **Grassland Conservation (Overlapping) Working Circle:**

This WC shall cover all forest land under Alpine pasture and Panwis totaling to an area of 52,728 Ha and also include other such grassland areas which are overlapping with regular working circle. This new Working Circle is proposed with objective of protection and improvement of valuable grasslands ecosystem and preserves the grassland suitably for right holders/local people as laid down in Faisla-e-Janglat. Various medicinal and aromatic plants are also found distributed in these areas which are rare and threatened species, the conservation of which needs to be taken up. The main object of management of this highly biodiverse landscapes will be the conservation of the alpine pasture eco system, regulation of grazing based on carrying capacity assessment, soil moisture conservation efforts using innovative methods to ensure the key eco system services provided by these forest compartments in the form of water provisioning, fodder, biodiversity conservation are ensured to be provided.

➤ **Forest Protection (Overlapping) Working Circle:** This working circle is constituted with a view to promote forest protection, eco restoration and rehabilitation particularly of degraded, denuded, eroded, deforested landscapes. The main focus in this working circle shall be to prescribe measures to counter the multiple threats including encroachment, illicit felling, mining and other such miscellaneous dangers to forest conservation.

➤ **Soil Conservation and Water Resource Management (Overlapping) Working Circle**

This will be overlapping Working Circle comprising areas of 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 and ensure the permanence of water resources and soil replenishment.

The main justification for constitution of this working circle is the inseparable link between water and forest health and the need to rejuvenate dying springs to sustain the most important eco system service i.e. provisioning of water resources.

(9) Plantation (Overlapping) working Circle: This working circle is constituted with the objective of improving stocking of under stocked forest areas, improving forest cover specially focusing on sparsely stocked forest and encroachment evicted areas achieving the national objective of increasing carbon stocks and forest cover.

(10) Wildlife Conservation (overlapping) WC: The working circle constituted with the idea to conserve and protect Wildlife which are protected under Wildlife Protection Act, 1972. The tract given its altitudinal shifts is crucial for being a key wildlife habitat of fauna of all orders. The main object of management here would be the enforcement of Wildlife Protection Act, 1972 and the strict ban on hunting/ poaching apart from wildlife monitoring and habitat management.

(11) Biodiversity Management and Conservation (Overlapping) Working Circle:

The Working Circle encompasses rich biodiversity which is spread over the tract especially the relatively higher altitude areas comprising trees, herds, shrubs, climbers, lichens, algae and fungi and other micro flora. The efforts in this working circle include the documentation and biodiversity assessment of the landscapes with larger objective of declaring Biodiversity Heritage Sites. Further, the NTFPs in the region shall be sustainably harvested and benefits equally shared in accordance with Access and Benefit Sharing Framework defined in Nagoya Protocol and Biodiversity Act, 2002. The summary justification for this working circle is to link biodiversity conservation with sustainable harvest of NTFPs galvanizing local stakeholder support through the institution of BMCs.

(12) Participatory and Joint Forest Management (overlapping) WC:

Joint Forest Management has been implemented by Govt of India after implementation of National Forest Policy, 1988 wherein policy emphasized on participation of local people in conservation and management of forests. The primary objective of JFM is to provide a visible role to the local communities in planning, management and protection of forests and to give them a share in the benefits from these forests. Several JFM Committees were formed in this Division in the past under different schemes. However, not all of them are active. In the WC the active and defunct JFMCs will be identified and the strengths of active JFMCs will also be identified. The WC shall also make a note of informal social groups/ communities that are voluntarily conserving natural resources by way of practicing rotational lopping / grazing, protecting, regenerating forests etc. The VFDS societies formed under JICA project shall be strengthened and institutionalized for long term forest conservation.

(13) Ecotourism (Overlapping) WC: This working circle is constituted recognizing the immense potential for eco tourism in the tract in terms of hiking trails, trekking paths, scenic sites and pilgrimage destinations immersed in nature. This offers a huge scope for creating complimentary linkages of economic opportunities through development of tourism and spreading the message of nature and biodiversity conservation. The landscape offers great potential for integrating ecotourism and rural tourism with spiritual and cultural tourism. This in-turn would provide alternative livelihood opportunities for people living in forest fringe villages and reduce anthropogenic dependence on forests also motivating people towards the cause of conservation.

(14) Infrastructure Development and Maintenance (overlapping) WC: This working circle is overlapping over the entire division. Under this WC inventory of all existing buildings, huts, roads, footpaths, bridges and other construction and infrastructure activities going in entire division will be made and shall suggest newsites for carrying out construction activities related to forestry operations. The construction of new buildings, rest houses, roads and paths etc. will be addressed in this working circle.

1.4 Period of working plan and necessity for mid-term revision

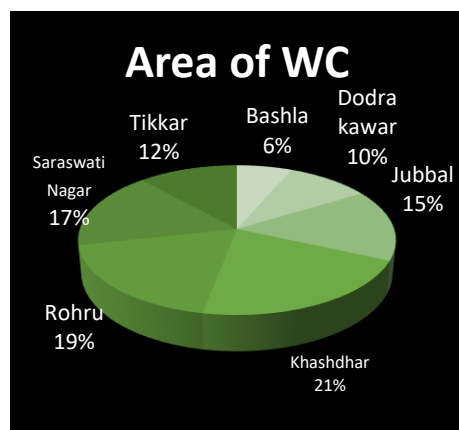
The period of this working plan is ten years from 2025-2035. It replaces previous working plan by Sri Ajay Srivastava, which is expired in 2008-09. The management results and forest ecosystem health, vitality, productivity and biodiversity will be monitored regularly. The principle of adaptive management will be adopted to allow introduction of mid-term changes in the management operations, if necessitated or new facts impinging upon forests' well being come to notice. The working plan system by an in-built provision for revision every ten years retains the spirit of adaptive management for more than a century. Though mid-term review may be considered, the revision will be only at ten years interval because forest ecosystems are long-standing, perpetual and complex biological entities.

Chapter-2

Deodar and Kail Working Circle

2.1 Name of Working Circle: Deodar and Kail Working circle.

2.2 General Constitution of Working Circle: This working circle covers an area of 28008.2729 ha kail and deodar forests as a mixed or pure crops in Rohru Forest division. The forests are distributed on gentle to precipitous slopes in the Himalayan belt. The density of forests varies from 0.4 to 0.9. In some patches, deodar and kail are found distributed as pure crops where their proportion is more than 50%. The working circle is constituted to enable sustainable yield of timber from Deodar and Kail as both the species are commercially important timber species and also enable the regeneration of both these species. Salvage felling is also done under timber distribution right for the right holders in the division. The distribution of this Working circle is shown in the map (Figure 2.1).



Sr no.	Range	Area
1	Bashla	1790.44
2	Dodrakawar	2715.6915
3	Jubbal	4266.2341
4	Khashdhar	6288.7827
5	Rohru	5329.7566
6	Saraswati Nagar	4628.721
7	Tikkar	2988.647
Total	Rohru	28008.2729

Range wise area under Deodar Kail working circle

Figure 2.1

2.3 General Characteristics of the Vegetation: The vegetation of this working circle falls under type Group 12 (Himalayan Moist Temperate Forest) and sub type 12/CI of the forest types classification by *Champion and Seth, 1968*. The crops consisted of pure deodar and kail and mixture of these species. Among all the species found in this working circle, Himalayan Blue Pine is noted to dominate the composition with its IVI being 145 in comparison to Deodar at 71 which shows that the distribution and stocking of Kail outweighs that of Deodar by twice the

amount. Apart from these two principal species, Rai and Tosh species also form significant part of the composition with its IVI readings being 35 and 14 respectively. In addition, the vegetation also comprise of Ban Oak, Mohru Oak, Buransh, Khanor, Kharshu Oak, Jamu, Rakhal, Kunis, Walnut and other miscellaneous species making a mixed composition presence especially in higher altitudes.

Both species in the working circle in the distribution of age shows that young and established tree species of class V and class IV are greater in number. This indicates good regeneration and robust forest health and vitality. However, it is noted that the number of class V trees are lesser than class IV trees indicating an aberration in the inverse J curve that is the usual norm for natural forests. This indicates that there is an issue of regeneration in certain compartments of the working circle. The working circle constituted has a healthy growing stock with more than moderate density forest cover found in almost all compartments constituted in the working circle. The total growing stock of various species found in the working circle are given in the table below:

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Deodar	294902	413455	426793	254890	174866	74096	23711	8892	4446	4446	1680496
Vol (in m³)	29490.19	124036.64	256075.64	331357.13	367219.58	271191.21	130408.89	62240.61	36677.50	36677.50	1645374.89
Kail	806164	1198873	890633	480142	308239	198577	80024	17783	2964	1482	3984881
Vol (in m³)	56431.48	419605.42	623443.41	768226.91	745938.85	720835.14	408120.55	118257.15	28897.42	14448.71	3904205.05
Rai	74096	97807	74096	81506	60759	71132	35566	14819	13337	11855	534973
Vol (in m³)	7409.60	31298.13	51867.17	128778.78	183491.24	391226.67	259632.24	138559.45	145643.02	129460.46	1467366.75
Tosh	19265	28156	22229	44458	41494	25193	13337	7410	4446	2964	208951
Vol (in m³)	1348.55	8446.94	16004.73	71132.12	118257.15	123947.72	97362.09	75577.88	57127.99	38085.32	607290.49
Other BLs	96325	192649	94843	40012	23711	5928	2964	0	1482	2964	460877
Vol (in m³)	19264.95	38529.90	66389.98	52015.36	49792.49	19561.33	15115.58	0.00	12596.31	33194.99	306460.89
Total	1290752	1930941	1508594	901007	609069	374926	155602	48903	26675	23711	6870177
Vol (in m³)	113944.77	621917.03	1013780.93	1351510.31	1464699.30	1526762.08	910639.35	394635.08	280942.24	251866.99	7930698.07

Table 2.1: Total growing stock found in Deodar/ Kail WC

2.4 Felling Series, Cutting Sections and JFM areas: There will be a single felling series:

i. Rohru Felling Series comprised of Rohru Forest Division

2.5 Blocks, Compartments and JFM area: The following table (table 2.2) gives information on blocks and compartments and their area under the working circle. The allotment of compartments to this working circle is broadly similar to the allotment made out in previous working plan of Ajay Srivastava. However,

there are new forest compartments which are allotted in this working circle owing to the newly notified Demarcated Protected Forests in the tract. The list of such newly added DPFs which are added to this working circle is given in table 2.3. Apart from this, few compartments which was earlier part of PCR working circle and Plantation working circle has been now allotted to this working circle considering overlapping nature of these working circles in this plan. The total area allotted under working circle is 28008.2729 ha.

Range	Block	Beat	Sr. No.	COMPARTMENT	AREA (Ha)
DEMARCATED PROTECTED FORESTS					
Bashla	Arhal	Arhal	1	Adhal 32 a (i)	38.63
			2	Adhal 32 a (ii)	31.79
			3	Adhal 32 b (i)	37.65
			4	Adhal 32 b (ii)	42.67
			5	Adhal 32 b (iii)	30.16
			6	Brasli 33 a	22.58
			7	Brasli 33 b	59.98
		Sharog	8	Brara 35 a	4.86
			9	Kargad 35 b	17.4
			10	Sharog 34	35.61
	Bashla	Bashla	11	Bashla 31 a (i)	65.2
			12	Bashla 31 a (ii)	38
			13	Jhaltu 31 a (iii)	49.44
			14	Jhaltu 31 a (iv)	35.14
			15	Jhaltu 31 a (v)	67.77
			16	Koti 31 b	30.35

		Bhalara	17	Balara 30 a	47.75
			18	Balara 30 b	60.68
		Malkhun	19	Malkhun 30 c (i)	32.63
			20	Malkhun 30 c (ii)	49.52
			21	Malkhun 30d	67.99
	Khadrala	Kewli	22	Bijashal 28 a	27.11
			23	Kuili 41 a	14.16
			24	Kuili 41 b	25.5
			25	Kuili 41 c	78.91
		khangteri	26	Kakoibasa 29 c(i)	60.22
			27	Kakoibasa 29 c(ii)	33.46
			28	Khangteri 29 b	62.32
			29	Khangteri 29 d	37.64
DodraKawar	Jakha	Jakha	30	Paba 69 c	100.77
			31	Pandhar 69 a	607.84
			32	Jakha 69 b	487.64
	Kawar	Kawar	33	Chineon 69e	375.55
Jubbal	Jubbal	Badhal	34	Giri 1a	78.91
			35	Giri 1b	69.2
			36	Badhal	40.46
		Kharapathar	37	Jachli	17.81
			38	Jhalri	63.13

		Muril	39	Muril 1	121.4
			40	Muril 2	82.55
		Shilli	41	Giri 2a	152.97
			42	Giri 2b	66.37
			43	Giri 3a	97.12
			44	Giri 3b	117.76
			45	Kalauntha	14.16
			46	Mihana	1.62
			47	Rampuri	2.83
		Snabha	48	Giri 4b	63.13
			49	Jakhala	1.61
	Sheel	Mandhol	50	Baral 17	102.79
			51	Jharag 19b	23.88
			52	Kadol 19a	10.93
			53	Mandhol 18a	116.95
			54	Sari 18b	129.1
		Shallan	55	Ganga Nagar 13a	41.28
			56	Ganga Nagar 13b	132.74
			57	Kalgaon 11	130.31
			58	Nahal 12	64.75
			59	Shallan 10a	40.87

			60	Shallan 10b	81.75
		Sheel	61	Badrol 15b	100.35
			62	Gadgaon 14b	31.97
			63	Kaina 15c	65.56
			64	Kaina 16	4.05
			65	Matil 15a	99.96
			66	Matil 15d	40.87
			67	Sheel 14c	190.2
Khashdhar	Chirgoan	Chirgoan	68	Jabal 64	7.69
		Duidi	69	Ambot 67 a	7.69
			70	Diudi 67 b	6.88
		Jhaknoti	71	Advani 61 b	11.33
			72	Bari 57	26.72
			73	Bhampur 59	12.14
			74	Charoti 62 a (ii)	16.18
			75	Chiroti 62 a (i) part II	30.38
			76	Chiroti 62 a(i) part I	28.3
			77	Dunduna 60	44.52
			78	Jaknoti 61 a	34.4
			79	Kiwalta 62 b	3.24
			80	Punjali 58	23.88

		Sindasali	81	Gokaswati 66 b	4.05
			82	Khabal 65 a	34.8
			83	Khabal 65 b	14.16
			84	Sandasli 66 a	4.05
	Khashdhar	Dalli	85	Dalli78a (ii)	41.53
			86	Dalli78a(i)	67.74
			87	Dhak 77a	25.9
			88	Dhak 77b	40.06
			89	Jakhi75a	11.33
			90	Jatalta 74b	18.62
			91	Rikshal 78b	46.13
		Diswani	92	Diswani 80a	61.51
			93	Kayani 81a	116.95
			94	Pokhridhar 81b	101.58
		Khashdhar	95	Dogra75b	42.9
			96	Khashadhar 74 a (i)	38.63
			97	Khashadhar 74 a (ii)	31.38
			98	Khashadhar 74 a (iii)	33.99
		Telga	99	Telga 73 a	43.3
			100	Telga 73 b	21.04
			101	Telga73c	18.62

	Larot	Kharshali	102	Gumma 72 b (i)	50.6
			103	Gumma 72 b (ii)	53
			104	Kharshali 72 a	84.58
		Thalathar	105	Moila 68	15.38
	Todsa	Todsa	106	Todsa 56 a	22.58
			107	Todsa 56 b	57.95
Rohru	Gawas	Bhagi	108	Baghi 83 c (i)	58.68
			109	Baghi 83 c (ii)	46.94
			110	Baghi 83a	63.13
			111	Dabri 83b(ii)	93.07
			112	Sainjibasa 83 b (iii)	47.35
		Gawas	113	Gawas 82a	127.88
			114	Gawas 82b	37.23
		Lowerkoti	115	Chipari 84 c (i)	20.23
			116	Lowerkoti 84b	23.07
			117	Parsa 84 a	12.14
			118	Shekal 85	5.67
	Rohru	Dalgaon	119	Bretli 51 a (i)	70.42
			120	Bretli 51 a (ii)	60.7
			121	Dalgaon 52 b	31.97
			122	Dalgaon 52 c (i)	57.39
			123	Dalgaon 52 c (ii)	45

		Gauna	124	Gauna 53 b (i)	37.13
			125	Gauna 53 b (ii)	37.74
		Kutara	126	Dalgaon 52 a	6.47
			127	Kutara 53 a	58.27
		Rantari	128	Rantari 55 a	49.94
			129	Rantari 55 b	39.69
	Summerkot	Graitha	130	Bajain 45 a(i)	81.34
			131	Bajain 45 a(ii)	46.13
			132	Balun 45 b (i)	31.16
			133	Balun 45 b (ii)	16.19
			134	Graitha 43 a (i)	41
			135	Graitha 43 a (ii)	46.01
			136	Graitha 43 b	64.75
			137	Jaunli 44	33.59
			138	Shirmali 46 a (i)	36.42
			139	Shirmali 46 a (ii)	74.06
			140	Shirmali 46 a (ii)	29.14
			141	Sungri 46 b (i)	20.63
			142	Sungri 46 b (ii)	44.51
		Kui	143	Bamnoli 40 a (i)	42.65
			144	Bamnoli 40 a (ii)	34.24
			145	Bamnoli 40 b	53.42
			146	Dungadobal 39	29.14

			147	koti 36 a	9.71
			148	Koti 36 b	5.26
			149	Kui 37 (a)	36.83
			150	Kui 37 (b)	43.3
			151	Kui 37 (c)	12.14
			152	Kui 37 (d)	46.94
			153	Kui 37 (e)	63.53
			154	Shakli 38	33.18
		Machoti	155	Darshal 50 a	60.75
			156	Darshal 50 b	36.78
			157	Khonola 49 a	67.58
			158	Khonola 49 b	36.02
		Summerkot	159	Kateri 47 c	43.3
			160	Kateri 47 d (i)	30.35
			161	Kateri 47 d (ii)	60.3
			162	Seri 47 a	28.73
			163	Seri 47 b	31.97
Saraswati Nagar	Chhajpur	Chhajpur	164	Chhajpur -20	153.38
		Kelwi	165	Baghain 3	56.65
			166	Baghain 4	36.42
			167	Jond 1	57.46
			168	Jond 2 a	63.94
			169	Jond 3 a	75.27

		Ravingarh	170	Jond 3 b	24.28
			171	Chhajpur -1	135.57
			172	Chhajpur -2 a	94.29
			173	Chhajpur -4 a	67.18
			174	Chhajpur -4 b	87.82
	kuddu	Kuddu	175	Ori	39.25
	Mandal	Dhansar	176	Jakhi 4 a	105.97
			177	Jakhi 4b	139.11
		Jhalta	178	Jakhi 3a	411.57
			179	Jakhi 3b	0
			180	Jakhi 3c	0
			181	Jakhi 3d	0
		Kawalta	182	Jakhi 2	564.95
		Mandal	183	Dulu	586.8
			184	Jakhi 1	601.37
			185	Kiala	20.23
Tikkar	Tikkar	Farog	186	Astari 4 (a)	29.14
			187	Astari 4 (b)	134.36
			188	Dhanoti 5 (a)	40.06
			189	Dhanoti 5 (b) (I)	35.39
			190	Dhanoti 5 (b) (ii)	76.3
			191	Farog 3	44.52
		kadiwan	192	Kadyun 26	116.95

			193	Kathari 27 a(i)	62.75
			194	Kathari 27 a(ii)	38.83
			195	Khalgar 25	3.24
			196	Naugadhar 27 b	137.59
		Naksetli	197	Jagтели 20a	90.65
			198	Khalai 24 a	57.06
			199	Khalai 24 b	67.99
			200	Koti 20b(i)	67.18
			201	Koti 20b(ii)	28.73
			202	Naksetli 23 a	19.02
			203	Naksetli 23 b	17.4
			204	Phriunkoti 21	60.7
			205	Pujarli 22	23.07
		sharontha	206	Karchari 9a(i)	83.63
			207	Karchari 9a(ii)	78.6
			208	karchari 9b(i)	50.2
			209	karchari 9b(ii)	40.45
			210	Narain 8	42.49
			211	Sharontha 7	185.35
		Tikkar	212	Kashani 6c	54.63
			213	Soldu (a) (ii)	47.18
			214	Soldu (a)(iii)	34
			215	Tikar 6(b) (i)	38.05

			216	Tikar 6(b) (ii)	36	
UN-DEMARCATED PROTECTED FORESTS						
Bashla	Arhal	Sharog	1	Pheril UF 12	119.38	
	Bashla	Bashla	2	Dandi Gad UF 10	97.93	
			3	Lambidhar UF 11	75.27	
			Malkhun	4	Mundiban	131.5
	Khadrala	kewli	5	Pagas	19.42	
			6	PekhaDhar UF 7	59.08	
			7	Rehri/rehu	20.64	
			Khadrala	8	Khadrala	62.1
		DodraKawar	Jakha	Jakha	9	Raigad
	Jubbal	Jubbal	Badhal	10	Barhal	476.58
Kharapathar			11	Deem	177.58	
			12	Jhalri	10.11	
			13	Ori	110.6652	
Muril			14	Muril	313.04	
Shilli			15	Kalontha	2.42	
			16	Kiari	45.4953	
			17	Kohlara	37.1646	
			18	Mihana	20.11	
			19	Rampuri	6.87	

			20	Shari	25.7459
			21	UF Sundli	62.7466
		Snabha	22	Giri part II	98.2716
			23	Sanabha	113.4642
			24	Giri part-1	119.83
	Chirgaon	Chirgaon	25	Andhra	31.77
			26	Bagi	40.4
		Duidi	27	Diudi UF 36	18.21
		Jakhnoti	28	Kudiang	15.38
Khashdhar	Khashdhar	Dalli	29	Chiwari	17.81
			30	Masli	42.09
			31	Silot	21.45
		Khashdhar	32	Khashdhar	40.87
			33	Sandasu	193.8006
			34	Shankar	25.5
		Telga	35	Telga	26.5683
			36	ThatiDhar	39.945
	Larot	Kharshali	37	Kindari	149.071
		Thalathar	38	Khatu and Gangu	60.6
	Todsa	Banoti	39	BanotiUrdu	118.0219
			40	UF Mathla	62.1726
		Jalwari	41	Jhalwari	106.81

		Todsā	42	Shiroli	15.58
			43	Amboibasa	35.61
			44	Amboibasa UF 32	38.37
			45	Baridhar	6.47
			46	Devidhar	43.3
			47	Jailot	27.5578
			48	Seri basa	10.93
			49	Shagli UF 30	114.93
			50	Thali	79.72
			51	Thana	91.06
			52	Tiproli	35
Rohru	-	-	53	Barnola	64.75
	Gawas	Lowerkoti	54	Chiuni	42.32
			55	Dhara	10.92
			56	Diwari UF 55	33.59
			57	Munaikdhar	268
			58	Panipanwi	20.2
	Rohru	Dalgoan	59	Bamnala	51.19
			60	Chameltu UF 18	15.78
			61	Jakhar UF 17	20.24
		Gauna	62	Kaneora	13.55
			63	Kansa Koti	80.8

			64	Katmori UF 21 a	42.67
			65	Katmori UF 21 b	112.33
			66	Khorsu	65.14
			67	Nauna UF 22 a	45.81
			68	Nauna UF 22 b	69.93
		Kutara	69	Badoda	113.92
			70	Khurki Suki UF 19	142.45
			71	Kundgad	353.49
			72	Kutara	106.84
			73	Sadgad	143.86
			74	Sanal Gad UF 20	201.94
			75	Pauligad	183.93
		Rantari	76	Bajauri	12.34
			77	Jakhar	66.94
			78	Kandrol	45.93
			79	Manjena	5.87
	Summerkot	Graima	80	Graima	135.97
		Kui	81	Tilri	40.4
			82	Karetli	105.21
		Machoti	83	Bari	64.75
			84	Khanola	53.01

			85	BhutKanon UF 16	148.92
			86	Bhut UF 15	18.21
		Summerkot	87	Dungsa UF 13	26.3
Saraswati Nagar	Chhajpur	Chhajpur	88	Chhajpur	113.31
		Ravinghar	89	Sanoli	7.69
			90	Shillar	84.98
		Sawra	91	Khouni	52.5992
			92	Raika	72.49
			93	Sarot	16.18
			94	Sawra	10.12
			95	Sherhana	44.27
	Mandal	Dhanser	96	Dhanser part-I	48.56
		Jhalta	97	Jhalta part-II	59.88
			98	UF Jhalta part -I	67.2086
			99	Giltari	93.08
		Kawalta	100	Kawalta	20.7333
		Mandal	101	Shiroli	130.4894
Tikkar	Tikkar	Kadiwan	102	Bambla-I	46.54
			103	Bambla-II	40.4
			104	Ganasi	73.25
			105	Nalaban	93.28
			106	Tutupani	142.45

			107	Tutupani UF 5	51.8
		Sharontha	108	Field bag	310.19
			109	Naldigad (b)	92.87
			110	Tangri	98.3
			111	UF Naldigad	42.3434
		Tikkar	112	Danotgad	39.7805

Table 2.2: Forest Compartments allotted to Deodar Kail Working Circle

Range	Block	Beat	Sr. No.	COMPARTMENT	AREA (Ha)
DodraKawar	Jakha	Pandhar	1	DPF Miyan	119.8779
			2	DPF Pissar Gad	813.8272
	Kawar	Kawar	3	DPF Kawar-III	42.4464
Jubbal	Jubbal	kharapathar	4	DPF Oddi	113.5748
		shilli	5	DPF Kiari	6.8747
			6	DPF Kohlada	21.2754
			7	DPF Shari	6.6241
			8	DPF Sundli	11.7634
		Snabha	9	DPF Giri II	20.7584
			10	DPF Sanabha	54.1158
	Sheel	Mandhol	11	DPF Jharag	11.8141
Khashdhar	Chirgaon	Jhaknoti	12	DPF Kunjwani	2.5826
		Sindasli	13	DPF Bosari	1.6513

		Sindasli	14	DPF Denvari	15.6859
		Sindasli	15	DPF Khabal	93.745
		Chirgaon	16	DPF Baghi	73.9351
		Chirgaon	17	DPF Chirgaon	32.8574
		Chirgaon	18	DPF Gaosari	2.842
		Jakhnoti	19	DPF Koti	5.1128
		Jhaknoti	20	DPF Dasoti	6.286
	Khashdhar	Dalli	21	DPF Chiwari	2.01
			22	DPF Dellidhar	32.2574
			23	DPF Jatata	5.8798
		Diswani	24	DPF Kaloti	3.1921
		Khashdhar	25	DPF Sandasu-I	13.9747
			26	DPF Sandasu-II	32.4047
			27	DPF Dogda	26.8582
			30	DPF Jinapawer	690.2778
			31	DPF TopiDhar	190.0996
		Telga	28	DPF ThatiDhar	104.525
			29	DPF Sharoli	28.4056
	Larot	Kharshali	32	DPF Dari Gad	54.889
	Todsa	Banoti	33	DPF BanotiUrdu	686.8981
			34	DPF Devvan	352.6818
			35	DPF Kolsa	45.9016
			36	DPF Peskukhech	75.4053

		Jalwari	37	DPF Kutra II	30.9312
			38	DPF Nandla	67.8908
			39	DPF Kutra-I	299.5724
		Todsas	40	DPF Devidhar	185.5911
			41	DPF Jangla	11.4348
			42	DPF Jaylot	31.1222
			43	DPF Mandli	88.6054
			44	DPF Shangli	7.6022
Rohru	Gawas	Baghi	45	DPF Jhatwari	1.0966
Saraswati Nagar	Chhajpur	Ravingahr	46	DPF Malog-I	76.271
		Ravinghar	47	DPF malog-II	47.2111
		Sawra	48	DPF Ghiyan	28.5829
			49	DPF Khouni	12.5508
	Mandal	Jhalta	50	DPF Jhalta-I	17.7714
		Kawalta	51	DPF Kawalta	33.0827
		Mandal	52	DPF Shirol-I	87.2863
			53	DPF Shirol-I	13.9429
			54	DPF Shirol-I	91.4854
			55	DPF Shirol-I	8.1052
			56	DPF Shirol-I	8.3731
			57	DPF Shirol-I	60.9577
Tikkar	Tikkar	kadiwan	58	DPF Shalni- Ganasi	102.7083

		Sharontha	59	DPF Dogda	4.3087
			60	DPF Naldigad	1.3666
		Tikkar	61	DPF DanotGad	7.5495

Table 2.3: Newly notified DPFs allotted to Deodar/ Kail WC

2.6 Special Objectives of Management: The special objectives of management are:

- (i) To obtain optimum and sustained yield of timber and to provide for timber distribution to right holders from salvage and dry timber as per the policy of state government in line with the national forest policy
- (ii) To conserve and maintain existing forest ecosystem in the interest of soil, water and environment.
- (iii) To regenerate these forests naturally, by nursing the existing regeneration wherever necessary and through execution of appropriate silvicultural system.
- (iv) To involve VFDS/ JFMCs in carrying out various activities for biodiversity conservation and provide equitable share of cut back forest produce to village communities to fulfill the broader objectives of productivity, equity, and sustainability for the general good of the people.

2.6.1 Analysis of crop:

2.6.1.1 Crop Composition: The crop of this working circle mainly consisted of Deodar and Kail dominated with these species accounting for more than 60 percent of the composition throughout the working circle based on the characteristics of relative density, relative frequency and IVI as detailed in table below:

Species	Nos	Density	Relative Density	Frequency	Relative Frequency	Domina nce	Relative Abundan ce	IVI
Deodar	1134	6	24.46	107	22.814	127.21	24.310	71.590
Kail	2688	14.22	57.99	169	36.034	271.68	51.918	145.945
Chil	7	0.037	0.15	1	0.2132	0.60	0.116	0.480

Rai	361	1.91	7.78	64	13.646	70.81	13.533	34.967
Tosh	141	0.74	3.04	24	5.117	29.52	5.642	13.801

Table: 2.4: Detail of Crop Composition in the working circle

There are numerous compartments where Deodar and Kail are found as pure crop without presence of the other. However, in many of the compartments they are found as mixed crop with generally Kail dominating in the mixed composition. In places near Nallah, streams and cooler aspects, both the species are mixed with spruce and fir. Other broadleaved like oaks, burans, poplars, akhrot, badam, paja, parang, khanoor, Kosh etc. are mixed with deodar and kail. The shrub species found distributed are berberis, Seski, chindwa, masuri, reuns, kaula, ghuktai, bhekal etc. Many herb species which are being utilized in medicines are also grown in this working circle.

2.6.1.2 Diameter class wise distribution of trees in numbers

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Deodar	294902	413455	426793	254890	174866	74096	23711	8892	4446	4446	1680496
Kail	806164	1198873	890633	480142	308239	198577	80024	17783	2964	1482	3984881
Rai	74096	97807	74096	81506	60759	71132	35566	14819	13337	11855	534973
Tosh	19265	28156	22229	44458	41494	25193	13337	7410	4446	2964	208951
Other BLs	96325	192649	94843	40012	23711	5928	2964	0	1482	2964	460877
Total	1290752	1930941	1508594	901007	609069	374926	155602	48903	26675	23711	6870177

Table: 2.5 Diameter class wise distributions of trees in numbers

The above data indicates that both the principal species follow the natural forest inverse J curve except for the aberration at the class V level in Deodar and both class IV and V in Kail. This indicates that regeneration on the whole is deficient in this working circle. It can be presumed that the reason for deficient regeneration is the non working of the forests due to the prevailing ban on green felling.

2.6.1.3 Stock Maps: Stock maps on the scale of 1:15000 has been prepared using modern digital and GIS technologies and are enclosed in Compartment History Files.

2.6.1.4 Range and Mean of Quality Classes: The average site quality of the trees vary from I/II to IV with the standard quality being I/II.

2.6.1.5 Density: The assessment has been made on ocular basis and the same has been incorporated in the compartment history files. The density of forest varies from 0.3 to 0.7 and average density is 0.5.

2.6.1.6 Age Classes:

The age class distribution is such that the distribution mimics natural forest but at the same time having deficient regeneration which is gathered to be occurring due to the non working of the forests in the event of ban on green felling. As a result of the same, there is increasing predominance of middle aged trees. The number of over mature trees are also increasing however as a percentage of the total number they are still less but projected to increase again given scenario of non working of the forests.

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Deodar	294902	413455	426793	254890	174866	74096	23711	8892	4446	4446	1680496
Kail	806164	1198873	890633	480142	308239	198577	80024	17783	2964	1482	3984881
Rai	74096	97807	74096	81506	60759	71132	35566	14819	13337	11855	534973
Tosh	19265	28156	22229	44458	41494	25193	13337	7410	4446	2964	208951
Other BLs	96325	192649	94843	40012	23711	5928	2964	0	1482	2964	460877
Total	1290752	1930941	1508594	901007	609069	374926	155602	48903	26675	23711	6870177

Table 2.6: Class Wise Detail of Tree Species in Deodar Kail Working Circle

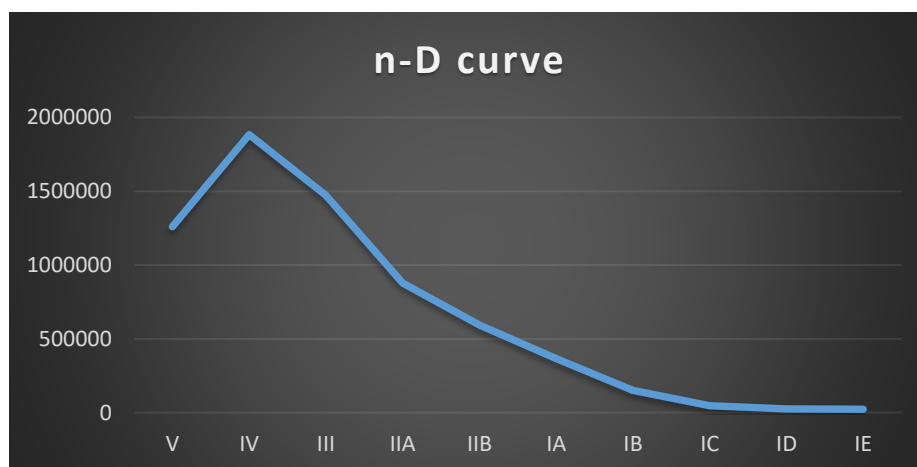


Figure 2.2 n-D curve for Deodar Kail WC

2.6.1.7 Selection of Sample Units and Type of Enumeration: The technique of survey and assessment of forest resources using sample plots and quadrat method of data collection as prescribed in the National Working Plan Code 2014 in which Sample plots of 0.1 Ha area are laid out on selected grids were followed.

A total of 201 sample plots were laid in this working circle covering all Periodic Blocks the detail of which is given in table below:

Sl.No	Periodic Block	No. of Sample Plots in the periodic Plock
1	PBI	72
2	PBIV	57
3	PBU	72
Total		201 Sample Plots

Table 2.7: PB wise sample plot distribution in Deodar/ Kail Working Circle

2.6.1.8 Assessment of NTFP bearing Species: The major NTFPs available in this working circle are Gucchi, Kashmal(root), Buransh (flower), Kuth (root for medicinal purpose), Walnut bark, Pine Cones, Pine needles.

2.6.1.9 Status of Regeneration: The regeneration of principal species in this working circle appears to be deficient with less number of established seedlings or pole crop noticed in many compartments. However, the greater number of class IV trees compared to class V trees indicates decreasing trend of regenerated seedlings and indicates trend towards matured forests due to non working of forests. The data regarding same is given below:

Sr. No.	Total No. of Seedlings and Saplings recorded in Sample Plot	Category	Sample Plot Counts
1	0 – 5	Poor	125
2	6 – 10	Fair	52
3	11 – 20	Good	24

Table 2.8: Detail of regeneration status in Deodar/ Kail Working Circle

2.6.2. Silvicultural System:

The previous working plan of Ajay Srivastava prescribed Indian Irregular Shelterwood system with a view to convert irregular crop to uniform crop and to enable regeneration by conserving mother trees and at the same time providing sustained yield.

It is prescribed to continue with the Indian Irregular Shelterwood System in order to open up the canopy and enable regeneration so that young crop is established and sustainable yield of timber is obtained. In order to achieve this, it is proposed to have class wise periodic blocks where felling to remove overwood and mature trees and to encourage regeneration shall be carried out. The following areas shall be exempted from felling:

- Degraded natural forest ecosystems in protected areas to be used for watershed management, wildlife conservation, ecotourism or community development.
- No felling will be carried out in riparian zones along streams, rivers and other water bodies to preserve riparian zones.
- No felling on the slopes at risk of soil erosion and landslides.

2.6.3. Rotation Period: The rotation period is fixed at 120 years which was the same in the case of previous working plan also. Both principal species are expected to be of harvestable diameter at the rotation age.

2.6.4 Harvestable Diameter: The Harvestable diameter is fixed at 40 cm for Deodar and Kail respectively taking into account the rotation period of 120 years.

2.6.5 Reducing Factor and Reduced Areas: Area is not reduced in this working circle.

2.6.6 Felling Cycle: Felling cycle is kept at 30 years considering regeneration period of 30 years.

2.6.7 Division into periods and allotment to periodic blocks: With rotation of 120 years and regeneration period is 30 years, this working circle is divided into 3 periodic blocks by merging PB II and PB III blocks as PB Unallotted. It has been observed that regeneration of Deodar and Kail is suffering due to absence of opening up of the canopy. The forest compartments part of Periodic Block I in Ajay Srivastava Working Plan are once again allotted to PBI

considering the non working of these compartments in the prevailing ban on green felling. The forest compartments having middle aged trees are classified and grouped into PB Unallotted. The forest compartments having young crop are classified as PBIV where final felling is prescribed. Some of these compartments have been notified as Demarcated Protected Forests and accordingly the names of newly notified DPFs earlier which were UFs are also occurring in respective periodic blocks. The area statement showing the total area allotted in each periodic block is given below:

Area allotted to Periodic Blocks (in Ha)	PB I	PB II	PB III	PB Un allotted	PB IV
Ajay Srivastava Plan	3062.84	3267.07	3315.74	-	2455.17
Current Plan	9843.0415	-	-	9259.8949	8905.3365

Table 2.9: Area statement (in Ha) in respective PBs in Deodar/ Kail Working Circle

2.6.7.1 PB I: The area allotted to PB I is 9843.415 Ha. Areas having significantly matured and over matured crops have been allotted to this PB. These compartments are having sufficient recruits and considerable pole crops and also regeneration in whippy or sub-whippy stages is generally deficient except for certain pockets in some compartments. All these areas need canopy manipulation through felling as well as intensive silvicultural operations for enhancing the regeneration of kail and deodar.

In comparison to the previous working plan of Ajay Srivastava, all compartments which were part of PBI previously have been once again allotted to same periodic block due to non working of these forests. In a

2.6.7.2 PB Unallotted: The crop is generally of middle aged along with some matures are allotted in this PB. The compartments which are allotted previously to PB II and PBIII are allotted to this compartment. Only salvage removal in the

form of dead, decaying and uprooted trees shall be carried out in these areas during plan period. The total area of this PB is 9259.8949 ha.

2.6.7.3 PB IV: The crop mostly of young age group i.e. 0-30 cm diameter is allotted to this PB. The total area of this PB is 8905.3365 ha.

The list of all forest compartments allotted to various Periodic Blocks are given below:

Periodic Block I

Range	Block	Beat	COMPARTMENT	AREA (Ha)
Bashla	Arhal	Sharog	Pherli UF 12	119.38
Bashla	Bashla	Bashla	Bashla 31 a (i)	65.2
Bashla	Bashla	Bashla	Bashla 31 a (ii)	38
Bashla	Bashla	Bashla	Dandi Gad UF 10	97.93
Bashla	Bashla	Bashla	Jhaltu 31 a (iii)	49.44
Bashla	Bashla	Bashla	Jhaltu 31 a (iv)	35.14
Bashla	Bashla	Bashla	Jhaltu 31 a (v)	67.77
Bashla	Bashla	Bashla	Koti 31 b	30.35
Bashla	Bashla	Bashla	Lambi dhar UF 11	75.27
Bashla	Khadrala	Kewli	Bijashal 28 a	27.11
Bashla	Khadrala	kewli	Rehri/rehu	20.64
Bashla	Khadrala	Khadrala	Khadrala	62.1
Bashla	Khadrala	khangteri	Kakoibasa 29 c(i)	60.22
Bashla	Khadrala	khangteri	Kakoibasa 29 c(ii)	33.46
Bashla	Khadrala	khangteri	Khangteri 29 b	62.32
Bashla	Khadrala	khangteri	Khangteri 29 d	37.64

Dodra Kawar	Jakha	Jakha	Jakha 69 b	487.64
Dodra Kawar	Jakha	Jakha	Paba 69 c	100.77
Dodra Kawar	Jakha	Jakha	Pandhar 69 a	607.84
Dodra Kawar	Kawar	Kawar	Chineon 69e	375.55
Jubbal	Jubbal	Badhal	Barhal	476.58
Jubbal	Jubbal	Badhal	Giri 1a	78.91
Jubbal	Jubbal	Kharapathar	Jachli	17.81
Jubbal	Jubbal	Muril	Muril	313.04
Jubbal	Jubbal	Muril	Muril 1	121.4
Jubbal	Jubbal	Muril	Muril 2	82.55
Jubbal	Jubbal	shilli	DPF Kiari	6.8747
Jubbal	Jubbal	Shilli	DPF Kohlada	21.2754
Jubbal	Jubbal	Shilli	Giri 2a	152.97
Jubbal	Jubbal	Shilli	Giri 2b	66.37
Jubbal	Jubbal	Shilli	Giri 3b	117.76
Jubbal	Jubbal	Snabha	Giri part II	98.2716
Jubbal	Jubbal	Snabha	Sanabha	113.4642
Jubbal	Jubbal	Snabha	DPF Giri II	20.7584
Jubbal	Jubbal	Snabha	Giri 4b	63.13
Jubbal	Jubbal	Snabha	Giri part-1	119.83
Jubbal	Sheel	Shallan	Shallan 10a	40.87
Jubbal	Sheel	Shallan	Shallan 10b	81.75

Jubbal	Sheel	Sheel	Badrol 15b	100.35
Jubbal	Sheel	Sheel	Gadgaon 14b	31.97
Jubbal	Sheel	Sheel	Kaina 15c	65.56
Jubbal	Sheel	Sheel	Kaina 16	4.05
Jubbal	Sheel	Sheel	Matil 15a	99.96
Jubbal	Sheel	Sheel	Matil 15d	40.87
Jubbal	Sheel	Sheel	Sheel 14c	190.2
Khashadar	Khashadhar	Dalli	DPF Chiwari	2.01
Khashdhar	Chirgaon	Chirgaon	Andhra	31.77
Khashdhar	Chirgaon	Chirgaon	Bagi	40.4
Khashdhar	Chirgaon	Duidi	Diudi UF 36	18.21
Khashdhar	Chirgaon	Sindasli	DPF Bosari	1.6513
Khashdhar	chirgoan	chirgoan	DPF Chirgaon	32.8574
Khashdhar	Chirgoan	Chirgoan	Jabal 64	7.69
Khashdhar	Chirgoan	Jhaknoti	Advani 61 b	11.33
Khashdhar	Chirgoan	Jhaknoti	Bari 57	26.72
Khashdhar	Chirgoan	Jhaknoti	Bhampur 59	12.14
Khashdhar	Chirgoan	Jhaknoti	Jaknoti 61 a	34.4
Khashdhar	Khashdhar	Dalli	Jakhi75a	11.33
Khashdhar	Khashdhar	Diswani	Diswani 80a	61.51
Khashdhar	Khashdhar	Telga	Telga 73 b	21.04
Khashdhar	Larot	Kharshali	Gumma 72 b (i)	50.6

Khashdhar	Larot	Kharshali	Gumma 72 b (ii)	53
Khashdhar	Larot	Thalathar	Khatu and Gangu	60.6
Khashdhar	Larot	Thalathar	Moila 68	15.38
Khashdhar	Todsa	Banoti	Banoti Urdi	118.0219
Khashdhar	Todsa	Banoti	DPF Banoti Urdi	686.8981
Khashdhar	Todsa	Banoti	UF Mathla	62.1726
Khashdhar	Todsa	Todsa	Amboibasa	35.61
Khashdhar	Todsa	Todsa	Amboibasa UF 32	38.37
Khashdhar	Todsa	Todsa	Baridhar	6.47
Khashdhar	Todsa	Todsa	Jailot	27.5578
Khashdhar	Todsa	Todsa	Seri basa	10.93
Khashdhar	Todsa	Todsa	Shagli UF 30	114.93
Rohru	Rohru	Bhagi	Dabri 83b(ii)	93.07
Rohru	Rohru	Bhagi	Gawas 82b	37.23
Rohru	Rohru	Dalgoan	Bamnala	51.19
Rohru	Rohru	Dalgoan	Chameltu UF 18	15.78
Rohru	Rohru	Dalgoan	Jakhar UF 17	20.24
Rohru	Rohru	Gauna	Kaneora	13.55
Rohru	Rohru	Kutara	Dalgaon 52 a	6.47
Rohru	Rohru	Kutara	Khurki Suki UF 19	142.45
Rohru	Rohru	Kutara	Kundgad	353.49
Rohru	Rohru	Kutara	Kutara	106.84
Rohru	Rohru	Kutara	Pauligad	183.93

Rohru	Rohru	Kutara	Sadgad	143.86
Rohru	Rohru	Kutara	Sanal Gad UF 20	201.94
Rohru	Rohru	Rantari	Rantari 55 a	49.94
Rohru	Rohru	Rantari	Rantari 55 b	39.69
Rohru	Summerkot	Graima	Graima 43 a (i)	41
Rohru	Summerkot	Graima	Graima 43 a (ii)	46.01
Rohru	Summerkot	Graima	Jaunli 44	33.59
Rohru	Summerkot	Kui	Dunga dobal 39	29.14
Rohru	Summerkot	Kui	koti 36 a	9.71
Rohru	Summerkot	Kui	Koti 36 b	5.26
Rohru	Summerkot	Kui	Kui 37 (b)	43.3
Rohru	Summerkot	Machoti	Khonola 49 b	36.02
Rohru	Summerkot	summerkot	Dungsa UF 13	26.3
Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur	113.31
Saraswati Nagar	Chhajpur	Ravinghar	Sanoli	7.69
Saraswati Nagar	Chhajpur	Ravinghar	Shillar	84.98
Saraswati Nagar	Chhajpur	Sawra	DPF Ghiyan	28.5829
Saraswati Nagar	Mandal	Dhanser	Dhanser part-1	48.56
Saraswati Nagar	Mandal	Jhalta	Giltari	93.08
Saraswati Nagar	Mandal	Jhalta	Jhalta part-II	59.88

Saraswati Nagar	Mandal	Jhalta	UF Jhalta part -I	67.2086
Saraswati Nagar	Mandal	Kawalta	DPF Kawalta	33.0827
Saraswati Nagar	Mandal	kawalta	UPF Kawalta	20.7333
Saraswati Nagar	Mandal	Mandal	Shiroli	130.4894
Tikkar	Tikkar	Kadiwan	Bambla-I	46.54
Tikkar	Tikkar	Kadiwan	Bambla-II	40.4
Tikkar	Tikkar	Kadiwan	DPF Shalni-Ganasi	102.7083
Tikkar	Tikkar	Kadiwan	Kathari 27 a(i)	62.75
Tikkar	Tikkar	Kadiwan	Kathari 27 a(ii)	38.83
Tikkar	Tikkar	Naksetli	Khalai 24 b	67.99
Tikkar	Tikkar	Naksetli	Koti 20b(i)	67.18
Tikkar	Tikkar	Sharontha	DPF Dogda	4.3087
Tikkar	Tikkar	sharontha	Narain 8	42.49
Tikkar	Tikkar	Tikkar	Dhanoti 5 (b) (I)	35.39
Tikkar	Tikkar	Tikkar	Dhanoti 5 (b) (ii)	76.3
Tikkar	Tikkar	Tikkar	DPF DanotGad	7.5495
Tikkar	Tikkar	Tikkar	Kashani 6c	54.63
Tikkar	Tikkar	Tikkar	Soldu (a) (ii)	47.18
Tikkar	Tikkar	Tikkar	Soldu (a)(iii)	34
Tikkar	Tikkar	Tikkar	Tikar 6(b) (i)	38.05
Tikkar	Tikkar	Tikkar	Tikar 6(b) (ii)	36

Periodic Block Unalloted				
Range	Block	Beat	COMPARTMENT	AREA (Ha)
Bashla	Bashla	Malkhun	Mundiban	131.5
Bashla	Khadrala	Kewli	Kuili 41 a	14.16
Bashla	Khadrala	Kewli	Kuili 41 b	25.5
Bashla	Khadrala	Kewli	Kuili 41 c	78.91
Bashla	Khadrala	kewli	Pagas	19.42
Bashla	Khadrala	kewli	Pekha Dhar UF 7	59.08
Dodra Kavar	Jakha	Jakha	Raigad	167.74
Jubbal	Jubbal	Kharapathar	Deem	177.58
Jubbal	Jubbal	Kharapathar	Jhalri	10.11
Jubbal	Jubbal	Kharapathar	Ori	110.6652
Jubbal	Jubbal	Shilli	Kalontha	2.42
Jubbal	Jubbal	Shilli	Kiari	45.4953
Jubbal	Jubbal	Shilli	Kohlara	37.1646
Jubbal	Jubbal	Shilli	Mihana	20.11
Jubbal	Sheel	Mandhol	Baral 17	102.79
Jubbal	Sheel	Mandhol	Jharag 19b	23.88
Jubbal	Sheel	Mandhol	Sari 18b	129.1
Jubbal	Sheel	shallan	Kalgaon 11	130.31
Khashdhar	Chirgoan	Duidi	Ambot 67 a	7.69
Khashdhar	Chirgoan	Duidi	Diudi 67 b	6.88

Khashdhar	Chirgoan	Jhaknoti	Charoti 62 a (ii)	16.18
Khashdhar	Chirgoan	Jhaknoti	Chiroti 62 a (i) part II	30.38
Khashdhar	Chirgoan	Jhaknoti	Chiroti 62 a(i) part I	28.3
Khashdhar	Chirgoan	Jhaknoti	Dunduna 60	44.52
Khashdhar	Chirgoan	Jhaknoti	Kiwalta 62 b	3.24
Khashdhar	Chirgoan	Jhaknoti	Punjali 58	23.88
Khashdhar	Chirgoan	Sindasali	Khabal 65 b	14.16
Khashdhar	Chirgoan	Sindasali	Sandasli 66 a	4.05
Khashdhar	Khashdhar	Dalli	Dalli78a (ii)	41.53
Khashdhar	Khashdhar	Dalli	Dalli78a(i)	67.74
Khashdhar	Khashdhar	Dalli	Jatalta 74b	18.62
Khashdhar	Khashdhar	Dalli	Rikshal 78b	46.13
Khashdhar	Khashdhar	Diswani	Kayani 81a	116.95
Khashdhar	Khashdhar	Diswani	Pokhridar 81b	101.58
Khashdhar	Khashdhar	Khashdhar	Dogra75b	42.9
Khashdhar	Khashdhar	Khashdhar	Khashadhar 74 a (i)	38.63
Khashdhar	Khashdhar	Khashdhar	Khashadhar 74 a (ii)	31.38
Khashdhar	Khashdhar	Khashdhar	Khashadhar 74 a (iii)	33.99
Khashdhar	Khashdhar	Khashdhar	Khashdhar	40.87
Khashdhar	Khashdhar	Khashdhar	Sandasu	193.8006
Khashdhar	Khashdhar	Khashdhar	Shankar	25.5

Khashdhar	Khashdhar	Telga	Telga	26.5683
Khashdhar	Khashdhar	Telga	Telga 73 a	43.3
Khashdhar	Khashdhar	Telga	Telga73c	18.62
Khashdhar	Khashdhar	Telga	Thati Dhar	39.945
Khashdhar	Larot	Kharshali	Kharshali 72 a	84.58
Khashdhar	Larot	Kharshali	Kindari	149.071
Khashdhar	Todsa	Todsa	Thana	91.06
Khashdhar	Todsa	Todsa	Tiproli	35
Khashdhar	Todsa	Todsa	Todsa 56 a	22.58
Khashdhar	Todsa	Todsa	Todsa 56 b	57.95
Rohru	-	-	Barnola	64.75
Rohru	Gawas	Bhagi	Baghi 83 c (i)	58.68
Rohru	Gawas	Bhagi	Baghi 83a	63.13
Rohru	Gawas	Bhagi	Sainjibasa 83 b (iii)	47.35
Rohru	Gawas	Gawas	Gawas 82a	127.88
Rohru	Gawas	Lowerkoti	Chipari 84 c (i)	20.23
Rohru	Gawas	Lowerkoti	Chiuni	42.32
Rohru	Gawas	Lowerkoti	Dhara	10.92
Rohru	Gawas	Lowerkoti	Diwari UF 55	33.59
Rohru	Gawas	Lowerkoti	Lowerkoti 84b	23.07
Rohru	Gawas	Lowerkoti	Munaik dhar	268
Rohru	Gawas	Lowerkoti	Panipanwi	20.2
Rohru	Gawas	Lowerkoti	Shekal 85	5.67

Rohru	Rohru	Dalgoan	Bretli 51 a (i)	70.42
Rohru	Rohru	Dalgoan	Bretli 51 a (ii)	60.7
Rohru	Rohru	Dalgoan	Dalgaon 52 c (i)	57.39
Rohru	Rohru	Dalgoan	Dalgaon 52 c (ii)	45
Rohru	Rohru	Kutara	Badoda	113.92
Rohru	Rohru	Kutara	Kutara 53 a	58.27
Rohru	Summerkot	Graima	Bajain 45 a(i)	81.34
Rohru	Summerkot	Graima	Balun 45 b (i)	31.16
Rohru	Summerkot	Graima	Balun 45 b (ii)	16.19
Rohru	Summerkot	Graima	Graima 43 b	64.75
Rohru	Summerkot	Graima	Shirmali 46 a (i)	36.42
Rohru	Summerkot	Graima	Shirmali 46 a (ii)	74.06
Rohru	Summerkot	Graima	Shirmali 46 a (ii)	29.14
Rohru	Summerkot	Graima	Sungri 46 b (i)	20.63
Rohru	Summerkot	Kui	Bamnoli 40 a (i)	42.65
Rohru	Summerkot	Kui	Bamnoli 40 a (ii)	34.24
Rohru	Summerkot	Kui	Bamnoli 40 b	53.42
Rohru	Summerkot	Kui	Kui 37 (a)	36.83
Rohru	Summerkot	Kui	Kui 37 (c)	12.14
Rohru	Summerkot	Kui	Kui 37 (e)	63.53
Rohru	Summerkot	Kui	Shakli 38	33.18
Rohru	Summerkot	Machoti	Khonola 49 a	67.58
Rohru	Summerkot	Summerkot	Kateri 47 c	43.3

Rohru	Summerkot	Summerkot	Seri 47 a	28.73
Rohru	Summerkot	Summerkot	Seri 47 b	31.97
Saraswati Nagar	Chhajpur	Chhajpur	Baghain 4	36.42
Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -20	153.38
Saraswati Nagar	Chhajpur	Chhajpur	Jond 2 a	63.94
Saraswati Nagar	Chhajpur	Kelwi	Baghain 3	56.65
Saraswati Nagar	Chhajpur	Kelwi	Jond 1	57.46
Saraswati Nagar	Chhajpur	Kelwi	Jond 3 a	75.27
Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -1	135.57
Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -2 a	94.29
Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -4 a	67.18
Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -4 b	87.82
Saraswati Nagar	Kuddu	Kuddu	Ori	39.25
Saraswati Nagar	Mandal	Dhansar	Jakhi 4 a	105.97
Saraswati Nagar	Mandal	Dhansar	Jakhi 4b	139.11
Saraswati Nagar	Mandal	Kawalta	Jakhi 2	564.95
Saraswati Nagar	Mandal	Mandal	Dulu	586.8

Saraswati Nagar	Mandal	Mandal	Jakhi 1	601.37
Saraswati Nagar	Mandal	Mandal	Kiala	20.23
Tikkar	Tikkar	Farog	Astari 4 (a)	29.14
Tikkar	Tikkar	Farog	Astari 4 (b)	134.36
Tikkar	Tikkar	Farog	Dhanoti 5 (a)	40.06
Tikkar	Tikkar	Farog	Farog 3	44.52
Tikkar	Tikkar	Kadiwan	Ganasi	73.25
Tikkar	Tikkar	kadiwan	Kadyun 26	116.95
Tikkar	Tikkar	kadiwan	Khalgar 25	3.24
Tikkar	Tikkar	Kadiwan	Nalaban	93.28
Tikkar	Tikkar	kadiwan	Naugadhar 27 b	137.59
Tikkar	Tikkar	Kadiwan	Tutupani	142.45
Tikkar	Tikkar	Kadiwan	Tutupani UF 5	51.8
Tikkar	Tikkar	Naksetli	Jagтели 20a	90.65
Tikkar	Tikkar	Naksetli	Naksetli 23 a	19.02
Tikkar	Tikkar	Naksetli	Naksetli 23 b	17.4
Tikkar	Tikkar	Naksetli	Phriunkoti 21	60.7
Tikkar	Tikkar	Naksetli	Pujarli 22	23.07
Tikkar	Tikkar	sharontha	Sharontha 7	185.35
Tikkar	Tikkar	Tikkar	Danotgad	39.7805
Periodic Block IV				

Range	Block	Beat	COMPARTMENT	AREA (Ha)
Bashla	Arhal	Arhal	Adhal 32 a (ii)	31.79
Bashla	Arhal	Arhal	Adhal 32 b (i)	37.65
Bashla	Arhal	Arhal	Adhal 32 b (ii)	42.67
Bashla	Arhal	Arhal	Adhal 32 b (iii)	30.16
Bashla	Arhal	Arhal	Brasli 33 a	22.58
Bashla	Arhal	Arhal	Brasli 33 b	59.98
Bashla	Arhal	Sharog	Brara 35 a	4.86
Bashla	Arhal	Sharog	Kargad 35 b	17.4
Bashla	Arhal	Sharog	Sharog 34	35.61
Bashla	Bashla	Bhalara	Balara 30 a	47.75
Bashla	Bashla	Bhalara	Balara 30 b	60.68
Bashla	Bashla	Malkhun	Malkhun 30 c (i)	32.63
Bashla	Bashla	Malkhun	Malkhun 30 c (ii)	49.52
Bashla	Bashla	Malkhun	Malkhun 30d	67.99
Dodra Kwar	Jakha	Pandhar	DPF Miyan	119.8779
Dodra Kwar	Jakha	Pandhar	DPF Pissar Gad	813.8272
Dodra Kwar	Kwar	Kwar	DPF Kwar-III	42.4464
Jubbal	Jubbal	Badhal	Badhal	40.46
Jubbal	Jubbal	Badhal	Giri 1b	69.2
Jubbal	Jubbal	Kharapathar	DPF Oddi	113.5748
Jubbal	Jubbal	Kharapathar	Jhalri	63.13

Jubbal	Jubbal	Shilli	DPF Shari	6.6241
Jubbal	Jubbal	Shilli	DPF Sundli	11.7634
Jubbal	Jubbal	Shilli	Giri 3a	97.12
Jubbal	Jubbal	Shilli	Kalauntha	14.16
Jubbal	Jubbal	Shilli	Mihana	1.62
Jubbal	Jubbal	Shilli	Rampuri	2.83
Jubbal	Jubbal	Shilli	Rampuri	6.87
Jubbal	Jubbal	Shilli	Shari	25.7459
Jubbal	Jubbal	Shilli	UF Sundli	62.7466
Jubbal	Jubbal	Snabha	DPF Sanabha	54.1158
Jubbal	Jubbal	Snabha	Jakhala	1.61
Jubbal	Sheel	Mandhol	DPF Jharag	11.8141
Jubbal	Sheel	Mandhol	Kadol 19a	10.93
Jubbal	Sheel	Mandhol	Mandhol 18a	116.95
Jubbal	Sheel	Shallan	Ganga Nagar 13a	41.28
Jubbal	Sheel	Shallan	Ganga Nagar 13b	132.74
Jubbal	Sheel	Shallan	Nahal 12	64.75
Khashadar	Khashadhar	Dalli	DPF Dellidhar	32.2574
Khashadar	Khashadhar	Dalli	DPF Jatata	5.8798
Khashadar	Khashadhar	Khashadhar	DPF Sandasu-I	13.9747
Khashadar	Khashadhar	Khashadhar	DPF Sandasu-II	32.4047
Khashadar	Larot	Kharshali	DPF Dari Gad	54.889
Khashdhar	Khashadhar	Dalli	DPF Jina Paver	690.2778

Khashdhar	Chirgaon	Jakhnoti	DPF Topi Dhar	190.0996
Khashdhar	Chirgaon	chirgoan	DPF Baghi	73.9351
Khashdhar	Chirgaon	Jakhnoti	Kudiang	15.38
Khashdhar	Chirgaon	Jhaknoti	DPF Kunjwani	2.5826
Khashdhar	Chirgaon	Sindasli	DPF Denvari	15.6859
Khashdhar	Chirgaon	Sindasli	DPF Khabal	93.745
Khashdhar	chirgoan	Chirgoan	DPF Gaosari	2.842
Khashdhar	chirgoan	Jakhnoti	DPF Koti	5.1128
Khashdhar	chirgoan	Jhaknoti	DPF Dasoti	6.286
Khashdhar	Chirgoan	Sindasali	Gokaswari 66 b	4.05
Khashdhar	Chirgoan	Sindasali	Khabal 65 a	34.8
Khashdhar	Khashadar	Khashdhar	DPF Dogda	26.8582
Khashdhar	Khashadar	Telga	DPF Thati Dhar	104.525
Khashdhar	Khashadar	Telga	DPF Sharoli	28.4056
Khashdhar	Khashdhar	Dalli	Chiwari	17.81
Khashdhar	Khashdhar	Dalli	Dhak 77a	25.9
Khashdhar	Khashdhar	Dalli	Dhak 77b	40.06
Khashdhar	Khashdhar	Dalli	Masli	42.09
Khashdhar	Khashdhar	Dalli	Silot	21.45
Khashdhar	Khashdhar	Diswani	DPF Kaloti	3.1921
Khashdhar	Todsa	Banoti	DPF Devvan	352.6818
Khashdhar	Todsa	Banoti	DPF Kolsa	45.9016
Khashdhar	Todsa	Banoti	DPF Pesku khech	75.4053

Khashdhar	Todsa	Jalwari	DPF Kutra II	30.9312
Khashdhar	Todsa	Jalwari	DPF Nandla	67.8908
Khashdhar	Todsa	Jalwari	Jhalwari	106.81
Khashdhar	Todsa	Jalwari	Kutra UF	25.3188
Khashdhar	Todsa	Jalwari	Shiroli	15.58
Khashdhar	Todsa	Todsa	Devidhar	43.3
Khashdhar	Todsa	Todsa	DPF Devidhar	185.5911
Khashdhar	Todsa	Todsa	DPF Jangla	11.4348
Khashdhar	Todsa	Todsa	DPF Jaylot	31.1222
Khashdhar	Todsa	Todsa	DPF Mandli	88.6054
Khashdhar	Todsa	Todsa	DPF Shangli	7.6022
Khashdhar	Todsa	Todsa	Thali	79.72
Rohru	Gawas	Baghi	DPF Jhatwari	1.0966
Rohru	Gawas	Bhagi	Baghi 83 c (ii)	46.94
Rohru	Gawas	Lowerkoti	Parsa 84 a	12.14
Rohru	Rohru	Dalgaon	Dalgaon 52 b	31.97
Rohru	Rohru	Gauna	Gauna 53 b (i)	37.13
Rohru	Rohru	Gauna	Gauna 53 b (ii)	37.74
Rohru	Rohru	Gauna	Kansa Koti	80.8
Rohru	Rohru	Gauna	Katmori UF 21 a	42.67
Rohru	Rohru	Gauna	Katmori UF 21 b	112.33
Rohru	Rohru	Gauna	Khorsu	65.14
Rohru	Rohru	Gauna	Nauna UF 22 a	45.81

Rohru	Rohru	Gauna	Nauna UF 22 b	69.93
Rohru	Rohru	Rantari	Bajauri	12.34
Rohru	Rohru	Rantari	Jakhar	66.94
Rohru	Rohru	Rantari	Kandrol	45.93
Rohru	Rohru	Rantari	Manjena	5.87
Rohru	Summerkot	Graima	Bajain 45 a(ii)	46.13
Rohru	Summerkot	Graima	Graima	135.97
Rohru	Summerkot	Graima	Sungri 46 b (ii)	44.51
Rohru	Summerkot	Kui	Karetli	105.21
Rohru	Summerkot	Kui	Kui 37 (d)	46.94
Rohru	Summerkot	Kui	Tilri	40.4
Rohru	Summerkot	Machoti	Bari	64.75
Rohru	Summerkot	Machoti	Bhut Kanon UF 16	148.92
Rohru	Summerkot	Machoti	Bhut UF 15	18.21
Rohru	Summerkot	Machoti	Darshal 50 a	60.75
Rohru	Summerkot	Machoti	Darshal 50 b	36.78
Rohru	Summerkot	Machoti	Khanola	53.01
Rohru	Summerkot	Summerkot	Kateri 47 d (i)	30.35
Rohru	Summerkot	Summerkot	Kateri 47 d (ii)	60.3
Saraswati Nagar	Chhajpur	Chhajpur	Jond 3 b	24.28
Saraswati Nagar	Chhajpur	Ravingahr	DPF Malog-I	76.271

Saraswati Nagar	Chhajpur	Ravinghar	DPF malog-II	47.2111
Saraswati Nagar	Chhajpur	Sawra	DPF Khouni	12.5508
Saraswati Nagar	Chhajpur	Sawra	Khouni	52.5992
Saraswati Nagar	Chhajpur	Sawra	Raika	72.49
Saraswati Nagar	Chhajpur	Sawra	Sarot	16.18
Saraswati Nagar	Chhajpur	Sawra	Sawra	10.12
Saraswati Nagar	Chhajpur	Sawra	Sherhana	44.27
Saraswati Nagar	Mandal	Jhalta	DPF Jhalta-I	17.7714
Saraswati Nagar	Mandal	Jhalta	Jakhi 3a	411.57
Saraswati Nagar	Mandal	Jhalta	Jakhi 3b	0
Saraswati Nagar	Mandal	Jhalta	Jakhi 3c	0
Saraswati Nagar	Mandal	Jhalta	Jakhi 3d	0
Saraswati Nagar	Mandal	Kawalta	DPF Kawalta	33.0827
Saraswati Nagar	Mandal	Mandal	DPF Shirol-I	87.2863
Saraswati Nagar	Mandal	Mandal	DPF Shirol-II	13.9429
Saraswati Nagar	Mandal	Mandal	DPF Shirol-III	91.4854
Saraswati Nagar	Mandal	Mandal	DPF Shirol-IV	8.1052

Saraswati Nagar	Mandal	Mandal	DPF Shirol-V	8.3731
Saraswati Nagar	Mandal	Mandal	DPF Shirol-VI	60.9577
Tikkar	Tikkar	Naksetli	Khalai 24 a	57.06
Tikkar	Tikkar	Naksetli	Koti 20b(ii)	28.73
Tikkar	Tikkar	Sharontha	DPF Naldigad	1.3666
Tikkar	Tikkar	Sharontha	Field bag	310.19
Tikkar	Tikkar	Sharontha	Karchari 9a(i)	83.63
Tikkar	Tikkar	Sharontha	Karchari 9a(ii)	78.6
Tikkar	Tikkar	Sharontha	Karchari 9b(i)	50.2
Tikkar	Tikkar	Sharontha	Karchari 9b(ii)	40.45
Tikkar	Tikkar	Sharontha	Naldigad (b)	92.87
Tikkar	Tikkar	Sharontha	Tangri	98.3
Tikkar	Tikkar	Sharontha	UF Naldigad	42.3434

Table 2.10: Detail of Forest compartments allotted to periodic blocks

2.7 Silvicultural Systems

2.7.1 Prescriptions: According to previous plan of Srivastava, **Indian Irregular Shelterwood System** was applied in these forests wherein the compartments with advance growth and saplings are retained; the canopies are opened irregularly by felling of mature and over mature trees under Periodic Block (PB) system for obtaining growth of advance regeneration so as to convert the irregular age group crops into uniform age crops site by site improvement of regeneration.

The felling in compartments will be restricted keeping in view of the following:

1. Over felled or poorly stocked secondary forests in need of supplementary natural regeneration and through enrichment planting.

2. Degraded natural forest ecosystems in protected areas to be used for watershed management, wildlife conservation, ecotourism or community development.

3. No felling will be carried out in riparian zones along streams, rivers and other water bodies to preserve riparian zones.

4. No felling on the slopes at risk of soil erosion and landslides.

5. Areas close to habitation and villages.

2.6.8 Calculation of yield: The yield from this working circle is calculated on the basis of timber yield from various periodic blocks depending on available timber for extraction considering harvestable diameter, terrain condition and retention of seed bearers and advance growth.

2.6.8.1 Rohru Felling Series

2.6.8.1.1 Yield from PB I: All PB I area was enumerated down to 10 cm dbh. The abstract is given in the following table 2.1.

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Deodar	103638	145302	149989	89577	61454	26040	8333	3125	1562	1562	590582
Vol (in m ³)	10363.8373	43590.61	89993.522	116449.95	129053.21	95305.64	45830.03	21873.43	12889.7	12889.7	578239.63
Kail	283313	421324	312998	168738	108326	69787	28123	6250	1042	521	1400420
Vol (in m ³)	19831.9058	147463.3	219098.81	269980.57	262147.8	253325.52	143427.2	41559.51	10155.52	5077.76	1372067.9
Rai	26040	34373	26040	28644	21353	24998	12499	5208	4687	4166	188007
Vol (in m ³)	2603.97923	10999.21	18227.855	45257.159	64484.942	137490.1	91243.43	48694.41	51183.82	45496.73	515681.63
Tosh	6770	9895	7812	15624	14582	8854	4687	2604	1562	1042	73432
Vol (in m ³)	473.92422	2968.536	5624.5951	24998.201	41559.509	43559.365	34216.29	26560.59	20076.68	13384.45	213422.14
Total	419761	610894	496839	302582	205714	129678	53642	17186	8854	7291	2252442
Vol (in m ³)	33273.6466	205021.7	332944.78	456685.88	497245.46	529680.62	314716.9	138687.9	94305.71	76848.64	2679411.3

Table 2.11: Growing stock of PB I

Calculation of annual yield:

(Total growing stock of PB I down to 10 cm dbh)- (Volume of mother trees) + (Vol. not available for felling due to difficult terrain i.e. 20% of total GS)+ (80% Vol. of 10-20 and 20-30 cm diameter classes in case of deodar, kail, spruce and fir to be retained as advance growth)

Annual yield = Total Yield / Regeneration Period (30 years)

i. Total Growing Stock of PB I: 2679411.3 m³

ii. Vol of mother trees (retained):

Species	Volume (in m³)	Proportion
Deodar	578239.63	22%
Kail	1372067.91	51%
Rai	515681.63	19%
Tosh	213422.14	8%
Total	2679411.30	100%

Table 2.12: Species wise proportion

Species	Number of Trees	Volume factor	Volume to be retained per ha (in m³)	Total Volume retained over the area of 9843.0415 Ha (in m³)	Proporti onate factor	Net Volume retained (in m³)
Deo	45	2.88	129.6	1275658.178	22%	280644.799
Kail	30	3.02	90.6	891779.5599	51%	454807.576
Spruce	35	4.26	149.1	1467597.488	19%	278843.523
Fir	60	3.88	232.8	2291460.061	8%	183316.805
					Total	1197612.7

Table 2.13: Calculation of retained volume of Mother trees

Species wise growing stock depends on the number of trees retained per ha extrapolated to the total area covered under mother trees.:

1197612.7 m³

iii. Vol. not available for felling due to difficult terrain (20%) of total vol.=

=0.2 × Total Volume of Growing Stock in PBI = 0.2 × 2679411.3

$$= 535882.26 \text{ m}^3$$

iv. Volume not available for felling due to retention of young trees as advance growth (80% of volume of Class IV and V trees)

$$= 238295.35 \times 80\% = 190636.27 \text{ m}^3$$

$$\text{v. Annual yield} = 2679411.3 - [1197612.7 + 535882.26 + 190636.27]$$

$$30$$

$$= 755280.0622 / 30 = 25176 \text{ Or Say } 25100 \text{ m}^3$$

vi. Species wise yield: (Total annual yield * proportion of species in forests)

$$\text{Deodar} = 5538 \text{ m}^3 \text{ or Say } 5550$$

$$\text{Kail} = 12839 \text{ m}^3 \text{ or Say } 12850$$

$$\text{Rai} = 4783 \text{ m}^3 \text{ or Say } 4700$$

$$\text{Tosh} = 2014 \text{ m}^3 \text{ or Say } 2000$$

$$\text{Total} = \text{25100 m}^3$$

2.6.8.1.2 Yield from PB IV: The removal of overwood as final felling has to be executed in PB IV measuring area 8905.3365 ha. where class I and Class II trees are available for removal. However, the considerations and restraints in this regard include the need to safeguard mother trees where new crop is present to prevent damage while extraction to new crop, forest areas adjacent to rivers and streams where chances of damage and soil erosion are higher, difficult terrain where execution of felling is not feasible and forest boundaries prone to encroachments. Taking all these factors into account, it is expected that a total of 40% of the available class I and II trees in this periodic block are not available due to aforementioned considerations. The table of periodic block IV listing species and class are given below:

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Deodar	93765	131460	135700	81043	55599	23559	7539	2827	1414	1414	534320
Vol (in m ³)	9376.52	39437.92	81420.22	105356.26	116758.86	86226.27	41464.00	19789.64	11661.75	11661.75	523153.18
Kail	256323	381186	283180	152663	98006	63138	25444	5654	942	471	1267008
Vol (in m ³)	17942.60	133415.13	198226.19	244260.66	237174.08	229192.26	129763.47	37600.31	9188.05	4594.02	1241356.79
Rai	23559	31098	23559	25915	19318	22617	11308	4712	4241	3769	170097
Vol (in m ³)	2355.91	9951.36	16491.36	40945.70	58341.73	124392.00	82551.06	44055.50	46307.75	41162.44	466554.82
Tosh	6125	8952	7068	14135	13193	8010	4241	2356	1414	942	66437
Vol (in m ³)	428.78	2685.74	5088.76	22616.73	37600.31	39409.65	30956.65	24030.27	18164.06	12109.37	193090.31
Other BLs	30627	61254	30156	12722	7539	1885	942	0	471	942	146538
Vol (in m ³)	6125.36	12250.73	21108.95	16538.48	15831.71	6219.60	4806.05	0.00	4005.05	10554.47	97440.40
Total	410399	613950	479663	286479	193656	119209	49474	15549	8481	7539	2184399
Vol (in m ³)	36229.17	197740.88	322335.49	429717.82	465706.69	485439.79	289541.23	125475.72	89326.65	80082.06	2521595.50

Table 2.14: Growing Stock in PB IV

Species	Total Volume of I and II class trees (in m ³)
Deodar	392918.52
Kail	891772.86
Rai	437756.19
Tosh	184887.04
Total	1907334.61

Table 2.15: Table Showing volume of Class I and II trees in PB IV

Considering the aforementioned constraints and taking into account that only 60% of overwood volume is available for extraction, species wise annual yield is calculated as follows:

Annual Yield for different species is as follows:

i) Deodar- $\frac{392918.52 \times 60\%}{10} = 23575$ or 23500 m³

10

ii) Kail - $\frac{891772.86 \times 60\%}{10} = 53506$ or say 53500 m³

10

$$\text{iii) Rai-} \quad \frac{437756.19 \times 60\%}{10} = 26265 \text{ or say } 26200 \text{ m}^3$$

10

$$\text{iv) Tosh-} \quad \frac{184887.04 \times 60\%}{10} = 11093 \text{ or say } 11000 \text{ m}^3$$

10

Total annual Yield from PB IV = 114200 m³

2.6.8.1.3 Yield from PB Unallotted

The prescription in this regard is to remove only salvage removals in this periodic block to meet the requirements of right holders and for sale through HP Forest Corporation. The total salvage removal volume for the tract annually taken as an average over last 10 years comes to be 11085.746 m³. The proportionate volume taking the area of periodic block unallotted that is for an area of 9259.8949 Ha comes to be 1290 m³.

Total Annual Yield from Periodic Block Unallotted =

Total Annual Yield = Yield from PB I + PB IV + PB Unallotted =

$$= 25100 + 114200 + 1290 = 140590 \text{ m}^3$$

2.6.9 Table of felling: Felling is carried out in PB I and PB IV areas as seeding and final felling. The area of PB I and PB IV prescribed for felling includes 9843.0415 and 8905.3365 respectively. The felling is prescribed to take place as per the approval of Honourable Supreme Court in the T.N. Godavarman case and other guidelines laid down by the Supreme Court in this regard.

Felling Series for PB I Areas

Year of Felling	Name of Range	Name of Block	Name of Beat	Name of Forest Compartment	Area
2026-27	Bashla	Bashla	Bashla	Koti 31 b	30.35
	Bashla	Khadrala	Kewli	Bijashal 28 a	27.11
	Bashla	Khadrala	khangteri	Kakoibasa 29 c(i)	60.22
	Bashla	Khadrala	khangteri	Kakoibasa 29 c(ii)	33.46
	Bashla	Khadrala	khangteri	Khangteri 29 d	37.64
2027-28	Jubbal	Jubbal	Badhal	Giri 1a	78.91
	Jubbal	Jubbal	Muril	Muril 1	121.4
	Jubbal	Jubbal	Muril	Muril 2	82.55
2028-29	Jubbal	Jubbal	Shilli	Giri 2a	152.97
	Jubbal	Jubbal	Shilli	Giri 2b	66.37
2029-30	Jubbal	Jubbal	Shilli	Giri 3b	117.76
	Jubbal	Sheel	Sheel	Sheel 14c	190.2
	Jubbal	Jubbal	Snabha	Giri 4b	63.13
	Jubbal	Jubbal	Kharapathar	Jachli	17.81
2030-31	Khashdhar	Chirgoan	Chirgoan	Jabal 64	7.69
	Khashdhar	Chirgoan	Jhaknoti	Bari 57	26.72
	Khashdhar	Chirgoan	Jhaknoti	Advani 61 b	11.33
	Khashdhar	Chirgoan	Jhaknoti	Bhampur 59	12.14

	Khashdhar	Chirgoan	Jhaknoti	Jaknoti 61 a	34.4
	Khashdhar	Khashdhar	Telga	Telga 73 b	21.04
	Khashdhar	Larot	Kharshali	Gumma 72 b (i)	50.6
2031-32	Khashdhar	Larot	Kharshali	Gumma 72 b (ii)	53
	Khashdhar	Larot	Thalathar	Moila 68	15.38
	Khashdhar	Khashdhar	Dalli	Jakhi75a	11.33
	Khashdhar	Khashdhar	Diswani	Diswani 80a	61.51
2032-33	Rohru	Rohru	Bhagi	Dabri 83b(ii)	93.07
	Rohru	Rohru	Bhagi	Gawas 82b	37.23
	Rohru	Rohru	Rantari	Rantari 55 a	49.94
	Rohru	Rohru	Rantari	Rantari 55 b	39.69
	Rohru	Rohru	Kutara	Dalgaon 52 a	6.47
2033-34	Rohru	Summerkot	Kui	Dunga dobal 39	29.14
	Rohru	Summerkot	Kui	Koti 36 A	9.71
	Rohru	Summerkot	Kui	Koti 36 b	5.26
	Rohru	Summerkot	Kui	Kui 37 (b)	43.3
2034-35	Rohru	Summerkot	Graima	Graima 43 a (i)	41
	Rohru	Summerkot	Graima	Graima 43 a (ii)	46.01
	Rohru	Summerkot	Graima	Jaunli 44	33.59
	Rohru	Summerkot	Machoti	Khonola 49 b	36.02

2035-36	Tikkar	Tikkar	Tikkar	Dhanoti 5 (b) (I)	35.39
	Tikkar	Tikkar	Tikkar	Dhanoti 5 (b) (ii)	76.3
	Tikkar	Tikkar	Tikkar	Tikar 6(b) (ii)	36
	Tikkar	Tikkar	Tikkar	Soldu (a) (ii)	47.18
	Tikkar	Tikkar	Tikkar	Tikar 6(b) (i)	38.05
	Tikkar	Tikkar	Tikkar	Soldu (a)(iii)	34
	Tikkar	Tikkar	Tikkar	Kashani 6c	54.63
	Tikkar	Tikkar	sharontha	Narain 8	42.49
	Tikkar	Tikkar	Naksetli	Koti 20b(i)	67.18
	Tikkar	Tikkar	Naksetli	Khalai 24 b	67.99
	Tikkar	Tikkar	kadiwan	Kathari 27 a(i)	62.75
	Tikkar	Tikkar	kadiwan	Kathari 27 a(ii)	38.83
	Saraswati Nagar	Mandal	Kawalta	DPF Kawalta	33.0827
	Saraswati Nagar	Mandal	kawalta	UPF Kawalta	20.7333
	Rohru	Summerkot	Summerkot	Dungsa UF 13	26.3
Felling Series for periodic Block IV					
Year of Felling	Name of Range	Name of Block	Name of Beat	Name of Forest Compartment	Area (in Ha)
	Bashla	Arhal	Arhal	Adhal 32 a (i)	38.63

2026-27	Bashla	Arhal	Arhal	Adhal 32 a (ii)	31.79
	Bashla	Arhal	Arhal	Adhal 32 b (i)	37.65
	Bashla	Arhal	Arhal	Adhal 32 b (ii)	42.67
2027-28	Bashla	Arhal	Arhal	Adhal 32 b (iii)	30.16
	Bashla	Arhal	Arhal	Brasli 33 a	22.58
	Bashla	Arhal	Arhal	Brasli 33 b	59.98
	Bashla	Arhal	Sharog	Brara 35 a	4.86
	Bashla	Arhal	Sharog	Kargad 35 b	17.4
	Bashla	Arhal	Sharog	Sharog 34	35.61
2028-29	Jubbal	Sheel	Mandhol	Kadol 19a	10.93
	Jubbal	Sheel	Mandhol	Mandhol 18a	116.95
	Jubbal	Sheel	Shallan	Ganga Nagar 13a	41.28
	Jubbal	Sheel	Shallan	Ganga Nagar 13b	132.74
2029-30	Jubbal	Sheel	Shallan	Nahal 12	64.75
	Khashdhar	Chirgoan	Sindasali	Gokaswari 66 b	4.05
	Khashdhar	Chirgoan	Sindasali	Khabal 65 a	34.8
	Khashdhar	Chirgaon	chirgoan	DPF Baghi	73.9351
2030-31	Khashdhar	Khashdhar	Dalli	Dhak 77a	25.9
	Khashdhar	Khashdhar	Dalli	Dhak 77b	40.06
	Khashdhar	Khashdhar	Diswani	DPF Kaloti	3.1921
	Khashdhar	Todsa	Todsa	Devidhar	43.3

2031-32	Rohru	Gawas	Bhagi	Baghi 83 c (ii)	46.94
	Rohru	Gawas	Lowerkoti	Parsa 84 a	12.14
	Rohru	Rohru	Dalgoan	Dalgaon 52 b	31.97
	Rohru	Rohru	Gauna	Gauna 53 b (i)	37.13
	Rohru	Rohru	Gauna	Gauna 53 b (ii)	37.74
2032-33	Rohru	Rohru	Gauna	Katmori UF 21 a	42.67
	Rohru	Rohru	Gauna	Katmori UF 21 b	112.33
	Rohru	Rohru	Gauna	Nauna UF 22 a	45.81
	Rohru	Rohru	Gauna	Nauna UF 22 b	69.93
2033-34	Rohru	Summerkot	Graima	Bajain 45 a(ii)	46.13
	Rohru	Summerkot	Graima	Sungri 46 b (ii)	44.51
	Rohru	Summerkot	Kui	Kui 37 (d)	46.94
	Rohru	Summerkot	Machoti	Darshal 50 a	60.75
	Rohru	Summerkot	Machoti	Darshal 50 b	36.78
	Rohru	Summerkot	Summerkot	Kateri 47 d (i)	30.35
	Rohru	Summerkot	Summerkot	Kateri 47 d (ii)	60.3
	Saraswati Nagar	Chhajpur	Chhajpur	Jond 3 b	24.28
	Saraswati Nagar	Mandal	Jhalta	Jakhi 3a	411.57

2034-35	Tikkar	Tikkar	Naksetli	Khalai 24 a	57.06
	Tikkar	Tikkar	Naksetli	Koti 20b(ii)	28.73
2035-36	Tikkar	Tikkar	Sharontha	Karchari 9a(i)	83.63
	Tikkar	Tikkar	Sharontha	Karchari 9a(ii)	78.6
	Tikkar	Tikkar	Sharontha	karchari 9b(i)	50.2
	Tikkar	Tikkar	Sharontha	karchari 9b(ii)	40.45

Table 2.16: Felling Series in Deodar Kail working Circle

2.6.10 Method of executing felling:

2.6.10.1 Methods of executing felling in PB I: The main object of this Periodic Block is to establish regeneration after carrying out seeding felling. The kind and marking of trees is depending upon the stage of regeneration which can be different at different places. The following principles and sequences are laid down for marking officer:

i. **Salvage Removal:** All dead, diseased and dried trees will be marked and handed over to right holders under Timber Distribution Rules or to HP Forest Corporation as Salvage Lot.

ii. **Removal of Mature Trees:** All mature trees above harvestable diameter of 40 centimeters for both Deodar and Kail standing above regeneration should be marked and before felling, lopping should be done.

iii. **Retention of Mother Trees:** Seed bearers should be distributed evenly and as far as possible be left in the ridges or high elevations so that the seeds can be spread to greater area. It is prescribed to retain mother trees in PBI to function as seed bearers and enable regeneration. The following table summarizes the prescription of mother trees per hectare that is to be retained for the major species in the working circle based on regeneration capacity and potential:

Species	Number of Mother Trees to be retained per Ha
Deodar	45
Kail	30
Spruce	35
Fir	60
other	30

Table 2.17: Mother trees to be retained per Ha

iv. **Steep Terrain Prescription:** On steep and broken ground with an incline of more than 65 degree, it is prescribed to avoid marking considering soil erosion and landslip possibility.

v. **Riverine and Streamside Prescription:** Trees present within 50 m (either side) of streams, riverbeds, nallahs and sites prone to soil erosion will not be marked.

vi. **Retention of Young Crop as Advance Growth:** It is prescribed to retain 80% of compact poles of class IV and class V trees of all species in the block accounting for retention against advanced growth with proper thinning wherever required.

vii. **Prescription for Marking and Deviations:** The marking for any year should be done for all compartments ear marked for that year. It is unlikely that marking will coincide with exact yield prescribed. Excess or deficit upto 20% marked should be carried forward and added to or deducted from the yield of following year without causing deviation from the prescriptions of the plans. Any deviations in excess of this figure will require sanction.

2.6.10.2 Methods of executing felling in PB Unallotted:

Only dead, dried, diseased and uprooted trees will be marked and felled as salvage removal against right holder requirements for timber distribution or as salvage lot towards forest corporation. All removals in this regard shall account for against the yield. Wherever ordinary thinning is required to open canopy site

specific thinning and ordinary grade thinning may be executed. Thinning and improvement fellings are prescribed in this PB in the interest of growing stock health, vitality and productivity.

2.6.10.3 Methods of executing felling in PB IV: The following silvicultural prescriptions shall guide final felling in PB IV:

i. **Salvage Removal:** All dead, diseased and dried trees will be marked and handed over to right holders under Timber Distribution Rules or to HP Forest Corporation as Salvage Lot.

ii. **Removal of Mature Trees:** All class I and class II trees except for those near boundaries of private cultivation, adjacent to riverine or stream areas, mother trees standing over regenerated young crop in steep terrain vulnerable to soil erosion shall be marked and removed against yield. It is assumed that 60% of such trees shall be available for removal after accounting for these considerations.

iii. **Retention of Mother Trees:** The mother trees standing above regenerated crop and where regeneration is deficient is to be retained.

iv. **Steep Terrain Prescription:** On steep and broken ground with an incline of more than 65 degree, it is prescribed to avoid marking considering soil erosion and landslip possibility.

v. **Riverine and Streamside Prescription:** Trees present within 50 m (either side) of streams, riverbeds, nallahs and sites prone to soil erosion will not be marked.

vi. **Ordinary Thinning** is prescribed to be carried out in young crop from class III and below wherever they are found compact and dense in nature.

vii. **Prescription for Marking and Deviations:** The marking for any year should be done for all compartments ear marked for that year. It is unlikely that marking will coincide with exact yield prescribed. Excess or deficit upto 20% marked should be carried forward and added to or deducted from the yield of following year without causing deviation from the prescriptions of the plans. Any deviations in excess of this figure will require sanction.

2.6.11 Subsidiary Silvicultural Operations:

i. Cleaning of young crop along with weeding is prescribed in PB I areas after seeding felling annually to encourage regeneration

- ii. Non commercial ordinary thinning is prescribed in PB I and PB IV areas with a few to promote growth and increase increment rate.
- iii. Climbers will also be removed wherever necessary and wherever the growth rate of trees is affected.
- iv. Slash should be disposed off immediately after the felling is over in order to provide clean bed for the seeds. Slash could also be burning fuel for spreading forest fire. The slash may therefore be controlled burn at a place of it can be spread in nallah areas.
- v. Weeding and Bush cutting in PB I areas after seeding felling is prescribed.
- vi. Lopping of broad leaved trees which interfere with the young crop in PB I areas is prescribed
- vii. Tending and pruning of young crop up to 50% height of the established pole crop is prescribed to increase increment and growth in PB IV areas.

2.6.12 Regeneration:

The current status of regeneration appears to be deficient in certain forest compartments while favourable in few compartments. The following prescriptions are made with respect to regeneration in this working circle:

- i. **Closure and ANR in PB-I areas:** The PB-I areas operated after felling shall be closed for grazing and wherever possible brought under ANR
- ii. **Artificial Regeneration:** AR shall be done through plantation under gap planting schemes wherever natural or induced regeneration is deficient
- iii. **Data Collection through Sample Plots:** Regeneration plots shall be laid and data be collected through these plots every year to evaluate regeneration in each compartment
- iv. **Weeding and Tending** to enhance growth of regenerated seedlings

2.6.13 Associated Regulations and Measures: The major prescription in this regard is with regard to protection of the forest patches in this circle from forest fire and grazing which are the two main risks for regeneration and sustained yield:

2.16.13.1 Forest Fire Protection: The treated areas will be protected from Forest fires. The dried leave litters and bushes will be controlled burnt before fire season to reduce fire hazard. Control burning is prescribed wherever possible especially in areas put under AR/ ANR to limit fire incidents and prevent loss of seedlings. Fire leaf blowers shall be utilized to fight fires wherever possible. The management of dry horticultural waste is crucial to preventing fire incidents in this working circle.

2.16.13.2 Protection from grazing and lopping: Grazing and lopping will not be allowed in PB I areas where crop is not established. The ANR/ AR regeneration areas shall be fenced with stone or live hedge fencings. In wild life prone or domestic cattle menace areas, fencing with interlacing is prescribed. Social fencing is also advisable wherein local people will be involved in fencing. Watchers may also be engaged on the recommendation of the committees. Removal of NTFPs from such areas may be allowed after establishment of the areas which will be regulated by the committee members.

Chapter-3

Fir-Spruce Working Circle

3.1 Name of Working Circle: Fir-Spruce Working Circle

3.2 General Constitution of Working Circle: This working circle covers an area of 39135.126 Ha Fir and Spruce as a mixed or pure crops in Rohru Forest division. The forests are distributed on gentle to precipitous slopes in the Himalayan belt. The density of forests varies from 0.4 to 0.9. In some patches, spruce and fir are found distributed as pure crops where their proportion is more than 50%. The working circle is constituted for the protection of the hills and to provide timber as both the species are commercially important timber species. Salvage felling is also done under timber distribution right for the right holders in the division. Felling is not done on high altitudes fragile and sloppy areas, river side and nallahs areas for protection of lands. Felling is also restricted in compartments where there are young crops and required ANR operations. The distribution of this Working circle is shown in the map (Figure 3.1).

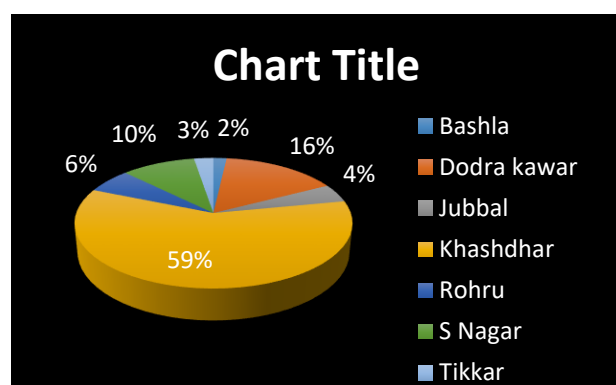


Figure 3.1 Range wise Area distribution

Name of Range	RF	DPF	UPF	Total
Bashla		189.39	496.14	685.53
Dodra Kavar		3802.6922	2209.09	6011.7822
Jubbal		1747.69	0	1747.69
Khashdhar		12775.845	10690.254	23466.099
Rohru		1639.9683	724.92	2364.8883
Saraswati Nagar	138.8	3715.56	0	3854.34
Tikkar		112.2262	892.57	1004.7962
	138.8	23983.372	15012.974	39135.126

3.3 General Characteristics of the Vegetation: The vegetation of this working circle falls under type Group 12 (Himalayan Moist Temperate Forest) and sub type 12/Cid of the forest types classification by *Champion and Seth, 1968*. The crops consisted mixture of spruce and fir. Kail and deodar are also found at lower altitude in some tension belts. The higher elevation supports high level fir (*Abies webiana*) mixed with silver fir (*Abies pindrow*). The natural regeneration of fir is found deficient. The broad leaved species mixed are *Quercus semecarpifolia*, *Aesculus indica*, *Rhododendron campanulatum*, *Carpinus viminia* etc.

Underground flora consisted of *Berberis spp.*, *Rubus ellipticus*, *Sarcococasaligna*, *Prinsepia utilis* etc.

3.4 Felling Series, Cutting Sections and JFM areas: There will be only one felling series:

i. Rohru Felling Series comprised of Rohru Forest Division.

3.5 Blocks, Compartments and JFM area: The following table (table 3.2) gives information on blocks and compartments and their area under the working circle. However, some new compartments are also carved out for effective and efficient forest management (table 3.3). Area statement, Range and felling series are as under:

Reserved Forests					
Sr. No.	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	2	3	4	5	6
1	S Nagar	Chhajpur	Chhajpur	Chhachhpur 14 a(i)	69
2	S Nagar	Chhajpur	Chhajpur	Chhachhpur 14 a(ii)	69.78
Demarcated Protected Forests (DPF)					
Sr. No.	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	2	3	4	5	6
1	Bashla	Khadralla	khadralla	Bijashal 28 b	38.04
2	Bashla	Khadralla	khadralla	Khadralla 29 a (ii)	37.65
3	Bashla	Khadralla	khadralla	Khadralla 29 a (I)	68.52
4	Bashla	Khadralla	khadralla	Knadralla 29 a (iii)	45.18
5	Dodra Kavar	Kavar	Dodra	Batari gad 69 f (i)	220.15
6	Dodra Kavar	Kavar	Dodra	Batari gad 69 f (ii)	504.24
7	Dodra Kavar	Jakha	Jakha	Dhudu 69d	182.93
8	Jubbal	Jubbal	Shilli	Giri 2c	60.7
9	Jubbal	Jubbal	Snabha	Giri 4a	83.36
10	Jubbal	Jubbal	Snabha	Giri 5a	121
11	Jubbal	Jubbal	Snabha	Giri 5b	155.4
12	Jubbal	Jubbal	Snabha	Giri 5c	222.98
13	Jubbal	Jubbal	Snabha	Giri 5d	167.84
14	Jubbal	Jubbal	Badhal	GiriI 1c	120.59
15	Jubbal	Jubbal	Muril	Muril 3	97.12
16	Jubbal	Jubbal	Muril	Muril 4 a (i)	58.97

17	Jubbal	Jubbal	Muril	Muril 4 a (ii)	60
18	Jubbal	Jubbal	Muril	Muril 4 b (i)	54
19	Jubbal	Jubbal	Muril	Muril 4 b (ii)	54
20	Jubbal	Jubbal	Muril	Muril 4 b (iv)	54.5
21	Jubbal	Jubbal	Muril	Muril 4 c	263.85
22	Jubbal	Jubbal	Muril	Muril4 b (iii)	54
23	Jubbal	Sheel	sheel	Tumbru 14a	119.38
24	Khashdhar	Khashdhar	Diswani	Diswani 80 b (ii)	55.33
25	Khashdhar	Khashdhar	Diswani	Diswani 80b(i)	41
26	Khashdhar	Larot	Larot	Kandi 70 d (i)	38.14
27	Khashdhar	Larot	Larot	Kandi 70 d (ii)	44.16
28	Khashdhar	Larot	Kharshali	Munga Jaki 70 b (i)	22.8
29	Khashdhar	Larot	Kharshali	Munga Jaki 70 b (ii)	55.96
30	Khashdhar	Larot	Kharshali	Munga Jaki 70 b (ii)	44.67
31	Khashdhar	Larot	Kharshali	Naluk 71 a	44.19
32	Khashdhar	Larot	Kharshali	Naluk 71 b	76
33	Khashdhar	Khashdhar	Dalli	Shaldhar 76	95.91
34	Khashdhar	Todsa	Jalwari	Shiroli 54 b (i)	55.09
35	Khashdhar	Todsa	Jalwari	Shiroli 54 b (ii)	60.24
36	Khashdhar	Todsa	Jalwari	Shiroli 54 b (ii)	25.1
37	Khashdhar	Larot	Kharshali	Topi Nigasan 70 a	204.77
38	Khashdhar	Larot	Larot	Urassa 70 c	117.36
39	Rohru	Rohru	Gauna	Bhamburai 54 a	269.92
40	Rohru	Rohru	Kutara	Chattri 51 b	79.72
41	Rohru	Gawas	Lowerkoti	Chipari 84 c (ii)	52.2
42	Rohru	Gawas	Bhagi	Dabri 83b(i)	25.09
43	Rohru	Summerkot	Summerkot	Nasari 48 b (i)	30
44	Rohru	Summerkot	Summerkot	Nasari 48 b (ii)	40
45	Rohru	Summerkot	Summerkot	Nasari 48 b (iii)	70
46	Rohru	Summerkot	Summerkot	Nasari 48 b (iv)	47.37
47	Rohru	Summerkot	Summerkot	Satigad 48 a (i)	60
48	Rohru	Summerkot	Summerkot	Satigad 48 a (ii)	46.03
49	S Nagar	Chhajpur	Kelwi	Baghain 1	95.5
50	S Nagar	Chhajpur	Kelwi	Baghain 2a	169.97
51	S Nagar	Chhajpur	Kelwi	Baghain 2b	135.97
52	S Nagar	Chhajpur	Chhajpur	Chhajpur -13 a	40.47
53	S Nagar	Chhajpur	Chhajpur	Chhajpur -13 b	128.69
54	S Nagar	Chhajpur	Chhajpur	Chhajpur -17 a (ii)	68.37
55	S Nagar	Chhajpur	Chhajpur	Chhajpur -17 b (i)	40

56	S Nagar	Chhajpur	Chhajpur	Chhajpur -17 b (ii)	39.72
57	S Nagar	Chhajpur	Chhajpur	Chhajpur -17a (i)	15
58	S Nagar	Chhajpur	Chhajpur	Chhajpur -18 a	56.5
59	S Nagar	Chhajpur	Chhajpur	Chhajpur -18 b	56
60	S Nagar	Chhajpur	Chhajpur	Chhajpur -19 a	36.99
61	S Nagar	Chhajpur	Chhajpur	Chhajpur -19 b	56.07
62	S Nagar	Chhajpur	Chhajpur	Chhajpur -19 c	63.55
63	S Nagar	Chhajpur	Ravingarh	Chhajpur -2 b	69.2
64	S Nagar	Chhajpur	Ravingarh	Chhajpur -3	171.59
65	S Nagar	Mandal	Kawalta	Dhedar 1	461.35
66	S Nagar	Mandal	Kawalta	Dhedar 2	388.5
67	S Nagar	Mandal	Kawalta	Dhedar 3	574.65
68	S Nagar	Mandal	Kawalta	Dhedar 4 a (i)	505.86
69	S Nagar	Mandal	Kawalta	Dhedar 4 a (ii)	
70	S Nagar	Mandal	Kawalta	Dhedar 4 c	
71	S Nagar	Mandal	Kawalta	Dhedar 4d	
72	S Nagar	Mandal	Kawalta	Dhedar 4e	
73	S Nagar	Mandal	Kawalta	Dhedar 4f	
74	S Nagar	Mandal	Kawalta	Dhedar 4g	
75	S Nagar	Mandal	Kawalta	Dhedar4 b	
76	S Nagar	Mandal	Dhansar	Jakhi 4c	101.33
77	S Nagar	Chhajpur	Kelwi	Jond 2 b	42.08
78	S Nagar	Chhajpur	Kelwi	Jond 4	29.94
79	S Nagar	Chhajpur	Kelwi	Jond 5 a	119.38
80	S Nagar	Chhajpur	Kelwi	Jond 5 b	248.88
Un Demarcated Protected Forests					
Sr. No.	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	2	3	4	5	6
1	Bashla	Khadrala	Khangteri	Basuni UF 8	382.83
2	Bashla	Bashla	Malkhun	Pani Khich UF9	113.31
3	Dodra Kawar	Kawar	Kawar	Dogra	246.05
4	Dodra Kawar	Jakha	Manjivan	Badgii gad	484.8
5	Dodra Kawar	Kawar	kawar	Haridwar	68.59
6	Dodra Kawar	Kawar	Dodra	Bagru thach	914.38
7	Dodra Kawar	Kawar	Kawar	Kawar-ll	454.87
8	Dodra Kawar	Kawar	Kawar	Rohal panoo	40.4
9	Khashadar	Khashadar	Telga	Bedar	240.79

10	Khashadar	Khashadar	Dalli	Nimgad	253.74
11	Khashadar	Khashadar	Dalli	Rikharn a (ii)	41.14
12	Khashadar	Khashadar	Dalli	Rikharn a (iil)	34.87
13	Khashadar	Khashadar	Dalli	Rikharn a (iv)	21.07
14	Khashadar	Larot	Larot	Basolgad	312.82
15	Khashadar	Larot	Thalathar	Sirad gad	227.84
16	Khashadar	Larot	Thalathar	Jaitia Bagto thath	61.5
17	Khashadar	Khashadhar	Telga	Telga	93.89
18	Khashadar	Khashadhar	Khashadhar	UF Jakhi (a)	37.12
19	Khashadar	Khashadhar	Khashadhar	UF Jakhi (b)	65.26
20	Khashadar	Khashadhar	Dalli	Badal mund dhar	134.76
21	Khashadar	Khashadhar	Diswani	Dalu-jungle	226.62
22	Khashadar	Khashadar	Dalli	Dalli	176.2888
23	Khashadar	Larot	Thalathar	Larot	369.3182
24	Khashdhar	Todsa	Jalwari	Riot UF 24	150.14
25	Khashdhar	Todsa	Todsa	Todsa UF 27	437.47
26	Khashdhar	Chirgoan	Chirgoan	Giari UF 33	140.83
27	Khashdhar	Chirgoan	Tangnu	Janglic UF 38	134.76
28	Khashdhar	Larot	Thalathar	Bhuta Thach UF 41	16.19
29	Khashdhar	Larot	Thalathar	Tisur UF43	73.65
30	Khashdhar	Khashadar	Telga	Harasa UF 46	83.37
31	Khashdhar	Khashadar	Dalli	Jharag UF 52	99.75
32	Khashdhar	Khashadar	khashdhar	Dhal UF 51	30.7407
33	Khashdhar	Chirgoan	chirgoan	Rohal	107.2
34	Khashdhar	Todsa	Banoti	Bhupra thach	115.94
35	Khashdhar	Chirgoan	Chirgaon	Daulatir	82.96
36	Khashdhar	Chirgoan	Jhaknoti	Katargad	1217.91
37	Khashdhar	Chirgoan	Chirgoan	Pauri	1316.05
38	Khashdhar	Chirgoan	Chirgoan	Jabal	372.97
39	Khashdhar	Chirgoan	Jakhnoti	Punjali-1	63.54
40	Khashdhar	Chirgoan	Tangnu	Bara thach	2310.37
41	Khashdhar	Larot	Thalathar	Shabigad-I	18.21
42	Khashdhar	Larot	Thalathar	Shabigad-II	45
43	Khashdhar	Khashadar	khashdhar	Dhal UF 51	30.7407
44	Khashdhar	Chirgoan	Duidi	UF Diudi	97.142
45	Khashdhar	Chirgoan	Chirgoan	Dauljan	102.7188
46	Khashdhar	Chirgoan	Chirgoan	Jhanjhwani	280.0846
47	Khashdhar	Chirgoan	Jhaknoti	Chuhagad	408.8901
48	Khashdhar	Chirgoan	chirgoan	Dangoli	656.6
49	Rohru	Summerkot	Summerkot	Khanortu UF 14	48.56

50	Rohru	Gawas	Gawas	Wani Thach UF 54 a	43.4
51	Rohru	Gawas	Gawas	Wani Thach UF 54 b	47.28
52	Rohru	Gawas	Gawas	Wani Thach UF 54 c	41.65
53	Rohru	Summerkot	Graima	Shadi thach	69.2
54	Rohru	Summerkot	Graima	Labadi	223.39
55	Rohru	Gawas	Lowerkoti	Baghi	211.04
56	Rohru	Gawas	Gawas	Thapti	40.4
57	Tikkar	Tikkar	Kadiwan	Jarla UF4	47.75
58	Tikkar	Tikkar	Kadiwan	Tanju UF 6	61.92
59	Tikkar	Tikkar	Kadiwan	Jamoch thach	48.6
60	Tikkar	Tikkar	Tikkar	Harshal tiba	734.3

Table 3.2: Forest Compartment allotted to Fir Spruce Working Circle

Newly added Demarcated Protected Forests

Sr No.	Range	Block	Beat	Forest	Area (in Ha)
1	Dodra Kawar	Kawar	Dodra	DPF ButariGad	198.5836
2	Dodra Kawar	Jakha	Jakha	DPF Dodu	391.2268
3	Dodra Kawar	Kawar	Dodra	DPF Dodwaltigad	222.883
4	Dodra Kawar	Jakha	Jakha	DPF Jakha	41.516
5	Dodra Kawar	Jakha	Manjivan	DPF Jawan gad	507.8456
6	Dodra Kawar	Kawar	Dodra	DPF Kaivaltu	194.3116
7	Dodra Kawar	Kawar	Dodra	DPF Kalapani	212.5506
8	Dodra Kawar	Jakha	Manjivan	DPF Kalyan Thach	21.5942
9	Dodra Kawar	Jakha	Manjivan	DPF Manjhiwan	541.9602
10	Dodra Kawar	Jakha	Manjivan	DPF Moti Dhar	20.6754
11	Dodra Kawar	Jakha	Pandhar	DPF Pandar	251.6738
12	Dodra Kawar	Jakha	Jakha	DPF Pava	122.6508
13	Dodra Kawar	Jakha	Jakha	DPF Tangan Khai	167.9006
14	Khashadar	Larot	Thalathar	DPF Belimel Dhar	604.299

15	Khashadar	Khashadar	Dalli	DPF Dalli	32.1212
16	Khashadar	Chirgoan	Tangnu	DPF Diyar Thach	2121.7876
17	Khashadar	Larot	Thalathar	DPF Janglikh	1599.79
18	Khashadar	Larot	Thalathar	DPF Karkot Tibba	552.2722
19	Khashadar	Larot	Thalathar	DPF Kashauli Dhar	182.2424
20	Khashadar	Larot	Thalathar	DPF KatalGar	539.21
21	Khashadar	Larot	Thalathar	DPF Ladot-I	119.0693
22	Khashadar	Larot	Thalathar	DPF Ladot-II	45.8025
23	Khashadar	Larot	Thalathar	DPF Maila	19.3383
24	Khashadar	Larot	Thalathar	DPF Pokhar	63.8842
25	Khashadar	Larot	Thalathar	DPF Pokhtu Thach	527.5845
26	Khashdhar	Larot	Thalathar	DPF Chhragli	15.4631
27	Khashdhar	Chirgoan	Jhaknoti	DPF Chuhagad	482.0299
28	Khashdhar	Chirgoan	chirgoan	DPF Dangoli	1.9659
29	Khashdhar	Khashadar	khashdhar	DPF Dhak	79.7393
30	Khashdhar	Chirgoan	Duidi	DPF Diudi	78.288
31	Khashdhar	Chirgoan	Chirgoan	DPF Doljan	28.3912
32	Khashdhar	Todsa	Banoti	DPF Dumreda	708.2163
33	Khashdhar	Chirgoan	Jhaknoti	DPF Ghat Dhar	273.2465
34	Khashdhar	Chirgoan	Jakhnoti	DPF Ghorikoti	546.8318
35	Khashdhar	Chirgoan	Jhaknoti	DPF Goskwari	285.1943
36	Khashdhar	Chirgoan	Chirgoan	DPF Jhanjhwani	257.7454
37	Khashdhar	Larot	Kharshali	DPF Lamba Thach	185.345
38	Khashdhar	Chirgaon	Chirgaon	DPF Maghyari	325.3116
39	Khashdhar	Todsa	Banoti	DPF Mathla	336.0374
40	Khashdhar	Larot	Kharshali	DPF Nalti Thach	1369.9937
41	Khashdhar	Larot	Thalathar	DPF Nirgani Gad	44.4288
42	Khashdhar	Khashdhar	Dalli	DPF Rikhran	36.5585
43	Khashdhar	Larot	Thalathar	DPF Sharali	31.3635
44	Khashdhar	Chirgaon	Jhaknoti	DPF Sundha Bhaunra	36.1059
45	Khashdhar	Chirgoan	Duidi	DPF Tangnu	44.102
46	Khashdhar	Khashadar	Telga	DPF Telga	15.4917
47	Khashdhar	Larot	Thalathar	DPF Varshil	163.8682
48	Khashdhar	Larot	Thalathar	DPF Velimel	42.0062
49	Rohru	Gawas	Gawas	DPF Gawas	919.6383
50	Tikkar	Tikkar	Farog	DPF Soldu gar	112.2262

Table 3.2: Newly notified Forest Compartment allotted to Fir Spruce Working Circle

3.6 Special Objectives of Management: The special objectives of management are

- (i) To improve productivity of spruce and fir forests for the protection and improvement of ecological condition of the higher hills in the interest of protection of soil, perennial supply water and environment.
- (ii) To obtain optimum sustainable yield of timber for the people.
- (iii) To regenerate these forests naturally, by nursing the existing regeneration
- (iv) To involve Van Societies/EDCs in carrying out various activities for biodiversity conservation and provide equitable share of cut back forest produce to village communities to fulfill the broader objectives of productivity, equity, and sustainability for the general good of the people.

3.6.1 Analysis of crop:

3.6.1.1 Crop Composition: Crop of this WC mainly consisted of Spruce and Fir pre-dominated crops. In some patches both the crops are mixed or found pure. Their proportion is more than 50% in the WC. At lower elevations, both the species are mixed with Deodar and Kail. Other broadleaved like Kharsu oaks, burans, poplars, akhrot, badam, paja, parang, khanoor, Kosh etc. are mixed with fir and spruce. The shrub species found distributed are berberis, Seski, chindwa, masuri, reuns, kaula, ghuktai, bhekal etc. Many high valuable herb species which are being utilized in medicines are also grown in this WC. Himalayan bamboo (ringaal) is also found along nallah and banks of streams.

3.6.1.2 Diameter class wise distribution of trees in numbers

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Rai	198285	292209	399178	420050	459185	409614	258292	117405	57398	65225	2676842.618
Tosh	164368	245247	404396	540065	412223	333953	172195	104360	91315	60007	2528129.14
Kail	130450	133059	161759	148713	91315	36526	15654	2609	2609	5218	727913.3436
Deodar	10436	33917	23481	13045	15654	5218	2609	0	0	0	104360.336
Thuna	49571	70443	49571	20872	7827	5218	2609	5218	0	0	211329.6804
Kharshu	148713	250465	146104	65225	26090	10436	7827	0	0	0	654861.1084
Other BIs	78270	138277	148713	182631	83488	54789	54789	10436	2609	13045	767048
Total	936634	1440173	1630630	1755863	1262760	965333	623553	260901	159150	169586	7670485

Table 3.4: Diameter class wise distribution of trees in numbers

3.6.1.3 Stock Maps: The new stock maps on 1:15840 scales have been made after reconnaissance, field observations. As per new National Working Plan Code, 2014, these maps include the area under spruce and fir and other forests within the compartments or sub-compartments. It also includes the area covered by miscellaneous species, blanks and un-workable.

3.6.1.4 Quality Classes: The average site quality of the trees vary from I/II to IV with the standard quality being I/II.

3.6.1.5 Density: The assessment has been made on ocular basis and the same has been incorporated in the compartment history files. The density of forest varies from 0.3 to 0.7 and average density is 0.5.

3.6.1.6 Age Classes:

i. The crops of this WC is categorized into the converted and un-converted crop. Even the converted areas contain young crop of various age classes started from very young to middle aged and mature trees with diameter sometimes above 30 cm. Higher age classes is present due to retention of healthy and vigorously growing saplings and poles upto 30 cm in diameter at the same time of regeneration felling. In addition, some older trees were left to safeguard against failure of regeneration. The converted areas also contain some younger suppressed stock.

ii. The unconverted areas contain all age classes however the mature and over mature stems of 50-100 cm dbh account for more than 60% of entire crops.

iii. All age classes are mixed together and it is difficult to assess the proportion of different age classes by area. However, on the basis of enumeration data the n-D distribution of the spruce and fir trees were plotted as below.

It can be noted that these forests largely follow normal distribution as bell shaped curve with significant number of mature and over mature trees.

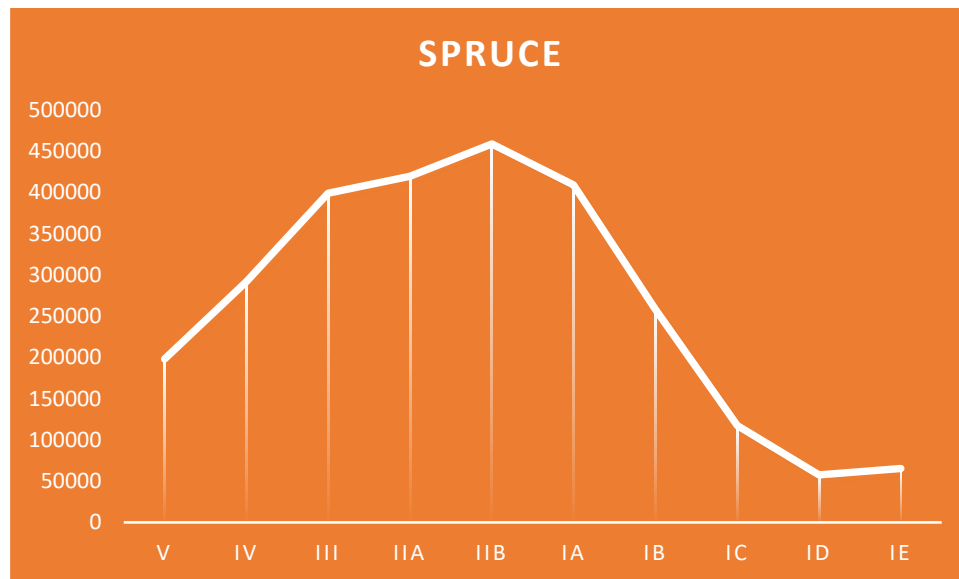


Figure 3.2 a: n-D curve for Rai in FIR Spruce WC

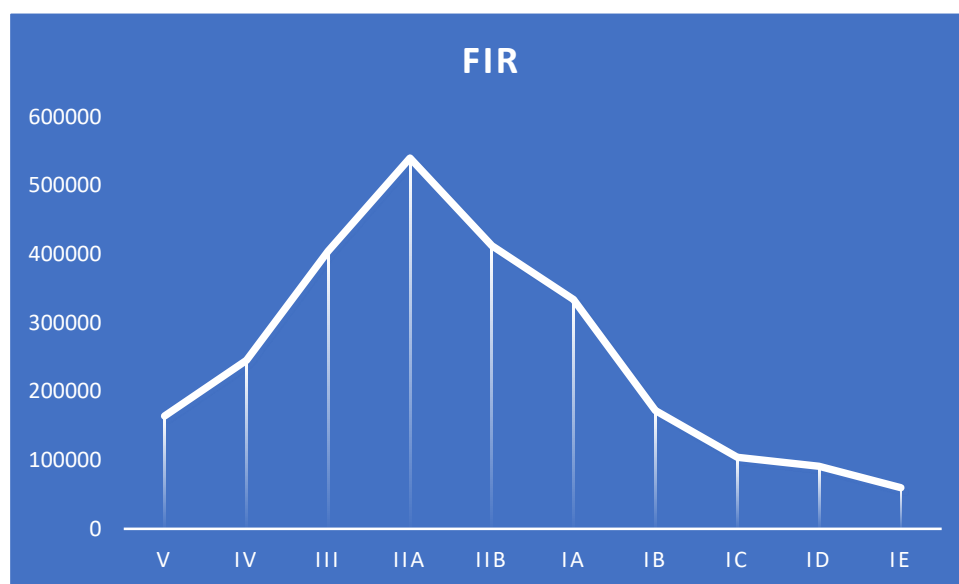


Figure 3.2 b : n-D curve for Tosh in FIR Spruce WC

3.6.2 Silvicultural Systems

According to previous plan of Srivastava, Indian Irregular Shelterwood System was applied in these forests wherein the compartments with advance growth and saplings are retained; the canopies are opened irregularly by felling of mature and over mature trees under Periodic Block (PB) system. Selection of PBI was based on advance regeneration in the groups and all other forest was allotted to PB un-allotted. The crop is very irregular, mature and over mature trees is distributed in entire working circle. Therefore, PB I area will be in groups

of advance regeneration for opening of canopy whereas Selection system will be applied in the PB un-allotted area. Periodic block systems will not be successful on higher elevation where protection of hills will be main objective.

The felling in compartments will be restricted keeping in view of the followings:

1. Over felled or poorly stocked secondary forests in need of supplementary natural regeneration and through enrichment planting.
2. Degraded natural forest ecosystems in protected areas to be used for watershed management, wildlife conservation, ecotourism or community development.
3. No felling will be carried out in riparian zones along streams, rivers and other water bodies to preserve riparian zones.
4. No felling on the slopes at risk of soil erosion and landslides.
5. Areas close to habitation and villages those are suitable for producing forest products.

3.6.2.1 Ecological Restoration of Degraded sites

About 20% area of this working circle is under sloppy and steep areas which require to be treated for protection of soil erosion and landslides. This will be done for the first three years. This will include-

A. Preventive Measures

B. Remedial Measures

A. Preventive Measures: The first priority should be to adopt preventive measures because soil erosion is such that once it occurs, it can only be restored partially, that too, with a very heavy investment.

- Steep slopes and the areas besides rivers, nalah, habitation areas, near natural water resources should have permanent green covers by planting of native grass, shrub and tree species and no such felling should be allowed in such areas. In habitation and areas close to village, the species should be planted as required by the local people.
- Immediate treatment should be done in eroded areas.
- The areas should be protected from grazing, felling and forest fires.

- Local people should be convinced to adopt such land use practices which are beneficial for their lands in the long term and which simultaneously can provide economic benefits to them.

B Remedial Measures: Remedial measures are adopted when the areas are devoid of vegetation due to heavy felling and where soil erosion is being done or had taken place. For such areas, there are two types of measures that can be applied.

- **Vegetative measures:** Vegetative measures should be applied where the intensity of removal is less and soil erosion is also less. The areas should be closed for grazing and fast growing species of native shrubs and grasses should be planted. Once the area is established due to succession, pioneer tree species and bamboos should be planted. After sometimes when the areas get established, people may be allowed to cut grasses, but no grazing is allowed. The areas must be protected from fire. *Alnus*, *Salix* plantation will be done throughout the forest area, especially in nalah, stream banks or eroded areas and areas having vegetative cover of density more than 0.4 by planting 625 seedlings/clumps per hectare at 6 m x 6 m spacing in 45 cm x 45 cm x 45 cm pits. The planted area shall be strictly protected against grazing, breaking of young shoots and fire. The plantation of native species will cover degradation of forests and improve ecosystem services.

The plantations of various schemes were undertaken from the years 2011-13 to 2019-20 in the division. The schemes were CAMPA, JICA, FDA (NAP), Finance, Plan and others. Plantations can be undertaken under these schemes in this working circle also.

- **Mechanical measures:** The mechanical measures will be followed in eroded slopes of hills of Rohru Forest Division. These measures can be undertaken in convergence of watershed development programme of the division. The following bio-engineering structures will be made to restore the eroded areas.

1. Contour Trenches: Contour trenches are constructed across the slopes of the hills along the contours when the degree of slope is not very high. These trenches are either continuous or staggered. The staggered trenches are constructed when the slope is high and continuous trenches are constructed when slope is less. The excavated soil from the trenches is placed towards slope for checking of soil moisture. The plantation of

native species can be undertaken in the trenches by direct seeding or planting entire plant.

2. Check dams: In high sloppy areas, nalah or gullies are formed due to landslides. A series of check dams are helpful to check erosion of soil from the nalah and gullies. The check dams also conserve moisture for development of vegetation in the gully beds. Construction of check dams from top to bottom transform the longitudinal gradient into a series of steps with low risers. Different types of check dams are given below:

- **Brushwood Check dam:** Brush wood check dam is recommended in areas where easy spouting tree species are available and where intensity of erosion is not very high and flow of water is not very rapid. The species for check dams are *Vitex negundo*, Poplars, *Salix spp.* etc. The check dams are constructed by planting cuttings of the species across the slope. These are constructed in small gullies. They may be single or double rows.
- **Stony check dams:** This type of check dam is made of stones only. It should be used in the top portion of the channel where there is less flow and the speed of flow is also less. Gradient of section should not be high. It is temporary in nature and can be used along vegetative measures.

Gabion check dams: A gabion is a rectangular shape cage made of galvanized wire which is fitted with locally available boulders, rocks or stones. The gabion may be conveyed flat and are folded to shape at the construction site. If the expected speed of flow is very high, gabions are recommended in place of dry check dam. The structure is flexible and may even change shape automatically according to the stream bed.

3.6.3 Rotation Period and Harvestable Diameter: The rotation is fixed at 150 years.

3.6.4 Harvestable Diameter: The harvestable diameter is 60 cm which is suitable for timber production. Rotation period is dependent on quality of sites also.

3.6.5 Reducing factor and reduced areas: Area is not reduced in this working circle.

3.6.6 Felling Cycle: Felling cycle is proposed to the equivalent to plan period i.e. 10 years has been fixed. The working plan officer/DFO will seek permission of felling in compartments from CCF (WP) prior to felling keeping in view of

annual yield, crop structure and advance regeneration. The mature and over mature trees will be felled keeping in view of advance growth.

3.6.7 Division into periods and allotment to periodic blocks: The rotation is fixed at 150 years and regeneration period is 30 years. There should be 5 periodic blocks corresponding to regeneration period. But only PB I has been allotted this working circle which is allotted in groups/patches considering regeneration and advance growth and rest all forest is not allotted for working and treated as PB –unallotted. The crop is very irregular, the age classes are difficult to find out areas for periodic blocks and in some compartments there are mature and over mature crops which require to be removed silviculturally. It has been observed that young crop cannot be established if canopy is not manipulated. Hence, in accordance with crop composition and preponderance of mature and over mature trees, the forest will be worked under PB I and PB –un-allotted.

3.6.8 Calculation of yield: The yield is prescribed from the PB I only considering the opening of ban on green felling above 1000 m in Himalaya. However, timber will be removed as salvage felling under TD right holders from PB un-allotted. The calculation of yield has been made separately for each felling series.

3.6.8.1 Yield from PB I: All the area 17512.2663 ha. Of PB I under WC enumerated down to 10 cm dbh. The abstract is given in the following table 3.7.

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Rai	88729	130758	178625	187965	205477	183295	115581	52537	25685	29187	1197839.015
Vol (m³)	8872.88	41842.64	125037.58	296984.69	620541.32	1008122.80	843740.99	491219.07	280476.46	318723.25	4035561.67
Tosh	73552	109744	180960	241669	184463	149438	77054	46699	40862	26852	1131292.403
Vol (m³)	5148.61	32923.06	130291.26	386670.84	525718.23	735234.99	562493.99	476333.64	525076.12	345050.02	3724940.77
Kail	58374	59542	72384	66547	40862	16345	7005	1167	1167	2335	325728.1532
Vol (m³)	4086.20	20839.60	50668.82	106474.58	98885.93	59331.56	35725.02	7763.77	11382.97	22765.95	417924.40
Deodar	4670	15177	10507	5837	7005	2335	1167	0	0	0	46699.3768
Vol (m³)	466.99	4553.19	6304.42	7588.65	14710.30	8545.99	6421.16	0.00	0.00	0.00	48590.70
Total	225324	315221	442477	502018	437807	351413	200807	100404	67714	58374	2701559
Vol (m³)	18575	100158	312302	797719	1259856	1811235	1448381	975316	816936	686539	8227017.54

Table 3.7: Growing stock of PBI Fir Spruce WC

Calculation of annual yield:

(Total growing stock down to 10 cm dbh)- (Vol. not available for felling due to difficult terrain i.e. 20% of total GS)+ (70% Vol. of 10-20 and 20-30 cm diameter classes in case of deodar, spruce and fir and 10-20 cm diameter in case of kail to be retained as advance growth)

Annual yield_____

Regeneration period (30)

i. Total Growing Stock of : 8227017.54 m³

ii. Vol. of mother trees not available for felling (40 trees /ha & average vol. of 4 m³ of fir/spruce tree).

$$= 40 \times 4 \times 17512.2663 = 2801962.61 \text{ m}^3$$

iii. Vol. not available for felling due to difficult terrain (20%) of total vol.

$$= 0.2 \times \text{Total Yield}$$

$$= 0.2 \times 8227017.54 = 1645403.507 \text{ m}^3$$

iv. 70% of future yield (trees in class IV and V)

$$= 0.7 \times 118733.17 = 83113.21 \text{ m}^3$$

v. Annual yield= As per above formula

$$= \frac{8227017.54 - [2801962.61 + 1645403.507 + 83113.21]}{30}$$

30

$$= \frac{3696538.20}{30} = 123217.94 \text{ or say } \mathbf{123000 \text{ m}^3}$$

30

vi. Species wise yield: (Total annual yield * proportion of species in forests)

Species	Volume	Proportion	Proportionate Yield	Prescribed Yield
Rai	4035561.67	49.05%	60334.6332	60000
Tosh	3724940.77	45.28%	55690.6209	55000
Kail	417924.4	5.08%	6248.27903	6200

Deodar	48590.7	0.59%	726.466921	700
Total	8227017.54	100.00%	123000	121900

Table 3.8: Prescribed Species Wise Yield Calculation Table

3.6.8.2 Prescribed Yield: The yield prescribed for Rohru felling series is given in table below:

Species	Yield (m3)
Rai	60000
Tosh	55000
Kail	6200
Deodar	700
Total	121900

Table 3.9: Prescribed species wise yield for PBI area in Fir Spruce WC

3.6.8.3 Yield Prescribed: Total yield of (PB I) **121900 m³**

3.6.9 Table of felling: The following table is prepared for annual felling to be carried out in beats, compartments of forest ranges.

Felling Series for PB I Area

Sr No.	Felling Year	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	2025-26	Khashdhar	Todsa	Banoti	Bhupra thach	115.94
		Khashdhar	Todsa	Banoti	DPF Dumreda	708.2163
		Khashdhar	Todsa	Banoti	DPF Mathla	336.0374
		Rohru	Gawas	Bhagi	Dabri 83b(i)	25.09
		Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -13 a	40.47
		Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -13 b	128.69
		Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -18 a	56.5

2	2026-27	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -18 b	56
		Saraswati Nagar	Chhajpur	Chhajpur	Chhachhpur 14 a(i)	69
		Saraswati Nagar	Chhajpur	Chhajpur	Chhachhpur 14 a(ii)	69.78
		Khashdhar	Chirgoan	Chirgoan	Dauljan	102.7188
		Khashdhar	chirgoan	Chirgoan	DPF Jhanjhwani	257.7454
		Khashdhar	Chirgoan	Chirgoan	Giari UF 33	140.83
		Khashdhar	chirgoan	Chirgoan	Jabal	372.97
		Khashdhar	chirgoan	Chirgoan	Pauri	1316.05
		Khashdhar	Chirgoan	chirgoan	Rohal	107.2
		Khashadar	Khashadar	Dalli	DPF Dalli	32.1212
		Khashadar	Khashadar	Dalli	Nimgad	253.74
		Khashadar	Khashadar	Dalli	Rikharn a (ii)	41.14
		Khashadar	Khashadar	Dalli	Rikharn a (iil)	34.87
		Khashadar	Khashadar	Dalli	Rikharn a (iv)	21.07
		Khashadar	Khashadhar	Dalli	Badal mund dhar	134.76
3	2028-29	Khashadar	Khashadhar	Dalli	Juna Pabar	951.83
		Khashdhar	Khashdhar	Dalli	DPF Rikhran	36.5585
		Saraswati Nagar	Mandal	Dhansar	Jakhi 4c	101.33
		Khashdhar	Khashdhar	Diswani	Diswani 80 b (ii)	55.33
		Khashdhar	Khashdhar	Diswani	Diswani 80b(i)	41
		Dodra Kavar	Kavar	Dodra	Batari gad 69 f (ii)	504.24
		Dodra Kavar	Kavar	Dodra	DPF Dodwaltigad	222.883
		Tikkar	Tikkar	Farog	DPF Soldu gar	112.2262
		Rohru	Gawas	Gawas	DPF Gawas	919.6383

		Rohru	Gawas	Gawas	Wani Thach UF 54 a	43.4
		Rohru	Gawas	Gawas	Wani Thach UF 54 b	47.28
		Rohru	Gawas	Gawas	Wani Thach UF 54 c	41.65
4	2027-28	Dodra Kawar	Jakha	Jakha	Dhudu 69d	182.93
		Dodra Kawar	Jakha	Jakha	DPF Tangan Khai	167.9006
		Khashdhar	chirgoan	Jhaknoti	Chuhagad	408.8901
		Khashdhar	chirgoan	Jhaknoti	DPF Chuhagad	482.0299
		Khashdhar	chirgoan	Jhaknoti	DPF Ghat Dhar	273.2465
		Khashdhar	chirgoan	Jhaknoti	Katargad	1217.91
		Saraswati Nagar	Mandal	kawalta	Dhedar 2	388.5
		Saraswati Nagar	Mandal	kawalta	Dhedar 4 a (i)	505.86
		Saraswati Nagar	Mandal	kawalta	Dhedar 4 a (ii)	
5	2029-30	Saraswati Nagar	Mandal	kawalta	Dhedar 4 c	
		Saraswati Nagar	Mandal	kawalta	Dhedar 4d	
		Saraswati Nagar	Mandal	kawalta	Dhedar 4e	
		Saraswati Nagar	Mandal	kawalta	Dhedar 4f	
		Saraswati Nagar	Mandal	kawalta	Dhedar 4g	
		Saraswati Nagar	Mandal	kawalta	Dhedar4 b	
		Dodra Kawar	Kawar	Kawar	Dogra	246.05
		Dodra Kawar	Kawar	kawar	Haridwar	68.59
6	2030-31	Dodra Kawar	Kawar	Kawar	Kawar-ll	454.87
		Dodra Kawar	Kawar	Kawar	Rohal panoo	40.4

		Saraswati Nagar	Chhajpur	Kelwi	Baghain 1	95.5
		Saraswati Nagar	Chhajpur	Kelwi	Baghain 2a	169.97
		Saraswati Nagar	Chhajpur	Kelwi	Baghain 2b	135.97
		Saraswati Nagar	Chhajpur	Kelwi	Jond 2 b	42.08
		Saraswati Nagar	Chhajpur	Kelwi	Jond 4	29.94
		Saraswati Nagar	Chhajpur	Kelwi	Jond 5 a	119.38
		Saraswati Nagar	Chhajpur	Kelwi	Jond 5 b	248.88
7	2031-32	Bashla	Khadrala	khangteri	Basuni UF 8	382.83
		Khashdhar	Larot	Kharshali	Munga Jaki 70 b (i)	22.8
		Khashdhar	Larot	Kharshali	Munga Jaki 70 b (ii)	55.96
		Khashdhar	Larot	Kharshali	Munga Jaki 70 b (ii)	44.67
		Khashdhar	Larot	Kharshali	Naluk 71 a	44.19
		Khashdhar	Larot	Kharshali	Naluk 71 b	76
		Khashadar	Khashadhar	Khashadhar	UF Jakhi (a)	37.12
		Khashadar	Khashadhar	Khashadhar	UF Jakhi (b)	65.26
		Khashdhar	Khashadar	khashdhar	Dhal UF 51	30.7407
		Khashdhar	Khashadar	khashdhar	DPF Dhak	79.7393
8	2032-33	Rohru	Rohru	Kutara	Chattri 51 b	79.72
		Dodra Kawar	Jakha	Manjivan	DPF Kalyan Thach	21.5942
		Dodra Kawar	Jakha	Manjivan	DPF Moti Dhar	20.6754
		Jubbal	Jubbal	Muril	Muril 3	97.12
		Jubbal	Jubbal	Muril	Muril 4 a (i)	58.97
		Jubbal	Jubbal	Muril	Muril 4 a (ii)	60
		Jubbal	Jubbal	Muril	Muril 4 b (i)	54

9	2033-34	Jubbal	Jubbal	Muril	Muril 4 b (ii)	54
		Jubbal	Jubbal	Muril	Muril 4 b (iv)	54.5
		Jubbal	Jubbal	Muril	Muril 4 c	263.85
		Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -2 b	69.2
		Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -3	171.59
		Jubbal	Jubbal	Shilli	Giri 2c	60.7
		Jubbal	Jubbal	Snabha	Giri 5a	121
		Jubbal	Jubbal	Snabha	Giri 5b	155.4
		Jubbal	Jubbal	Snabha	Giri 5c	222.98
		Jubbal	Jubbal	Snabha	Giri 5d	167.84
10	2034-35	Khashdhar	Chirgoan	Tangnu	Janglic UF 38	134.76
		Khashdhar	Khashadar	Telga	DPF Telga	15.4917
		Khashdhar	Khashadar	Telga	Harasa UF 46	83.37
		Khashadar	Larot	Thalathar	Larot	488.3875
		Khashdhar	Larot	Thalathar	Belimel	45.4038
		Khashdhar	Larot	Thalathar	DPF Varshil	163.8682
		Khashdhar	Larot	Thalathar	DPF Velimel	42.0062

Table 3.10: Table for felling in PBI area of Fir Spruce WC

3.6.10 Method of executing felling:

3.6.10.1 Method of executing felling in PB I: The marking of trees is done by the ACF and inspected randomly by DCF. The felling will be carried out as per following laid down principles:

- i. In selection mother trees, vigorous, healthy and tall trees are retained in preference to over mature trees.
- ii. The mother trees should be distributed uniformly allover the area. The mother trees preferably are fir/spruce but if not available, broadleaved trees

can be selected. Number of mother trees retained for spruce should be 30-35 per ha and for fir, 40-45 trees per ha should be retained.

iii. Marking should be done keeping in view of advance growth in groups.

iv. Felling will not be carried out on 20 m either sides banks of rivers, streams and nallahs. Felling is also restricted on high slopes and soil erosion prone areas.

v. Broadleaved trees shall not be marked considering ecological and soil moisture conservation aspects.

vi. Natural regeneration required cleaning and thinning. DFO will inspect the regeneration compartments seek permission of thinning and improvement felling.

3.6.10.2 Method of executive felling in Un-allotted PB:

i. Improvement felling will be carried out in entire un-allotted PB.

ii. Thinning if required in compartments will be done as and when required.

ii. Over mature, dried, diseased and wolf trees will be removed from the area.

3.6.11 Subsidiary Silvicultural Operations:

i. Removal of damaged and wolf trees.

ii. All regeneration felling areas will be treated under ANR operations. Fencing, protection from the fire and control of grazing will be ensured.

iii. Thinning is carried out in young crops.

iv. Climbers will also be removed wherever necessary.

v. Slash should be disposed off immediately after the felling is over in order to provide clean bed for the seeds. Slash could also be burning fuel for spreading forest fire. The slash may therefore be controlled burn at a place of it can be spread in nallah areas.

vi. If there is no natural regeneration obtained after felling in some patches, the regeneration is supplemented by artificial means.

3.6.12 Regeneration: Natural regeneration is the best way of obtaining growing stock through seedling origin. Though the status of natural regeneration in the

areas is poor or absent, if protected and tended properly after felling, it will become a good future growing stock in the least possible time. In some patches of the forest, the area is devoid of regeneration of timber species, covered extensively with scrubs only. In those areas, artificial regeneration with indigenous species will only be optioned. The regeneration area should be fenced to stop grazing. Regeneration is also protected from forest fires in such a way that fire lines are made around compartments which should be cleared from the fuel/ control burn during fire season. The invasive species which intervene in establishment of regeneration should be removed.

3.6.13 Associated Regulations and Measures

3.6.13.1 Forest Fire Protection: The treated areas will be protected from Forest fires. The dried leave litters and bushes will be controlled burnt before fire season to reduce fire hazard. All types of preparations for forest fire management will be completed before fire season. Effective fire protection shall be ensured during the fire season- February to June by involving the members of JFM Committees.

3.6.13.2 Protection from grazing and lopping: Grazing and lopping will not be allowed in regeneration areas. The regeneration areas shall be fenced with stone or live hedge fencings. In wild life prone or domestic cattle menace areas, trench fencing will be created. Social fencing is also advisable wherein local people will be involved in fencing. Watchers may also be engaged on the recommendation of the committees. Removal of NTFPs from such areas may be allowed after establishment of the areas which will be regulated by the committee members.

Chapter-4

Chil Working Circle

4.1 Name of Working Circle: Chil Working Circle.

4.2 General Constitution of Working Circle: This working circle covers an area of 3745.887 ha consisted of pure chil in Rohru Forest division. The forests are distributed on gentle to precipitous slopes maximum in the Saraswati Range from the elevation of 700 m to 1200 mand few in Rohru and Bashla Forest Range. The density of forests varies from 0.4 to 0.9. In patches at higher elevation, it is mixed with Ban oak which is largely the only associate species. Pure crop of chil is having proportion of more than 80%. The working circle is constituted for the protection of the hills and to provide timber for the right holders. The distribution of this Working circle is shown in the table below for the 3 forest ranges in the tract:

Range	RF	DPF	UPF	Total
Bashla		32.59		32.59
Rohru			60.6	60.6
Saraswati Nagar	63.13	1729.4187	1860.146	3652.697
Total	63.13	1762.0087	1920.746	3745.887

Table 4.1: Area Distribution (in Ha) of Chil working circle

4.3 General Characteristics of the Vegetation: The vegetation of this working circle falls under type Group 9 (Himalayan sub-tropical pine Forest) and sub type 9/CIbof the forest type's classification by *Champion and Seth, 1968*. The crop is heavily dominated by Chil Pine with 88% of the working circle composition. Apart from Chil, only Ban Oak is found in significant proportion in the working circle with 8% of working circle composition being made up of it. It shows that the vegetative composition in this working circle is largely of pure Chil crop with isolated mixed crop in few compartments. The crop is middle aged and ground cover is very thin due to grazing. The natural regeneration of chil is found deficient. The broadleaved species mixed are *Quercus leucotrichophora*,

Rhododendron arboreum, *Carpinus viminia* etc. Underground flora consisted of *Berberis spp.*, *Rubus ellipticus*, *Sarcococa saligna*, *Prinsepia utilis* etc.

4.4 Felling Series, Cutting Sections and JFM areas: There will be one felling series:

Rohru Felling Series comprised of Rohru Forest Division

4.5 Blocks, Compartments and JFM area: The following table (table 4.2) gives information on blocks and compartments and their area under the working circle. The allotment of compartments to this working circle has many new compartments compared to the allotment made out in previous working plan of Ajay Srivastava. However, there are new forest compartments which are allotted in this working circle owing to the newly notified Demarcated Protected Forests in the tract. The list of such newly added DPFs which are added to this working circle is given in table 4.3. Apart from this, few compartments which was earlier part of PCR working circle and Plantation working circle has been now allotted to this working circle considering overlapping nature of these working circles in this plan. The total area allotted under working circle is Area statement and Range are as under:

Reserve Forests					
Range		Beat	S No.	Compartment	Area (in Ha)
Saraswati Nagar		Kuddu	1	Batar	63.13
Demarcated Protected Forests					
Bashla	Bashla	Bashla	1	Jhaltu 31 a (vi)	32.59
Saraswati Nagar	Chhajpur	Sawra	2	Naliban	99.15
	Kuddu	Kuddu	3	Kudu	85.38
		Pandranu	4	Kashta 2	55.84
			5	Sainj	125.5
			6	Saran a	44.63
			7	Saran b	44
			8	Shashan 11	63.13
			9	Shashan 12	109.3
			Shashan	10	Salantu
		11		Shashan 1	144.9
		12		Shashan 2	99.96
		13		Shashan 5 a (i)	40.3
		14		Shashan 5 a (ii)	51.16

			15	Shashan 5 b	31.57
			16	Shashan 7 a	35.21
			17	Shashan 7 b (ii)	31.17
			18	Shashan 7 b(i)	32.37
			19	Shashan 9 a	47.53
			20	Shashan 9 b	38.26
	Mandal	Dhansar	21	Chaunri-Ser (i)	153.4
			22	Chaunri-Ser (ii)	122.2
Un Demarcated Protected Forests					
Range	Block	Beat	Sr No	compartment	Area (in Ha)
Rohru	Gawas	Lowerkoti	1	Goripith	60.6
S Nagar	Mandal	Dhanser	2	Dhanser part-II	33.59
		Dhanser	3	Chaunri	135.6
		Mandal	4	Jherashali	170
	Chhajpur	Chhajpur	5	Sansog	163.9
	Kuddu	Kuddu	6	Dhadi	345.2
			7	Salna	376.4
			8	Mungra	62.32
			9	Kudu	28.94
		Shashan	10	Saskir	396.6
		Pandranu	11	Sainj	147.7

Table 4.2 : Forest compartment allotted to Chil working Circle

Newly Notified Demarcated Protected Forests					
Range	Block	Beat	Sr No.	Compartment	Area (in Ha)
Saraswati Nagar	Chhajpur	Chhajpur	1	DPF Dharmana	40.4001
	Mandal	Jhalta	2	DPF Kharshal	153.0269
	Kuddu	kuddu	3	DPF Kudu	28.1217

Table 4.3: Newly notified DPFs allotted to Chil working Circle

4.6 Special Objectives of Management: The special objectives of management are

(i) To improve productivity of chil forests for the protection and improvement of ecological condition of the hills in the interest of protection of soil, forest fire protection, perennial supply of water and environment.

(iii) To obtain optimum and sustained yield of timber and resin.

(iv) To regenerate these forests naturally, by nursing the existing regeneration wherever necessary.

(v) To involve Van Societies/EDCs in carrying out various activities for biodiversity conservation, forest fire protection and provide equitable share of cut back forest produce to village communities to fulfill the broader objectives of productivity, equity, and sustainability for the general good of the people.

(vi) To encourage the local people to use pine needles in various alternative uses for protection of forest fires.

4.6.1. Analysis of crop:

4.6.1.1 Crop Composition: As already illustrated above, the working circle has largely pure Chil crop characteristic interspersed with isolated mixed crop of Ban Oak. The numbers and composition of other species are far too less to mention and take note of. The IVI detail of tree species in working circle is given in the following table:

Species	Nos	Relative Density	Relative Frequency	Dominance	Relative Abundance	IVI
Ban	19	8.962264151	11.111111	1.9109255	7.57933345	27.65271
Chil	181	85.37735849	66.66667	22.748044	90.22591974	242.2699
Chuli	3	1.41509434	7.407407	0.101422	0.402271652	9.224773
Kagish	2	0.943396226	3.703704	0.101422	0.402271652	5.049372
Kail	3	1.41509434	3.703704	0.198762	0.788352803	5.907151
Loji	3	1.41509434	3.703704	0.1263065	0.50097143	5.619769
Kainth	1	0.471698113	3.703704	0.025434	0.100879269	4.276281
	212	100	100	25.212316	100	

Table 4.4: Detail of Crop Composition of Chil working Circle

4.6.1.2 Diameter class wise distribution of trees in numbers

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL (in Nos.)
Ban	9858	7886	9858	1972	5915	1972	0	0	0	0	37459
Chil	84775	70975	72946	39430	41402	29573	11829	5915	0	0	356845
Kail	0	1972	3943	0	0	0	0	0	0	0	5915
other bls	11829	3943	1972	0	0	0	0	0	0	0	17744
Total	106462	84775	88718	41402	47316	31544	11829	5915	0	0	417962

Table 4.5: Class wise distribution of trees of Chil working Circle

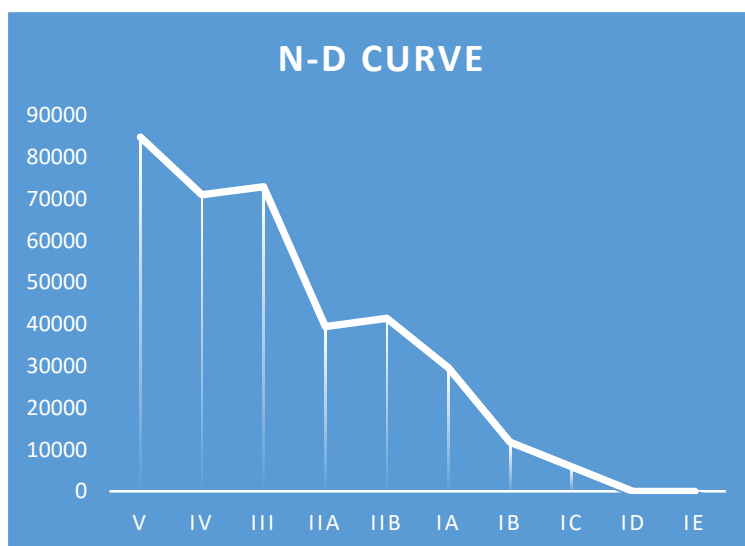


Figure 4.1: n-D curve of Chil

The class wise data of Chil Pine as given in the table above indicates that there is no clear trend of either normality or natural forest with aberration to the inverse J curve noticed at Class III and Class II B. Broadly, one can say that it is leaning more towards natural forest distribution with greater number of young crop and a broad trend of decreasing number of trees with increasing diameter.

4.6.1.3 Stock Maps: Stock maps on the scale of 1:15000 has been prepared using modern digital and GIS technologies and are enclosed in Compartment History Files.

4.6.1.4 Range and Mean of Quality Classes: The average site quality of the trees vary from I/II to IV with the standard quality being II.

4.6.1.5 Density: The assessment has been made on ocular basis and the same has been incorporated in the compartment history files. The density of forest varies from 0.3 to 0.6 and average density is 0.5.

4.6.1.6 Age Classes:

The n-D curve of Chil Pine given in Figure 4.1 indicates broadly decreasing number of trees with increasing diameter indicating natural forests. It represents an uneven aged irregular forest with all age classes distributed across the working circle with increasing number of young trees and decreasing number of mature ones. The age classes however show an aberration in Class II B and Class III.

4.6.1.7 Selection of Sample Units and Type of Enumeration: The technique of survey and assessment of forest resources using sample plots and quadrat method of data collection as prescribed in the National Working Plan Code 2014 in which Sample plots of 0.1 Ha area are laid out on selected grids were followed. A total of 20 sample plots were laid in this working circle covering all Periodic Blocks the detail of which is given in table below:

Sr.No.	Periodic Block	No. of Sample Plots in the periodic Block
1	PBI	8
2	PBIV	5
3	PBU	7
Total		19 Sample Plots

Table 4.6: Detail of Sample plots in PBs of Chil working Circle

4.6.1.8 Assessment of NTFP bearing Species: Due to the allelopathic effect of Pine Needles, NTFP bearing species are less in this working circle except for pine needles and pine cones.

4.6.1.9 Status of Regeneration: The regeneration of principal species in this working circle appears to be deficient. The data regarding same is given below:

Sr. No.	Total No. of Seedlings and Saplings recorded in Sample Plot	Category	Sample Plot Counts
1	0 – 5	Poor	15
2	6 – 10	Fair	3
3	11 – 20	Good	2

Table 4.7: Detail of Reegeration status of Chil working Circle

4.6.2 Silvicultural System:

The previous working plan of Ajay Srivastava prescribed Indian Irregular Shelterwood system with a view to enable regeneration by conserving mother trees and at the same time providing sustained yield.

It is prescribed to continue with the Indian Irregular Shelterwood System in order to open up the canopy and enable regeneration so that young crop is established and sustainable yield of timber is obtained. In order to achieve this, it is proposed to have class wise periodic blocks where felling to remove overwood and mature trees and to encourage regeneration shall be carried out. The following areas shall be exempted from felling:

- Degraded natural forest ecosystems in protected areas to be used for watershed management, wildlife conservation, ecotourism or community development.
- No felling will be carried out in riparian zones along streams, rivers and other water bodies to preserve riparian zones.
- No felling on the slopes at risk of soil erosion and landslides.

4.6.3. Rotation Period: The rotation period is fixed at 100 years which was the same in the case of previous working plan also.

4.6.4 Harvestable Diameter: The Harvestable diameter is fixed at 50 cm for Chil Pine in this working circle.

4.6.5 Reducing Factor and Reduced Areas: Area is not reduced in this working circle.

4.6.6 Felling Cycle: Felling cycle is kept at 25 years considering regeneration period of 25 years.

4.6.7 Division into periods and allotment to periodic blocks: The rotation is fixed at 100 years and regeneration period is 25 years for class I trees. The entire forest area should be divided into 4 periodic blocks corresponding to regeneration period. However, considering the middle aged stock in several compartments, PB II and PB III are merged into PB (unallotted). Accordingly, 3 periodic blocks shall be there for this working circle with the comparatively mature stocked compartments put into PB I and compartments having greater percentage of young crop put into PB IV. The area of 4 periodic blocks is shown in table 3.4.

The forest compartments which were earlier put into PB I during the last period is again allotted to PB I considering non working and non removal of timber due to ban on green felling. Few compartments put into PB II are now shifted to PB I owing to stock putting on increment and having larger presence of mature stock. The forest compartments having young crop is put into PB IV and all other compartments are merged into PB (unallotted). Some of the forest compartments earlier put into PCR working circle and Plantation Working Circle are allotted to this working circle considering overlapping or partly overlapping nature of these working circles in this plan. Some of these compartments have been notified as Demarcated Protected Forests and accordingly the names of newly notified DPFs earlier which were UFs are also occurring in respective periodic blocks. The area statement showing the total area allotted in each periodic block is given in the following table:

Area allotted to PBs	PB I	PB II	PB III	PB Unallotted	PB IV	Total Area
Ajay Srivastava Plan	246.46	296.62	303.11	-	271.14	1117.33
Current Plan	836.1469	-	-	1817.38	1092.36	3745.887

Table 4.8: Detail of Areas in PBs of Chil working Circle

4.6.7.1 PB I: The area allotted to PB I is 836.1469 Ha. Areas having significantly matured and over matured crops have been allotted to this PB. These compartments are having sufficient recruits and considerable pole crops and also regeneration in whippy or sub-whippy stages is generally deficient except for certain pockets in some compartments. All these areas need canopy manipulation through felling as well as intensive silvicultural operations for enhancing the regeneration of Chil Pine and to provide for sustained timber yield.

The non working of forests have left the matured stock in same condition as it existed previously with no removal of over wood causing increased overstocking and reduced regeneration. In this context, it is prescribed to remove matured stock after retaining for advance growth in Class IV and V trees. The compact group of poles of up to 30cm dbh shall be retained accordingly as advance growth in this working circle. Isolated poles shall not be retained. Seedling and secondary felling is prescribed to be undertaken on the rest of the growing stock after retention of seed bearing mother trees which can be chosen by seeing healthy and vigorous boles.

4.6.7.2 PB Unallotted: The crop is generally of middle aged along with some matures are allotted in this PB. The compartments which are allotted previously to PB II and PBIII are allotted to this compartment except for few PB II compartments in previous plan which matured and accordingly shifted to PBI. Only salvage removal in the form of dead, decaying and uprooted trees shall be carried out in these areas during plan period. The total area of this PB is 1817.38 Ha.

4.6.7.3 PB IV: The crop mostly of young age group having predominance of Class IV and Class V trees diameter is allotted to this PB.

The list of all forest compartments allotted to various Periodic Blocks are given below:

Periodic Block I

Sr.No.	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	Saraswati Nagar	Kuddu	Kuddu	Batar	63.13
2		Kuddu	Kuddu	Dhadi	345.2

3			Shashan	Salantu	53.01
4				Shashan 5 b	31.57
5				Shashan 7 a	35.21
6				Shashan 7 b (ii)	31.17
7				Shashan 7 b(i)	32.37
8				Shashan 5 a (i)	40.3
9				Shashan 5 a (ii)	51.16
10		Mandal	Jhalta	DPF Kharshal	153.0269
Areas in Periodic Block Unalloted					
Sl.No	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	Saraswati Nagar	Kuddu	Kuddu	Kuddu	85.38
2				Salna	376.36
3				Mungra	62.32
4			Shashan	Shashan 11	63.13
5				Shashan 9 a	47.53
6				Shashan 9 b	38.26
7				Shashan 12	109.27
8				Shashan 1	144.88
9				Shashan 2	99.96
10		Chhajpur	sawra	Naliban	99.15
11		Mandal	Dhanser	Dhanser part-II	33.59
12			Dhanser	Chaunri	135.57

13			Mandal	Jherashali	169.97
14		Chhajpur	Chhajpur	Sansog	163.9
15			Chhajpur	DPF Dharmana	40.4001
16		Kuddu	Pandranu	Sainj	147.71
Areas in Periodic Block IV					
Sr.No.	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	Saraswati Nagar	Kuddu	Pandranu	saran a	44.63
2				saran b	44
3				sainj	125.45
4				Kashta 2	55.84
5			Kuddu	DPF Kudu	28.1217
6				Kuddu	28.9383
7			Shashan	Saskir	396.59
8		Mandal	Dhansar	Chaunri-Ser (i)	153.38
9				Chaunri-Ser (ii)	122.22
10	Bashla	Bashla	Bashla	Jhaltu 31 a (vi)	32.59
11	Rohru	Gawas	Lowerkoti	Goripith	60.6

Table 4.9: Detail of Forest Compartments allotted in PBs of Chil working Circle

4.6.8 Calculation of Yield: The yield is prescribed from the PB I and PB IV areas only considering the opening of ban on green felling by Honourable Supreme Court. No separate yield is calculated for PB unallotted. However, timber will be removed as salvage felling under TD right holders and towards HP Forest Corporation from PB unallotted. Further, resin tapping will be carried out in PBI and PB unallotted through rill based method if the concerned tree is

above exploitable diameter of 35 cm. The calculation of yield has been made based on the felling series. Past yield obtained from salvage felling will be considered in total yield.

4.6.8.1 Yield from PB I: All the area under allotted PB I of this working circle enumerated down to 10 cm dbh. The abstract is given in the following table 3.5.

Species	V	IV	III	IIA	IIB	IA	IB	IC	TOTAL
Chil	18923	15843	16283	8802	9242	6601	2640	1320	79654
Vol	1135.4	4752.8	13840.43	14082.47	27262.79	29375.1608	15895.59	9901.74	116246.42
Kail	0	440	880	0	0	0	0	0	1320
Vol	0	154.03	616.1082	0	0	0	0	0	770.14
Total	18923	16283	17163	8802	9242	6601	2640	1320	80974
Vol	1135.4	4906.86	14456.54	14082.47	27262.79	29375.16	15895.59	9901.74	117016.56

Table 4.10: Detail of Growing Stock of PBI Chil working Circle

Calculation of annual yield:

(Total growing stock down to 10 cm dbh)-
(Growing stock of mother trees by retaining 40 trees/ha) + (80% Growing Stock of trees up to 20-30 cm diameter classes)+ (Growing Stock (20%) not available due to fragile sites in PB I areas)

Annual yield= _____

Regeneration period (25)

i. Total Growing Stock of Trees in PB I :117016.56 m³

ii. Vol. of mother trees not available for felling (40 trees /ha).

= 836.1469×40×1.5 (Average volume of tree is 1.5 m³)

=50168.81 m³

iii. Vol. not available for felling due to difficult terrain (20%) of total vol.

=0.2 * Total Yield

= 117016.56 × 0.2

$$=23403.3117 \text{ m}^3$$

iv. 80% of future yield (trees in class IV and V)

$$= 6042.26 \times 80\%$$

$$= 4833.809 \text{ m}^3$$

v. Annual yield= As per above formula

$$= \frac{117016.56 - [50168.81 + 23403.3117 + 4833.809]}{25}$$

$$25$$

$$= \frac{38610.62}{25}$$

$$25$$

$$= 1544.42$$

Or Say $1540 \text{ m}^3 = \text{Annual Yield}$

4.6.8.2 Prescribed Yield from PB IV: All the area under allotted PB I of this working circle enumerated down to 10 cm dbh. The abstract is given in the following table 3.6 below:

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Chil	24722	20697	21272	11499	12073	8624	3450	1725	0	0	104062
Vol	1483.31	6209.20	18081.43	18397.64	35616.69	38376.33	20766.34	12935.84	0.00	0.00	151866.79
Kail	0	575	1150	0	0	0	0	0	0	0	1725
Vol	0.00	201.22	804.90	0.00	0.00	0.00	0.00	0.00	0	0	1006.12
Total	24722	21272	22422	11499	12073	8624	3450	1725	0	0	105786
Vol	1483.31	6410.43	18886.33	18397.64	35616.69	38376.33	20766.34	12935.84	0.00	0.00	152872.91

Table 4.11: Detail of Growing Stock in PBIV of Chil working Circle

As final felling is to be executed in this periodic block, there is no need to retain any mature tree above exploitable diameter of 50cm. However, the factors of vulnerability to erosion, steep terrain, stream side and riverine areas, patches of low regeneration are to be taken into consideration as a limiting factor. On these accounts, 70% of available mature stock is taken to be the harvestable yield from this periodic block. On this basis, the yield is calculated as follows:

70% of (Growing stock of trees of Class I/IIB)

$$\begin{aligned}
 \text{Annual yield} &= \frac{\text{70\% of (Growing stock of trees of Class I/IIB)}}{25} \\
 &= \frac{70\% \text{ of } 126092.84}{25} \\
 &= \frac{88264.988}{25} = 3530.59
 \end{aligned}$$

Or Say 3500 m³

Total prescribed annual yield= Yield of PB I+ PB IV = 1500+3500 =5000 m³

4.6.8.1.3 Yield from PB Unallotted

The prescription in this regard is to remove only salvage removals in this periodic block to meet the requirements of right holders and for sale through HP Forest Corporation. The total salvage removal volume for the tract annually taken as an average over last 10 years comes to be 2740.93 m³. The proportionate volume taking the area of periodic block unallotted that is for an area of 1817.38 Ha comes to be 65 m³.

Total Annual Yield from Periodic Block Unallotted = 65 m³

Total Annual Yield = Yield from PB I + PB IV + PB Unallotted = 1500+3500+65
= **5065 m³**

4.6.9 Table of felling: Felling is carried out in PB I and PB IV areas as seeding and final felling. The area of PB I and PB IV prescribed for felling include 836.1469 ha. and 1092.36 spreading over 10 and 11 numbers of forest compartments respectively. The felling is prescribed to take place as per the approval of Honourable Supreme Court in the T.N.Godavarman case and other guidelines laid down by the Supreme Court in this regard.

Felling Series for PB I Areas

Year of Felling	Name of Range	Name of Block	Name of Beat	Name of Forest Compartment	Area (in Ha)
2026-27	Saraswati Nagar	Kuddu	Kuddu	Batar	63.13
2027-28		Kuddu	Kuddu	Dhadi	345.2
2028-29			Shashan	Salantu	53.01
2029-30				Shashan 5 b	31.57
2030-31				Shashan 7 a	35.21
2031-32				Shashan 7 b (ii)	31.17
2032-33				Shashan 7 b(i)	32.37
2033-34				Shashan 5 a (i)	40.3
2034-35				Shashan 5 a (ii)	51.16
2035-36		Mandal	Jhalta	DPF Kharshal	153.0269
Felling series in PB IV Areas					
Year of Felling	Name of Range	Name of Block	Name of Beat	Name of Forest	Area

				Compartment	
2026-27	Rohru	Gawas	Lowerkoti	Goripith	60.6
	Saraswati Nagar	Kuddu	Pandranu	saran a	44.63
2027-28				saran b	44
2028-29				sainj	125.45
2029-30				Kashta 2	55.84
2030-31			kuddu	DPF Kudu	28.1217
2031-32				Kudu	28.9383
2032-33			Shashan	Saskir	396.59
2033-34		Mandal	Dhansar	Chaunri-Ser (i)	153.38
2034-35				Chaunri-Ser (ii)	122.22
2035-36	Bashla	Bashla	Bashla	Jhaltu 31 a (vi)	32.59

Table 4.12: Detail of Felling Series in PB Areas in Chil working Circle

4.6.10 Method of executing felling:

4.6.10.1 Methods of executive felling in PB I: The main object of this Periodic Block is to establish regeneration after carrying out seeding felling. The kind and marking of trees is depending upon the stage of regeneration which can be different at different places resulting in irregular crop. The following principles and sequences are laid down for marking officer:

i. **Salvage Removal:** All dead, diseased and dried trees will be marked and handed over to right holders under Timber Distribution Rules or to HP Forest Corporation as Salvage Lot.

ii. **Removal of Mature Trees:** All mature trees above harvestable diameter of 50 centimeters of Chil Pine standing above regeneration should be marked and before felling, lopping should be done.

iii. **Retention of Mother Trees:** Seed bearers should be distributed evenly and as far as possible be left in the ridges or high elevations so that the seeds can be spread to greater area. The number of mother trees to be retained is calculated taking into account the fact the Chil Working Circle is highly fire prone and regeneration is difficult to obtain in several patches which are repeatedly affected by fire. It is prescribed to retain 40 mother trees/Ha of Chil Pine in PBI to function as seed bearers and enable regeneration.

iv. **Steep Terrain Prescription:** On steep and broken ground with an incline of more than 65 degree, it is prescribed to avoid marking considering soil erosion and landslip possibility.

v. **Riverine and Streamside Prescription:** Trees present within 50 m (either side) of streams, riverbeds, nallahs and sites prone to soil erosion will not be marked.

vi. **Retention of Young Crop as Advance Growth:** It is prescribed to retain 80% of compact poles of class IV and class V trees of all species i.e. up to 30 cm DBH in compact groups in the block accounting for retention against advanced growth with proper thinning wherever required. All other trees which are isolated pole crop or above 30 cm DBH may be removed through seeding or secondary felling and shall account towards the yield.

vii. **Prescription for Marking and Deviations:** The marking for any year should be done for all compartments ear marked for that year. It is unlikely that marking will coincide with exact yield prescribed. Excess or deficit upto 20% marked should be carried forward and added to or deducted from the yield of following year without causing deviation from the prescriptions of the plans. Any deviations in excess of this figure will require sanction.

4.6.10.2 Methods of executing felling in PB Unallotted:

Only dead, dried, diseased and uprooted trees will be marked and felled as salvage removal against right holder requirements for timber distribution or as salvage lot towards forest corporation. All removals in this regard shall account

for against the yield. Wherever ordinary thinning is required to open canopy, site specific thinning and ordinary grade thinning may be executed. Thinning and improvement fellings are prescribed in this PB in the interest of growing stock health, vitality and productivity.

4.6.10.3 Methods of executing felling in PB IV: The following silvicultural prescriptions shall guide final felling in PB IV:

i. Salvage Removal: All dead, diseased and dried trees will be marked and handed over to right holders under Timber Distribution Rules or to HP Forest Corporation as Salvage Lot.

ii. Removal of Mature Trees: All class I and class IIB trees except for those near boundaries of private cultivation, adjacent to riverine or stream areas, mother trees standing over regenerated young crop or in steep terrain vulnerable to soil erosion shall be marked and removed against yield. It is assumed that 70% of such trees shall be available for removal after accounting for these considerations.

iii. Retention of Mother Trees: The mother trees standing above regenerated crop and where regeneration is deficient is to be retained.

iv. Steep Terrain Prescription: On steep and broken ground with an incline of more than 65 degree, it is prescribed to avoid marking considering soil erosion and landslip possibility.

v. Riverine and Streamside Prescription: Trees present within 50 m (either side) of streams, riverbeds, nallahs and sites prone to soil erosion will not be marked.

vi. Ordinary Thinning is prescribed to be carried out in young crop from class III and below wherever they are found compact and dense in nature.

vii. Prescription for Marking and Deviations: The marking for any year should be done for all compartments ear marked for that year. It is unlikely that marking will coincide with exact yield prescribed. Excess or deficit upto 20% marked should be carried forward and added to or deducted from the yield of following year without causing deviation from the prescriptions of the plans. Any deviations in excess of this figure will require sanction.

4.6.11 Subsidiary Silvicultural Operations:

- i. Cleaning of young crop along with weeding is prescribed in PB I areas after seeding felling annually to encourage regeneration
- ii. Non commercial ordinary thinning is prescribed in PB I and PB IV areas with a view to promote growth and increase increment rate.
- iii. Climbers will also be removed wherever necessary and wherever the growth rate of trees is affected.
- iv. Slash should be disposed off immediately after the felling is over in order to provide clean bed for the seeds. Slash could also be burning fuel for spreading forest fire. The slash may therefore be controlled burn at a place of it can be spread in nallah areas.
- v. Weeding and Bush cutting in PB I areas after seeding felling is prescribed.
- vii. Tending and pruning of young crop up to 50% height of the established pole crop is prescribed to increase increment and growth in PB IV areas.

4.6.12 Regeneration:

The current status of regeneration appears to be satisfactory in certain forest compartments while favourable in few compartments. The following prescriptions are made with respect to regeneration in this working circle:

- i. **Closure and ANR in PB-I areas:** The PB-I areas operated after felling where ban oak trees exist shall be closed for grazing and wherever possible brought under ANR considering that pure Chil regenerated seedlings are not palatable, there is no requirement for closure in such PBI areas of pure Chil crop.
- ii. **Weeding and Tending** to enhance growth of regenerated seedlings
- iii. **Annual survey of regeneration** is prescribed in the working circle in all forest compartments by laying regeneration plots.

4.6.13 Associated Regulations and Measures: The major prescription in this regard is with regard to protection of the forest patches in this circle from forest fire which are the two main risks for regeneration and sustained yield.

4.16.13.1 Forest Fire Protection: Chil forests are highly vulnerable to forest fires and repeated fire incidents which are noticed in the tract mainly during winter season where there is prevailing dry period. The highly inflammable pine needles are the major reason for fires in this working circle. Although Chil is highly resistant to fires and does not dry largely due to forest fires, there is a

need to check man made forest fires and limit the ecological retrogression and Chil taking over other forest types. The following measures are prescribed with regard to management of the Chil forest in terms of forest fires:

- i. **No plantation** is prescribed in Chil Working Circle. It is strictly prescribed that no plantation shall be undertaken in this working circle given its fire vulnerability and repeated fire incidents occurring in this working circle except for small patches not more than 2 Ha for propagation fodder trees like Ban Oak/ Rhododendron which shall be repeatedly control burnt and fuel removed.
- ii. **Removal of Inflammable Needles and Alternate Use:** There is a high volume of Chil Pine Needles in the working circle which can be put to alternate use like making of fuel briquette, composite boards, tiles and also used in check dams. It is strongly prescribed to mechanize the removal of needles in fire affected and fire vulnerable forest patches.
- iii. **Maintenance of Fire Lines:** There are numerous roads within the working circle which automatically function as fire lines. All kaccha roads in the working circle shall have their fuel removed and utilized elsewhere or control burnt
- iv. **Procurement and Utilization of Fire Fighting Equipment** especially the fire blower which is an effective instrument to combat forest fires in dry landscapes
- v. **Awareness Generation and Community Participation:** The villages adjoining the area of working circle shall be roped into fire fighting and fire prevention activities by undertaking awareness programs and sessions. The institution of Mahila Mandal and Yuvak Mandals shall be utilized for the same, there shall be a strict protocol on non kindling of fire in private areas adjoining forest land and violators in this regard shall be handed out exemplary fine.
- vi. **Soil Moisture Conservation:** It is prescribed to utilize removed pine needles as check dams in streams within the working circle areas to enable better retention of water and also aid in decreasing fuel load of the forest.

4.6.13.2 Resin Tapping Prescriptions

Along with yield of timber, the working circle shall be worked also for tapping of resin. The protocol of resin tapping in the state as decided by the HP Forest Corporation and the Pricing Committee chaired by Honourable Forest Minister shall be followed. The following are the prescriptions suggested in this regard:

- **PB I and PB Unalloted Areas** shall only be taken up for resin tapping considering that the exploitable diameter for resin tapping in Chil pine is fixed at 35cm during operation of the plan. However, till the time of lifting of ban on green felling in state by Honourable Supreme Court, PB IV areas may also be taken up for resin tapping prior to final felling.
- **Exclusion of Mother Trees:** It is prescribed to exclude seed bearing mother trees considering the need to protect and preserve mother trees for forest propagation.
- **Rill Based Method** is prescribed for extraction of resin considering it stimulates resin generation and also safeguards the heartwood. The number of blazes and the prescribed width and length as mentioned in the forest corporation manual shall be strictly followed as given below:

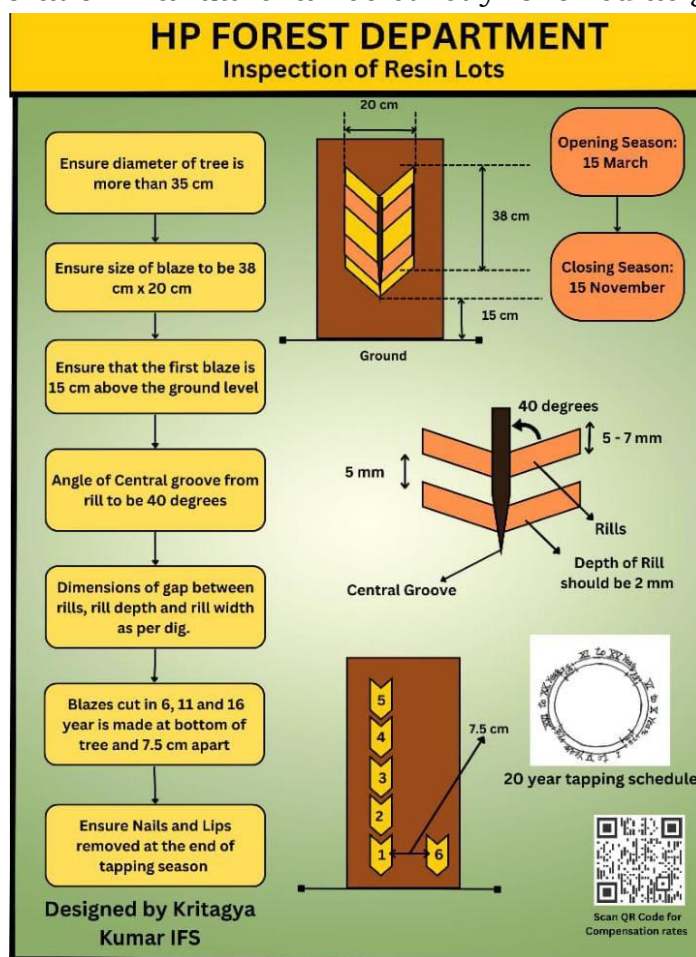


Figure 4.2: Resin Taping Protocol

- **Borehole Method of Extraction** has been piloted by Y S Nauni Forestry University which is found to be least invasive and also opens up and stimulates the resin duct and oleoresin production. This method of extraction shall also be piloted in select compartments and if found feasible replicated for other compartments also.

Chapter-5

High Altitude Broadleaved Working Circle

5.1 Name of Working Circle: High Altitude Broadleaved working circle

5.2 General Constitution of Working Circle: This working circle includes the entire area of important mixed broad-leaved forest situated in the higher elevations of the tract. The broad leaved species in Himalayan forests play important roles of maintenance and improvement of ecosystem services like biodiversity conservation, improvement moisture regime of the soil, perennial supply of water in lower catchment areas, protection of habitats of birds and wild animals, protection of soil erosion on the slopes and fuel wood, timber and fodder requirements of the fringe population. The distribution of this Working circle forest range wise is shown in the table below:

Sr No.	Range	Broad Leave
1	Bashla	0
2	Dodra kawar	4098.505
3	Jubbal	0
4	Khashdhar	2338.273
5	Rohru	0
6	S Nagar	0
7	Tikkar	514.8473
Total	Rohru Division	6951.625

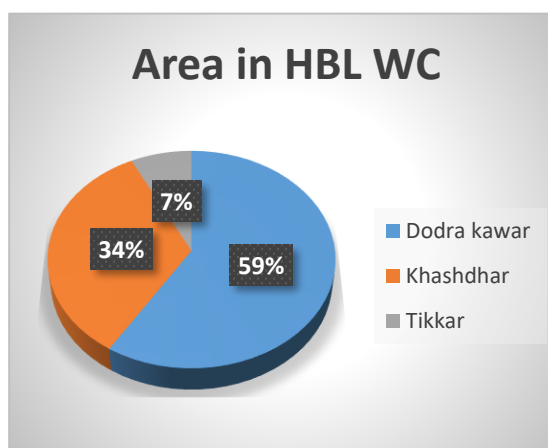


Table 5.1 Area statement in HBL WC

Figure 5.1: Area Chart for HBL WC

5.3 General Characteristics of the Vegetation: The broadleaved species are found as mixed forests generally, whereas Kharshu oaks are found as pure oak forests. Three species of oaks i.e. Ban (*Quercus leucotrichophora*), Moru (*Quercus dilatata* syn. *Q. floribunda*) and Kharsu (*Quercus semecarpifolia*) are distributed at different elevations and types of forests. Kharsu oak is found mixed with fir and spruce forests. This forest is distributed in elevation range from 2400 m to 3000 m. The types of forests are Kharsu Oak (*Quercus semecarpifolia*) (12/C2(a)) and West Himalayan Upper Oak – Fir Forest (12/C2(b)) mixed with fir and spruce. Other broadleaved species are *Acer spp.*, *Betula utilis*, *Prunus cornuta*, *Rhododendron campanulatum*, *Euonymus tigers*, *Ulmus wallichiana*,

Arundinaria spp., *Prinsepia utilis*, *Myrica rubra*, *Ficus spp.* *Juglans regia*, *Pieris ovalifolia*, *Taxus contorta*, *Aesculus indica* etc.

5.4 Felling Series, Cutting Sections and JFM areas: No felling is prescribed in this working circle except for salvage removal considering that the working circle covers high altitude areas having broad leaved vegetation which are not commercially valuable and at the same time are important from ecological, biodiversity and wildlife considerations.

5.5 Blocks, Compartments and JFM area: The following table (table 5.2) gives information on blocks and compartments and their area under the Working circle:

Sr. No.	Range	Block	Beat	COMPARTMENT	AREA (Ha)
1	Dodra Kawar	Jakha	Manjivan	DPF Kandarthach Gad	45.9708
2				DPF Bhujod Dhar	628.1002
3				Silgad	604.2
4			Pandhar	DPF Radki Thui	244.7236
5				DPF Amrich Gad	1236.7558
6		Kawar	Dodra	DPF GajyaniThach	566.5988
7				DPF Kharshuwala	126.7854
8				DPF Moryantu	293.0856
9				DPF KhaituThach	352.285
10	Khashdhar	Chirgoan	Tangnu	DPF Raktu gar	481.1626
11			Sindasli	Kala thach	1822.11
12				Dupa thach	35
13	Tikkar	Tikkar	Farog	DPF Bara	153.0573
14				Chambi UF 3/Umladwar	361.79

Table 5.2: Forest Compartment allotted to HBL WC

The allotment is based on the forest type present in compartments. Previously, these compartments were allotted to the PCR (Working Circle) which has in this plan been made into a protection overlapping working circle. As a result of the same, a separate exclusive working circle for managing high altitude broad leaf vegetation is carved out.

5.6 Special Objectives of Management: The broad objectives of this working circle are,

- i) To protect and preserve oaks and others high-altitude broad-leaved forests for providing ecosystem services in Himalayan areas
- ii) To meet the local demand of people for timber, fodder and fuel
- iii) To improve the stocking of the forests by effective closure and carrying out sowing and planting in vacant places.
- iv) To conserve broad leaved high altitude ecosystem and to monitor biodiversity and wildlife conservation

5.6.1 Analysis of crop:

5.6.1.1 Crop Composition: Crop of this working circle mainly consisted of Kharshu Oak (*Quercus semicarpifolia*), Maple (*Acer spp*), Jamu along with mixture of Spruce. In few forest compartments, Ban Oak is present where the moisture content and soil characteristics are suitable. Similarly, Mohru Oak(*Quercus dilacata*) is also found in this working circle in patches. The comparatively higher elevations nearer to the tree line in certain forest compartments hold the presence of endangered and threatened trees of Bhojpatra (*Betula utilis*) and Rakhal (*Taxus contorta*). Other broadleaved species with oaks are Burans, Akhrot, Parang, Khanor, Kosh etc. The shrub species found distributed are *Berberis spp.*, Seski, Chindwa, Masuri, Reuns, Kaula, Ghuktai, Bhekal etc. The list of species along with IVI values are given in the below table:

Species	Nos	Density	Relative Density	Frequency	Relative Frequency	Dominance	Relative Abundance	IVI
Ban	81	1.76	8.46	0.11	3.70	7.02	4.99	17.14
Bhojpatr	13	0.28	1.36	0.09	2.96	2.22	1.58	5.90
Burash	11	0.24	1.15	0.09	2.96	0.83	0.59	4.70

Deodar	2	0.04	0.21	0.02	0.74	0.55	0.39	1.34
Jamu	87	1.89	9.08	0.26	8.89	8.88	6.31	24.28
Kail	38	0.83	3.97	0.15	5.19	3.98	2.83	11.98
Kainth	2	0.04	0.21	0.02	0.74	0.03	0.02	0.97
Khanor	12	0.26	1.25	0.09	2.96	3.18	2.26	6.47
Kharak	41	0.89	4.28	0.07	2.22	3.28	2.33	8.84
Kharshu	220	4.78	22.96	0.37	12.59	28.98	20.59	56.15
Kunish	6	0.13	0.63	0.07	2.22	1.20	0.85	3.70
Maple	133	2.89	13.88	0.26	8.89	21.96	15.60	38.37
Mohru	13	0.28	1.36	0.07	2.22	0.41	0.29	3.87
Rai	36	0.78	3.76	0.22	7.41	12.28	8.72	19.89
Rakhol	4	0.09	0.42	0.04	1.48	0.60	0.43	2.33
Thuna	89	1.93	9.29	0.09	2.96	7.31	5.19	17.45
Titir	6	0.13	0.63	0.02	0.74	0.52	0.37	1.74
Tosh	112	2.43	11.69	0.43	14.81	27.02	19.20	45.71
Walnut	31	0.67	3.24	0.24	8.15	6.34	4.51	15.89
Willow	4	0.09	0.42	0.02	0.74	0.34	0.24	1.40

Table 5.3: Crop Composition HBL WC

5.6.1.2 Diameter class wise distribution of trees in numbers

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
Ban	22668	24180	21157	12090	9067	3022	3022	0	1511	0	96718
Jamu	10579	33247	40803	21157	9067	7556	0	0	0	0	122409
Maple	48359	19646	25691	45337	22668	16623	9067	9067	4534	0	200993
Kharshu	58938	98229	60449	39292	33247	24180	6045	1511	6045	4534	332469
Total	140544	175302	148100	117875	74050	51382	18135	10579	12090	4534	752589

Table 5.3: Class Wise distribution of Dominant Species in HBL WC

5.6.1.3 Stock Maps: Stock maps on the scale of 1:15000 has been prepared using modern digital and GIS technologies and are enclosed in Compartment History Files.

5.6.1.4 Quality Classes: average site quality of the trees is II to III with the standard quality being II.

5.6.1.5 Density: The assessment has been made on ocular basis and the same has been incorporated in the compartment history files. The density of forest varies from 0.5 to 0.8 and average density is 0.7.

5.6.1.6 Age Classes:

Add n D curve for Kharshu Oak, Maple and Jamu.

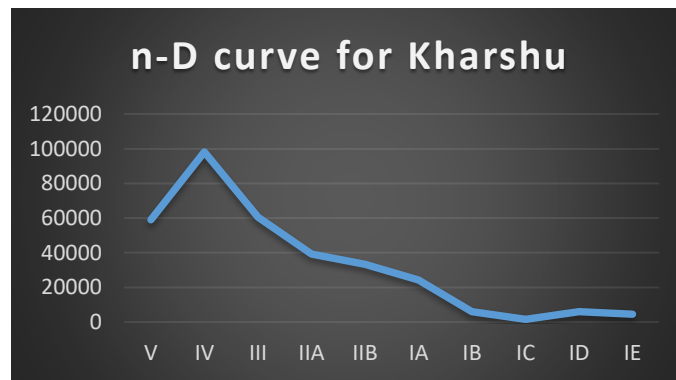


Figure 5.1 : n-D Curve for Kharshu

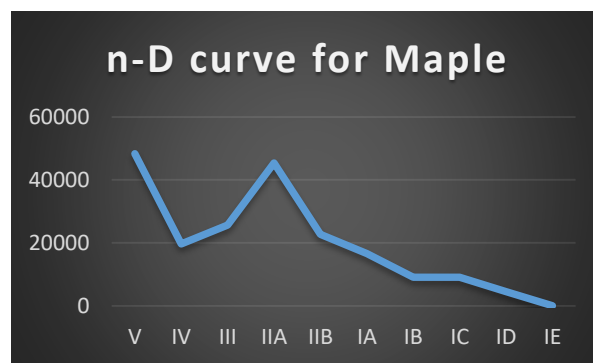


Figure 5.2: n-D Curve for Maple

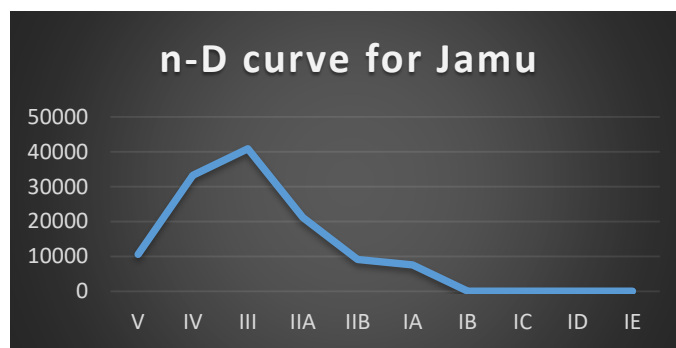


Figure 5.3: n-D Curve for Jamu

The n D curve plotted above shows the disjointed nature of distribution in this working circle. One can note that the common trend in age distribution in this working circle is that there are very few mature or over mature trees across

the species. The young pole crop is present in almost all species which indicates a healthy and vigorous crop for coming years. However, the number of class V trees in certain species like Jamu is lesser indicating deficiency in regeneration.

It would also be expectant that this working circle which has been historically not worked upon would follow an inverse J curve resembling a natural forest. However, the n-D curve of the species indicate peaking in class IV for Kharshu, Class III for Jamu and Class II A for Maple species. Hence, there is no uniform trend being witnessed when it comes to age distribution with regard to the number of trees vis-à-vis the diameter when taken species wise. Apart from this, it can be broadly gathered that the inverse J is largely followed for these species at the farther end of the diameter spectrum with aberrations noticed as described above. Similarly, the age class distribution is worrying for endangered and threatened species like the *Betula utilis* and *Taxus contorta* with the former especially having very few class V and class IV trees indicating the slow death and imminent extinction of these species if efforts are not taken to supplement the regeneration.

5.6.1.7 Selection of Sample Units and Type of Enumeration: The technique of survey and assessment of forest resources using sample plots and quadrat method of data collection as prescribed in the National Working Plan Code 2014 in which Sample plots of 0.1 Ha area are laid out on selected grids were followed. A total of 34 sample plots were laid in this working circle covering all the compartments, the detail of which is given in table below:

Sr. No.	Range	No. of Sample plots
1	Khashdhar	13
2	Dodra Kavar	17
3	Tikkar	4

Table 5.4: Detail of Sample plots in HBL WC

5.6.1.8 Assessment of NTFP bearing Species: The major NTFPs available in this working circle are Gucchi, Kashmal(root), Buransh (flower), Kuth (root for medicinal purpose), Walnut bark, Pine Cones, Pine needles.

5.6.1.9 Status of Regeneration: The regeneration of principal broad leaved species in this working circle appears to be deficient with less number of established seedlings or pole crop noticed in many compartments. The Kharshu

Oak exhibits unequal regeneration across forest compartments where in some compartments it has failed to regenerate substantially and in other compartments there exist reasonably satisfactory regeneration and established crop. Similarly, Maple and Jamu is also having sufficient recruits in certain compartments. However, the trend is not uniform across compartments. The Rakhal and Bhojpatra are the key species in this working circle where regeneration is highly deficient and calls for immediate action to supplement and augment existing natural regeneration. The data regarding regenerated seedlings/ saplings this working circle is given below:

Sr. No.	Total No. of Seedlings and Saplings recorded in Sample Plot	Category	Sample Plot Counts
1	0 – 5	Poor	25
2	6 – 10	Fair	5
3	11 – 20	Good	4

Table 5.4: Detail of regeneration status in HBL WC

5.6.2 Silvicultural System

Protection and improvement system will be followed in this working circle with emphasis to protect and conserve high altitude broad leaved eco system for enabling the various eco system services that the high altitude broad leaved forests provide. The major focus shall be to sustain, conserve and regenerate native endemic and threatened flora in the working circle through sustained efforts of protection, conservation and supplementing through artificial regeneration. Regeneration areas will be protected and regeneration will be assisted through application of suitable silvicultural operations. In specific compartments where regeneration of threatened endemic taxa is absent, artificial regeneration will be carried out by sowing of seeds and planting nursery raised seedlings of broadleaved species.

5.6.3 Rotation Period: Not applicable as the system prescribed does not prescribe felling

5.6.4 Harvestable Diameter: Not applicable as the system prescribed does not prescribe felling

5.6.5 Reducing Factor and Reduced Areas: Area is not reduced in this working circle.

5.6.6 Felling Cycle: Not applicable as the system prescribed does not prescribe felling

5.6.7 Division into periods and allotment to periodic blocks: No periodic block is prescribed in this working circle as shelter wood based system of felling is not followed.

5.6.8 Calculation of yield: Yield obtained after salvage felling will be recorded. Only diseased trees where felling is prescribed as a pathological mitigation measure shall be removed. No salvage lots to HPSFDC / for right holders are prescribed in this working circle.

5.6.9 Table of felling: Not applicable

5.6.10 Method of Executing felling: Not applicable

5.6.11 Subsidiary Silvicultural Operations

- i. **Weeding and Bush cutting** is prescribed to assist natural regeneration especially in forest compartments where regeneration is deficient
- ii. Tending of young crop and circular weeding in regenerated spots may be performed to enhance regeneration and better survival rate of seedlings
- iii. Forest Compartments having deficient regeneration may be brought under ANR by taking up closure of grazing prone areas.

5.6.12 Regeneration

The natural regeneration appears to be deficient in this working circle with endangered and threatened species facing local extinction. In this context, the following plan of action is made out with respect to enhancing regeneration:

- i. **Assisted Natural Regeneration (ANR):** Selected forest compartments with low regeneration of Kharshu, Maple and other broad leaved species may be brought under ANR with closure for grazing. The fixation of route for grazers and rotational grazing is to be encouraged to facilitate regeneration

- ii. **Fencing and Closure of Select Areas:** Few patches on experimental basis may be taken up for closure and fencing using inter link chain to enable regeneration
- iii. **Seed Collection:** The seed collection of Kharshu Oak, Mohru Oak, Ban Oak, Jamu, Maple, Kharshu, Bhojpatr, Rakhal, Khanor is strongly prescribed to build seedling stock for AR.
- iv. **Artificial Regeneration (AR):** The artificial regeneration of threatened and endemic broad leaved species is strongly prescribed in this working circle. In this regard, there is a great need to build capacity and diversity of forest nurseries in the tract with regard to seed collection, seed treatment, raising of seedlings in polybag/ root trainers and raising of plants among broad leaved species. Concerted focus is required on *Betula utilis* and *Taxus contorta* which are on the verge of local extinction given the absent regeneration. Even among other broad leaved species
- v. **Ex Situ Conservation:** The threatened species as listed above are prescribed to be conserved outside their natural environment in controlled polyhouses or nurseries with a view to separately keep a gene pool of these species and also to aid in artificial regeneration
- vi. **Collection of Regeneration Data:** The data pertaining to regeneration in terms of number of seedlings and stage of regeneration shall be collected forest compartment wise after laying regeneration plots.

5.6.12.1 Artificial Regeneration techniques of broadleaved species:

5.6.12.1.1 Oaks (*Quercus spp.*): Ban oaks suppressed by Pine (*Pinus roxburghii*) in most of the areas. It is learned that oak regeneration is facing problems due to short seed viability, forest fires, wild animals, lopping and grazing by the local people.

Seed Stock and seed sowing: Seeds of oaks are found inside the acorn, a capsule like fruit structure. Each acorn has one seed. Seeds are easily attacked by fungi and insects if they lie on ground. Seed viability is also low. The seeds of Ban oak can be collected from November to December depending upon local condition. Seeds of Moru oak are collected in the rainy season i.e. June-July and time of collection of Kharsu oak is same as Ban oak (November-December). The acorns of oaks can be stored for 2-3 months under room temperature. Acorns can be stored after dipping in a mixture of soil and sand in a shallow

pit. Acorns should not dip very deep inside soil mixture. The soil and sand mixture should be air dried but remain moist during the storage. The acorns can also be stored in the soil and sand, fill jute bags with the mixture, and close the bag so that it fits snugly around the mixture. These bags can be buried under 15–20 cm of soil. Proper drainage arrangements are required in stored pits. Sites that are too moist and damp are not good for storage. The stored acorns should be frequently monitored for sprouting/germination in 15-20 days intervals. As soon as a few acorns start germinating, the whole lot is ready for direct sowing or the germinated plants can be transplanted into bags/root trainers.

Oak grows well in clay and loamy soils that are fertile and rich in organic matter. Oak does grow well in sandy, dry, and shallow-depth soil. It prefers moist sites along water sources, and furrows of hill slopes. Irrigation is not required when planting in forest areas. Newly planted acorn-sown areas require protection from forest fires and wild animals' grazing and browsing. A barbed fence can be used to keep animals out of the area. Oak can be grown at a higher or lower density depending on whether the management goals are to keep the area more open (for example, in a silvipastoral setting) or closed (in a mixed species closed canopy forest). At seedling and sapling stage, regular weeding, manuring, and irrigation can accelerate plant growth. Pruning excess branching at the tree base helps the main stem to grow faster.

Protection: Acorns are prone to damage by wild animals like monkeys and pheasants. These animals can damage acorns up to two years after direct sowing. For example, in the pilot study pheasants dug out acorns from every planting pit. Spreading dry oak leaves or leaf litter over the acorn-sown pits helps to minimize damage. Oaks are sensitive to forest fire and animal browsing and require protection in their initial stage of growth, or until they grow out of reach for cattle in the latter case. During the first year, maintaining moisture in the soil increases survival rates by encouraging root system growth. Beyond the first year, with a strong root system established, seedlings are able to withstand normal environmental shock. Oak is slow-growing and takes 20–25 years to be ready for fuelwood or fodder purposes.

Help of JFMCs can be taken in artificial regeneration of oaks. With active involvement of local communities, the sowing technique is being used to support natural regeneration of oak in degraded areas and afforestation of blank forest patches in the forests.

Oaks can also be planted by propagation of rooting of branch cuttings.

5.6.12.1.2 Burans (*Rhododendron arboreum*):

Propagation through Seeds:

Seed Stock: Seeds of Burans are enclosed in a capsule. The seeds are matured in the months of October-December depending upon local climatic conditions. The capsules (fruits) are air dried and stored in the porous cotton bags for 3 months. The minute seeds are separated from the capsules after drying.

Seed Sowing: Seeds are sown in the trays or wooden boxes which should be filled with soil media containing soil, sand and FYM in the ratio of 1:1:1 in March-April. The germinating trays should be kept in net house/green house. Watering is done regularly to keep soil media moist. Germination takes place within a month. The seedlings should be pricked out in containers (poly bags/root trainers) when the seedlings produce secondary leaves. The plants are kept in the shady places or in the net house. The average height of seedlings is 0.5 cm, average number of leaves is 3, the average length of the leaf is 0.5 cm, and breadth is 0.9 cm after almost one year. The average height of seedlings is measured 1 cm with average number of leaves 5, length and breadth 1.2 cm and 0.8 cm respectively after one year of picking from soil beds to poly bags.

Vegetative Propagation: Vegetative methods are also used for propagation. Cutting, grafting and layering are the methods of conservation through vegetative propagation.

Propagation through Wildings: Wildings are small natural regenerated seedlings of burans found in the forests under Burans trees. The wildings of burans can be dug out from the soil of the forest along with roots and transplanted into polybags. The plants then be placed under the shady places and water regularly so as to establish plants. These wildings can be planted in vacant places of forest patches.

5.6.12.1.3 Bhojpatra (*Betula utilis*):

Propagation through seeds:

Seed collection and seed sowing: Seeds of Bhojpatra are ripened in the months of October-December and cold dried seeds for 2 to 3 months. Seeds can be sown in the trays or in wooden boxes. The media of the trays contains 2 parts of FYM: 1 part of sand and 1 part of soil. The germinating trays should be kept in shady places or in the net houses. The seedlings are pricked out in containers when the germinating seedlings may bear secondary leaves. The containers

seedlings are placed in shady places or in the net houses. The plants are kept in the nursery for one year.

Plantation: Depending on when the seedlings reach the apt collar girth and height, they are ready to be planted during growing season i.e March-April. The plantation can be done in the vacant native places to increase regeneration potential of the species as natural regeneration of this species is being affected by acute anthropological pressure.

5.6.12.1.4 Maple (*Acer caesium*) :

Propagation through seeds:

Seed collection and Seed Sowing: The fruits ripen in October-November. The seeds of *Acer* spp. enclose in the wings as the fruits are winged (samara). The seeds are separated from the wings and can be stored in open container for one year without losing viability. Immediately after collection of *Acer* seeds, seeds are sown in the germinating trays/ wooden trays. The growing medium having soil, sand and vermin-compost in the ratio of 2:1:2 in the best media of germination trays. The seedlings are pricked out in containers after 1 month from the trays and keep them under the shady places or in net house. The potted plants can be kept in the nursery for one year. The plants are transplanted in the field when the plants are about one foot.

Propagation through branch cuttings: Soft cuttings of *Acer* spp. of 20 cm length and pencil thickness can be planted in the containers during growing season i.e. March-April. It was found that cuttings treated with IBA @ 8000 ppm showed maximum sprouting percentage, rooting percentage, length of longest root, no. of roots/ cutting, shoot length and survival percentage. The rooted cuttings can be kept in the nursery for one year.

5.6.12.1.5 Khanor (*Aesculus indica*):

Propagation through seeds:

Seed collection and seed sowing: Seeds from identified mother trees are collected from October–December, depending on the altitude and aspect of the slope where the tree is growing. After collection, fruits of the Indian horse chestnut should be left in shade to dry slightly for two days to ease seed removal from their covering. The seeds are quite large at about three to four cm in diameter and 10 gm in weight, and are easily harvested by collecting from the ground, or shaking branches to make the ripe seed fall to the ground or on collection cloths. Direct sowing should be carried out within 10–20 days of seed

harvest and before onset of snow in the higher altitudes. Germination starts with the snow melt between March–April, depending on weather conditions. The direct-seeded horse chestnuts need protection from rats and porcupines.

Khanor is also been raised very successful in forest nurseries. It is prescribed to continue raising Horse Chestnut in Kharshali, Bashla and Buthara forest nurseries. The seedlings after 2 years are ready to be planted for artificial regeneration or afforestation activities.

5.6.13 Associated Regulations and Measures: It is prescribed to control grazing through implementation of closures and rotational grazing in areas adversely affected by over grazing. Along with the same soil moisture conservation measures in terms of drainage line treatment and water retention is suggested to improve regeneration.

Chapter-6

Forest Protection (Overlapping) Working Circle

6.1 Name of Working Circle: Forest Protection (Overlapping) Working Circle.

6.2 General Constitution of Working Circle: The large part of the tract dealt with in this plan is vulnerable to encroachments for raising of fruit orchards. Illicit felling for timber and fire are also major threats to the tract. Apart from these threats, mining, debris dumping are also significant threats spread across the tract. Considering these aspects, the forest protection working circle will encompass the entire tract. Forest vegetation will be protected from anthropological pressures, soil erosion, invasive species, forest fires and insect-pests diseases under this working circle.

6.3 General Characteristics of the Vegetation: This working circle will be applied in almost all parts of forest division, so all types of vegetation will be met in the working circle. The types of forests in the division are already given in the chapter-2 of Part-I.

6.4 Felling Series, Cutting Sections and JFM areas: No felling series is constituted in this working circle as it is constituted for protection cum rehabilitation.

6.5 Blocks, Compartments and JFM area: No area is currently under JFM in the tract.

6.6 Special Objectives of Management: The special objectives of management are,

- i) Consolidation and Demarcation of Forests by securing its boundaries to prevent encroachment
- ii) Protection of eroded areas of the hills and appropriate action is taken against soil erosion and landslides.
- iii) Protection of forests from illicit felling by enforcing law
- iv) Protection of forests from wild fires

v) To protect the forest composition from invasive species, anthropological pressure and insect pests and to plant fodder species and other valuable broadleaved species.

vi) To increase participation of local people for the protection of forest under JFM through usufruct mechanism and entry point activities.

6.6.1 Analysis of Crop: Keeping in view of the objectives of this working circle no analysis of crop is required.

6.6.1.1 Stock Maps: All the area under working circle is stock map in the scale of 1: 15850.

6.6.1.2 Enumeration: No enumeration is required in the working circle.

6.6.1.3 Density: Density of forest is different in different compartments. It varies from 0.3 to 0.9 and ocular estimation of density is mentioned in compartment history files.

6.6.2 Silvicultural System: As no commercial felling will be carried out but demand of timber and wood under Timber Distribution rights for the right holders will be met from the salvage felling wherein dried, hazardous, lanky and diseased trees will be removed. Salvage removal of dry trees shall continue.

6.7 Protection: The growing stock of forests will be improved after implementation of effective protection measures. The forests will be protected from illicit felling, encroachment, grazing, pests and diseases. The wildlife in this circle needs to be protected from poaching or hunting.

The tract is facing multiple threats which have also been exhaustively identified under the Divisional Level REDD + Action Plan detailed in Appendix of Volume II to this plan. It comprehensively details based on tract assessment the major threats and drivers to deforestation, forest degradation and forest carbon enhancement. The major threats identified from the assessment are encroachment, development related forest loss, illicit felling, forest fire and mining which have been detailed below along with the suggested prescriptions.

6.7.1 Encroachment: The biggest threat to forests in the tract is from encroachment for raising fruit orchards as already extensively discussed and recorded in Part 1 of this plan. As such, encroachments in forest areas of state of Himachal Pradesh can be dealt under the legislations of Land Revenue Act (Section 163) in which Assistant Collectors of Revenue Department are empowered to eject encroachers and under the HP Public Premises (Eviction

and Rent Recovery) Act, 1971 in which DFOs are notified as Collectors for purpose of adjudicating encroachment matters and issuing eviction orders. A total of 2479 cases of area 957.1323 Ha have been tried in the court of Collector cum DFO Rohru under the HP Public Premises Act whereas the Revenue courts are also holding trial of certain lands deemed to be protected forests owing to the 1952 notification of state of Himachal Pradesh deeming all waste lands owned by government as forest land. The following table summarizes the position of encroachment cases recorded in the tract:

Sr.No.	Total Number of Cases detected and Challaned in Collector Court	Total Area of Encroachment Cases (in Ha)	Total Area in which Eviction orders are passed (in Ha)	Total Area Evicted (in Ha)	Total Number of Cases Pending for Eviction	Total Area pertaining to pending evictions (in Ha)	Total Area in which felling of Apple Trees were carried out
1	2479	957.1323	943.987	662.5075	935	228.5357	232.80

Table 6.1: Detail of encroachment cases in the tract

The issue of encroachment in the tract has also been extensively discussed by the Honourable High Court in land mark cases of CWPIL 17/2014, CWP 1028/2002 and CWP 1093/2016 in which Honourable High Court has made some key observations which has greatly complicated the handling of encroached fruit orchards.

6.7.1.1 Issues related to Encroachment

- **Lack of clarity of Boundaries:** The tract is having 443 DPF and 187 UPFs in which 125 DPFs are newly notified. Among many of these forests, boundaries are not defined or boundary pillars are not present. As a result of which the concerned beat guards or deputy rangers are not clear about the respective boundaries. This leads to possibility of encroachment and overlooking the existing encroachments.

- **Possibility of Re-Encroachment:** The Honourable High Court of Himachal Pradesh in its judgement in the CWP 1093/2016 and CWPIL 17/2014 dated 20.12.2018 mandated that the removal of encroachment on forest land shall be without the removal of fruit trees. The following paragraph 3 of the order of the Honourable High Court reads as follows:

“The removal of encroachment, however, shall be without cutting the trees for the time being as we feel that the cutting of trees may not be in the interest of environment and ecology. Even cutting of fruit trees in our ‘Shastras’ is also prohibited”

Prior to this judgement, it is to be noted that encroachments detected were being removed by removing the apple or fruit crop. However, after the above judgement, the removal of encroachments has been occurring without the removal of fruit trees raised and present on the encroached land. This has proven to be the ‘Achilles heel’ for forest department as managing the evicted lands has become virtually impossible considering the apple crop remains on evicted land.

The High court ban on removal of the fruit trees had rendered these lands highly vulnerable to re-encroachment as every beat guard is having many scattered parcels of evicted lands and it is humanely impossible to patrol and keep preventing the cultivation and harvesting of fruits from these lands. The ban on felling of the fruit trees also pulled back the scientific management of these forests and the raising of native forest species in these evicted lands.

However, the Honourable High Court of HP in its judgement dated 2nd July 2025 permitted the felling of apple trees from evicted forest lands which has eased the management of evicted lands and enables forest department to raise native tree species on evicted forest lands. Thereafter, the Honourable Supreme Court of India has issued an interim stay order in which the felling of fruit trees has again been prohibited.

- **Lack of Data on Evicted Lands:** There is also an acute deficiency of data with respect to the lands in which evictions were carried out. Although the Khasra Number of the land and area is available in records, these lands need to be identified in the field with help of revenue staff. Digital record/ KML file of these lands are not available. Subsequently, the concerned beat guard or deputy ranger is not aware of evicted lands in

their respective beat/ block which again renders these lands vulnerable to re-encroachment.

- **Lack of Revenue Staff in Forest Department:** Despite the forest department being in possession of large majority of the tract dealt with, it is a pity that no competent revenue officer is posted with forest department and an absent cadre of revenue officials prevails. This makes the forest department completely dependent on revenue department to conduct demarcations and subsequently challan cases of encroachment in Collector cum DFO court. The current sanctioned strength of 1 Qanungo and Patwari for the division is grossly inadequate to meet the needs of demarcation.
- **Unimplemented Eviction Orders:** The Honourable High Court in CWP 1093/2016 had temporarily provided relief that land holders having encroached land can temporarily retain up to 5 bighas of land till a maximum of 10 bighas. This order of the high court temporarily stayed all eviction process in the tract and led to gradual accumulation of cases in which eviction orders were passed but could not be implemented due to the temporary relief provided by Honourable High Court. Currently, there are 933 cases in the tract where eviction orders are yet to be implemented. However, the High Court of Himachal Pradesh overturned this temporary relief later on in the CWP 1093/2016 case thus enabling evictions sans felling to be carried out for all lands regardless of the size of landholding.
- **Observations of Honourable Supreme Court in Babu Ram Case:** The Honourable Supreme Court in the Babu Ram vs State of Himachal Pradesh observed procedural irregularities violating principles of natural justice and procedural fairness nullifying 12 eviction orders in various cases. The main contention in the judgement of the Honourable Supreme Court was that the applicants were not provided notice of demarcation, the presence of all parties were not ensured during the demarcation process and that the demarcation report was not served to the alleged encroacher prior to proceeding under HP Public Premises Act, 1971. The court also made mention of the need for a speaking reasoned order from Court of Collector.

6.7.1.2 Standard Operating Procedure for Challaning Encroachment Cases

In the aftermath of the judgement of Honourable Supreme Court, a need was felt to standardize the procedure for challaning and adjudicating cases in DFO cum Collector Court. Accordingly, the following standard operating procedure is prescribed to be followed for all cases of encroachment detected on forest land in the tract:

Standard Operating Procedure for Encroachment Cases in Rohru Forest Division

Stage 1:

Encroachment is detected on forest land by concerned forest official either on basis of complaint or suo moto.

Stage 2:

Concerned Deputy Range Officer applies to Tehsildar for getting demarcation conducted for the encroached land.

Stage 3:

Tehsildar issues notice of demarcation to all parties i.e. encroacher, adjoining land owners and copies the same to forest department. He/ she shall ensure at least 2 weeks advance notice is given. Notice shall also be transmitted to all parties concerned through SMS/ Whatsapp/ Email and screenshot of the same shall be recorded in the file. Range officer through field staff shall ensure the notice is received and take the signed copy of the notice, if the party refuses to sign, it shall be pasted on any property in the encroached land.

Stage 4:

Tehsildar then conducts the demarcation through his field kanungo on the said date in presence of all parties concerned recording their objections if any along with signature of parties concerned. The demarcation report is thereafter submitted to Tehsildar by field kanungo. The tehsildar shall thereafter forward the demarcation report to the applying forest official clearly recording his satisfaction with the demarcation concerned and that the demarcation so conducted is as per the HP Land Revenue Act and Land Records

Manual. If he is not satisfied with the demarcation, he shall again depute the field kanungo for demarcation reissuing notice to parties concerned with 2 weeks advance time.

Stage 5:

The Deputy Range officer/ Range officer shall challan the case of encroachment before the DFO cum Collector. The challan file shall be complete in all respects including the notice issued to alleged encroacher (screenshot of notice send by phone/ mail and the physical notice received), demarcation report of Field Kanungo along with the forwarding report of the Tehsildar, Jamabandi of the land encroached certified by revenue official, Forest Damage Report, Tatima showing the extent of encroachment, statements of the officials present during demarcation/ any other independent witness, statement of the alleged encroacher.

Stage 6:

The DFO cum Collector shall issue a notice under Section 4 of the act to the alleged encroacher to show cause as to why he/ she should not be evicted from the encroached land on basis of the evidence presented before him. A fortnights time shall be given to the respondent.

Stage 7:

The reply of the respondent shall be taken on record and if the respondent admits to offence, then eviction orders shall be passed under Section 9 of the act. If the respondent pleads not guilty, then the court of collector shall frame charges and the charges shall be read out to the respondent. If the respondent pleads guilty to the charges, eviction orders can be issued. If he pleads not guilty to the charge, trial shall ensue.

Stage 8:

Once the charges are framed in case, the prosecution shall provide its list of witnesses and present its evidence before the court. The PWs shall be summoned by notices to appear before the court. The examination in chief and cross examination of prosecution witnesses shall be conducted in presence of prosecution and defense counsels as per Section 142 of Bharatiya Sakshya Adhiniyam.

Stage 9:

The statement of the respondent shall be recorded in accordance with section 351 of BSA. He shall be examined in court in this stage with regard to charges framed and an opportunity to hear.

Stage 10:

The defence presents its list of witnesses and evidence. DWs are summoned and their examination and cross examination conducted in presence of both counsels as per Section 142 of BSA.

Stage 11:

The final arguments are heard from both prosecution and defence sides in the court of Collector.

Stage 12:

Based on the arguments and evidence presented before him/her, the DFO cum Collector issues the judgement which is a speaking and reasoned in nature deliberating on the charges of unauthorized occupation, evidences presented before him and issue final order in this regard.

Stage 13:

If an eviction order is issued by the collector court, RFO shall ensure to get it implemented within 3 months from the time of the order. If there is any property situated on the land, the same shall be vacated and correspondence shall be made with IPH and Electricity Department to remove the connections of water and electricity.

Stage 14:

If the order is appealed in any appellate court, then action shall be taken as per the directions of the appellate court.

6.7.1.3 Preventive Prescriptions to protect forest from Encroachment

- Demarcation and affixing of boundary pillars be completed for existing DPFs, newly notified DPFs
- Mutation of these lands should be performed at the earliest to change their status to Demarcated Protected Forests

- The forest settlement process be completed for all undemarcated protected forests to clearly identify the boundaries of forest land and notify these forests as DPFs
- It is prescribed that beat forest guards regularly monitor boundary pillars in their beat including those constructed with regard to CWP 1093. It is prescribed that every beat guard shall perambulate their respective forest compartments at least once and collect the data regarding boundary pillars. They shall report every month the condition of each and every boundary pillar in following formats

Sr.No.	Forest Block	Forest Beat	Name of Forest Compartment	Boundary Pillar Number	Geo Coordinates	Current Condition along with geo tagged photographs(Good condition/ Needing Repair/ Broken)

Boundary Pillar Status of CWP 1093/2016

Sr.No.	Case Number	Case Title	Khasra Number	Boundary Pillar Number	Current Condition along with geo tagged photographs(Good condition/ Needing Repair/ Broken)

Boundary Pillar Abstract Data of Beat

Sr.No.	Forest Block	Forest Beat	Compartment Name	Number of BPs in Good Conditions	Number of BPs requiring repair	Number of BPs to be newly constructed

- It is prescribed that the boundary pillars of every compartment be restored and constructed on war footing to ensure that all boundaries of forests are secure. The miscreants destroying boundary pillars should be tried under Indian Forest Act, 1927
- Range officers along with concerned block and beat staff shall take steps for identification of evicted lands on field and monitor them for Re-encroachments and for Digitization of evicted land. In this way, KML file database shall be made for all evicted lands.
- If re encroachment is noticed, Concerned Deputy Ranger shall Report/ file FIR and conduct eviction again.
- All forest guards shall have charge list of evicted area with them which they shall hand over to the forest guard on transfer/ posting. The charge list shall clearly indicate the compartment name, lat, long, Khasra number and KML.
- All forest guards shall be responsible to ensure that there is no re encroachment in these evicted areas. If this is a cultivated area, then they must be prevented from cultivation. If it is an area where crop is felled, then they must be prevented from raising plants. Effort should be to put these areas under ANR/ Plantation.
- All forest guards as per the order of Honourable High Court in CWPIL 17/14 must report the status of encroachment in their respective beats to concerned Deputy Ranger who shall report to Range officer who shall then report to DCF.

Proforma for Evicted Areas

Sr.No.	Case Number	Case Title	Name and Address of Encroacher	Khasra Number	Area Evicted	Whether the evicted land has been found re-encroached during patrolling ? (Yes/ No)	If Yes - Action Taken (FIR/ Evicted/ Reported to Higher Authority)

Proforma for Newly Detected Encroachments during the month

Sr.No.	Forest Block	Forest Beat	Khasra Number	Forest Name	Name and Address of Encroacher	Area	Action Taken (Applied for Demarcation/ Reported to Higher Authority)

- Forest guards/ deputy rangers who are unaware of their boundaries shall take help of revenue department staff/ any other staff in understanding their boundaries.
- All KML files of evicted areas shall be stored in hard disk in division office and in cloud servers of division office mail ID. This is essential as this nullifies the need for repeated demarcation and coordination with revenue department. It is strongly prescribed that each and every beat guard and deputy ranger shall be aware of the evicted lands in their respective jurisdiction which is the first and foundational step of preventing re encroachment.

6.7.1.4 Prescriptions post detection of Encroachments

- **Monitoring of Complaints:** Range officers shall monitor the complaints received with regard to encroachment personally and send monthly action taken report. It shall be the responsibility of range officers to coordinate with Tehsildars and get demarcation conducted in such cases. Division office branch shall keep an updated list of complaints and action taken to avoid pendency and oversight.

Sr.No.	Complaint Received Date	Forest Name & Range	Alleged Offender Name and Address	Khasra No (if mentioned)	Action Taken by RFO	Current Status (Challaned in DFO court/ Eviction Order)

						Passed/ Evicted/ Pending for Appeal)

- **Challan in Court of DFO cum Collector:** As already detailed in the standard procedure outlined above, encroachment cases need to be challaned in Collector court after conducting demarcation in presence of parties.
- **Conducting Trial and Passing Eviction Orders:** It is prescribed that DFO cum Collector adjudicates the case and passes orders within at least 3 months from the date of challan in the court.

6.7.1.5 Prescriptions for Eviction and Rehabilitation

- Eviction orders passed shall be implemented within at least 3 months by RFO
- It is prescribed that eviction should be made by removing the fruit crop if any that exists over evicted land as this will hinder scientific management of forest and divert the object of management of forests in the tract.
- The Judiciary pursuant to this purpose may be requested to allow forest department to remove the fruit crop and plant native forest species as then only evictions can attain true meaning and value. Monoculture commercial fruit plantations cannot provide eco system services that natural forest provides. Considering this aspect and the scientific management of forest lands in the tract, it is imperative that the department be allowed to remove fruit crop from evicted land parcels. This is also vital from view point of preventing re encroachment.
- Any building or structure on evicted lands may be utilized as forest guard, deputy ranger/ range officer quarter or as an inspection hut wherever feasible.
- **Rent Recovery:** It is strongly prescribed to levy recovery of revenue from the encroachers under the HP Public Premises act as it can foster a strong deterrence against further encroachment.
- The detailed prescriptions for the rehabilitation of encroached areas will be discussed in the Evicted Area (Rehabilitation) Working Circle

The Divisional level REDD Plus Action Plan also seeks to prepare a land use plan of the division with view to prevent encroachment and ensure sustainable land use pattern with sufficient forest cover.

6.7.2 Illicit Felling: The tract has sporadic and scattered vulnerability to illicit felling. The characteristic of illicit felling crimes is largely of petty and bonafide nature although smuggling of timber has also been detected in several incidents in the past. The objective of timber smuggling/ illicit felling is largely centering around the demand for timber in houses and temples. In view of this, forests which are adjoining villages of large population are gathered to be vulnerable to illicit felling. The following compartments are identified as being vulnerable to illicit felling in the tract:

Sr.No.	Name of Forest Range	Name of Forest Block	Name of Beat	Name of Forest Compartment	Number of Illicit felling recorded in last 10 years	Number of cases of illicit timber transit recorded in last 10 years
1.	Bashla	Bashla	Bashla	C.No. 31a(iii)	4	
2				C.No.31a(i)	2	
3		Arhal	Arhal	C.No. 32b	3	
4			Sharog	UF 12 Ferli	1	1
5		Khadrala	Khangteri	UF-8 Bashuni	2	
6	Tikkar	Tikkar	Farog	C.No 4 a Hanstari	2	
7			Naksetly	C.No 23-b Naksetly	2	
8				C.No 23 a Naksetly	2	
9			Sharontha	C.No-8 Narian	2	
10				UF Tangri	2	
11				C.No-7 Sharontha	1	
12				UF Tangri,C.N-7 Sharontha C.No-8 Narian	1	

13	Rohru	Summerkot	Kui	C.No.40(a) Bamnoli	3		
14				C.No. 40 (b) Bamnoli	2		
15				C.No. 37c Kui	1	1	
16				C.No.40(a) Bamnoli	3		
17			Graima	C.No.46b (ii) Sungri	2		
18			Machoti	C.No.50 (b) Darshal	2		
19			Summerkot	C.No.47 d(ii) kateri	2		
20			Gawas	Gawas	C.No.82 (b) Gawas	5	
21				Lowerkoti	C.No.84 (b) Lowerkoti	2	
22		Rohru	Rantari	UPF Bijori	2	1	
23				UPF Majhan	3		
24			Gauna	UPF 22 nauna	3	1	
25	Jubbal	Jubbal	Kharapathar	UF Ori	3		
26			Snaba	UF Snaba	3	1	
27			Badhal	UPF badhal	7		
28			Shilli	UPF Kohlara	1	1	
29			Muril	UF Kelvi	5		
30		Sheel	Shallan	10a shallan	5	1	
31				Shallan 10b	6		
32			Sheel	15 b Kaina	3	1	
33			Mandhol	19A Jharag	3	2	
34				18b Mandhol	2		

35	Khashdhar	Larot	Thalatar	UPF Larot	2	
36		Chirgaon	Sindasli	65A Khabal	2	
37		Chirgaon	Sindasli	UPFSindasli	5	
38		Todsa	Todsa	56-Todsa	2	
39		Khashdhar	Diswani	81B-Diswani	2	
40		Larot	Kharshali	72A Kharshali	2	
41		Todsa	Todsa	UPFShagli	3	1
42		Chirgaon	Jhaknoti	61A Jakhnoti, UfGhatDhar, UfAtgaon, UfGoskwari	1	
43		Chirgaon	Chirgaon	UfRohal	2	
44		Larot	Thalatar	Uf-45 Larot	2	
45	DodraKawar	Dodra	Kawar	U.F. Kalapani	7	
46		Kawar	Kawar	C.No. 69e Chinon	2	
47	Saraswati Nagar	Chhajpur	Kelvi	C No 1 Jond	2	
48		Mandal	Mandal	C No 1 Jakhi	1	

Table 6.2: Detail of Illicit Felling and illegal timber transit during last 10 years

It is proposed to implement the following measures to control illicit felling

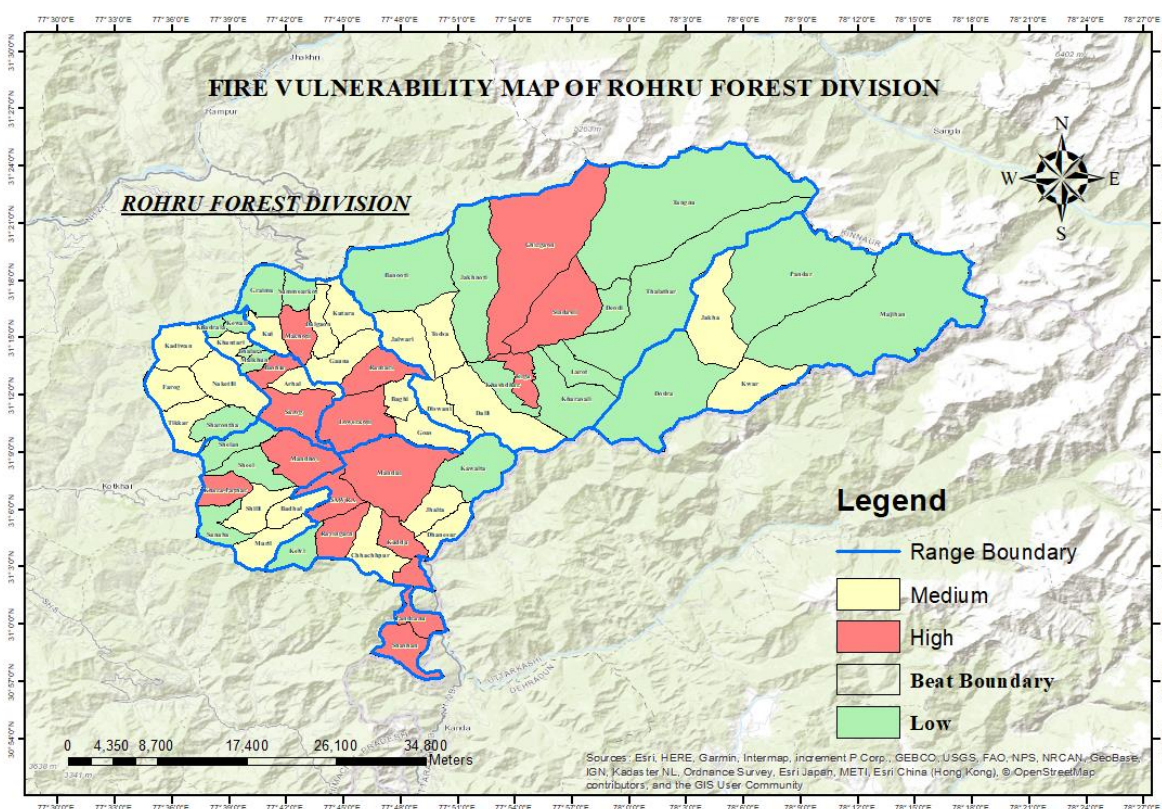
- i) **Joint Group Patrolling at Forest Block Level:** It is prescribed to have scheduled group patrolling for designated forest compartments. The Range Forest Officer shall schedule and organize such group patrols every month and inform the Deputy Conservator of Forests. At least 5 such group patrols shall be conducted every month for every forest block.
- ii) **Inter Block Shadow Patrolling:** In order to enhance the monitoring, shadow patrolling of the adjacent forest block staff is prescribed once in every month to keep a check on illicit felling.
- iii) **Night Raid/ Nakkas:** The Range Forest Officer shall prepare schedule of night raids for the month and enforce it. The night raid points shall be strategically chosen for every range. The following are the major points of night raid which shall be used as a reference for conducting night raids.

- iv) **Check Posts:** The division has a check post at Pandranoo in Sawra Range which is an inter state check post at the Uttarakhand border. The check post has been recently renovated and reinstalled in the year 2024. It is prescribed to keep check of all vehicles plying to the other state at this check post. The in charge forest guard and deputy ranger shall ensure that the detail of all vehicles plying through this check post be noted down. It is prescribed to provide this check post with computer infrastructure and CCTV cameras.
- v) **Timber Distribution:** The distribution of Timber in accordance with the notified TD rules for purpose of construction of new house, cow shed/ repair of house shall be promoted to reduce the cases of illicit felling and ensure that the bonafide demands of villagers and right holders are met with.
- vi) **Independent Charge sheeting of Cases in Magistrate Court:** The cases of illicit felling under Indian Forest Act shall be challaned independently by forest department without handing over the investigation to police or filing FIR. It is noted that handing over forest crime cases to police yields little success. Considering this, it is prescribed to charge sheet these cases independently in Magistrate court after collection of all evidence and witness statements. In cases of large scale illicit felling or in cases having doubtful integrity of forest staff, then the same may be handed over to police after registering First Information Report.
- vii) **Developing Intelligence Network:** Illicit felling can be controlled only with the development of a robust intelligence network at field level with informants placed strategically.
- viii) **Registration of Power Chain Saws** with forest beat guard
- ix) **Saw Mill and Timber Depot:** Routine checking of saw mills and timber depot can help control illicit felling
- x) **Standardized Checking of Forest Compartments handed over as Salvage Lots:** It is noticed that the probability of illicit felling is significantly higher in Salvage lots handed over to HP Forest Corporation. Considering this, a standardized regime of joint checking of such lots during and after operation is prescribed. It is prescribed that when handing over such forest compartments for operation of salvage lots, the responsibility to prevent illicit felling shall vest with the forest corporation staff on the basis of an agreement reached accordingly with HP Forest Corporation. Wherever illicit felling is noticed in such lots, damage bills shall be raised to the HP Forest Corporation.

6.7.2 Forest Fires: The tract as discussed in part 1 is heavily prone to forest fires in 2 distinct seasons. During the summer from May till end of June, the

Panwis, Chil and Kail Forests are vulnerable to fires and a spate of fire incidents occur in lower elevations of Sawra Forest Range, Bashla Forest Range, Jubbal and Rohru Forest Range. The tract has however greater vulnerability to forest fires in the winters with prevailing dry climate and increasingly low precipitation in the winter months especially the absence of snowfall. This results in a dry forest floor with heavy fuel load especially in grasslands and Kail forests as a result of which the tract is ravaged by winter fires.

The fire vulnerability map of the tract based on previous fire incidents and forest type is given below for reference:



Map 6.1: Fire Vulnerability Map of Rohru Forest Division

The prescriptions in this section are also guided by Divisional Level REDD+ Action Plan with regard to impact of fire on forest degradation and the miscellaneous techniques to prevent and mitigate forest fire incidents. The following prescriptions are made for controlling forest fires:

- i) **Maintenance of Existing Firelines:** The tract has the following fire lines:

Sl. No.	Range	Name of Forest	Length of Fire Line	Starting Point of Fire Line	End Point of Fire Line
1.	Rohru	C.No. 47(a) Seri 47(b)	1.00km	Sungari C.No.47 (a)	Sari C.No.47 (b)
2.		Dalgaon C.No. 52 (c) Satigad C.No.48 Nasari C.No.48 (b)	1.5km	DalgaonC.No. 52 (c)	Nasari C.No.48 (b)
3.		Gowas C.No.82 (a)	1.00km	Gowas C.No.82 (a)	Gowas C.No.82 (a)
4.		Dabri 83b (ii) &C/No. 83 (c) iBaggi	1.00km	Dabri 83b (ii)	C/No. 83 (c) iBaggi
5.		Lowerkot C.No.84 (b)	2.00km	Lowerkot C.No.84 (b)	Lowerkot C.No.84 (b)
6.	Bashla	C.No.31a(v) Jhaltu	1.5km	Jhaltu	MalkhoonNallah
7.		C.No 31a(i) C.No 31a(iv)	1.km	C.No 31a(i)	C.No 31a(iv)
8.		C.No 30c(ii) Malkhoon C.No. 30b(i) Bhalara	1.5km	C.No30c(ii)Malkhoon	C.No. 30b(i) Bhalara
9.		C.No 30 b(i) bhalara C.No 30a Bhalara	1.5km	C.No 30 b(i) bhalara	C.No 30a Bhalara
10.		C.No 34 Sharog	2.km	C.No 34 Sharog	Mundidhar
11.		C.No 28a Kewli C.No 28 b Bajeshal	1.km	C.No 28a Kewli	C.No 28 b Bajeshal
12.	Saraswati Nagar	ShashanC.No 7(a) DPF Kashta (ii)	8.km	ShashanC.No 7(a)	DPF Kashta (ii)

Table 6.3. Detail of Existing Fire Lines in the Tract

These fire lines shall be maintained and the fuel load shall not accumulate during fire seasons.

- ii) **Creation of New Firelines:** During the previous working plan, the tract has seen an extraordinary growth in roads fragmenting forests as several forest diversion proposals have been approved in the tract resulting in fragmentation of forests. These roads themselves act as firebreaks and hence need is not felt for the creation of many firelines.
- iii) **Control Burning:** It is prescribed that forest patches of 5 meter width be control burnt along the roads wherever possible and as per availability of budget. It is strongly prescribed to control burn and create fire breaks for all plantations considering that fire incidents result in huge loss of money spent on plantations. In the tract control burning needs to be done especially prior to the onset of dry weather in November-December ideally after a period of rain during early morning hours and when there is little wind.
- iv) **Removal of grass and Fuel from Plantation floor:** It is strongly prescribed to remove the fuel load and grass from forest floor in plantation areas before the onset of fire season. In case of plantation undertaken in Kail forests, there needs to be regular cleaning of the needles around the pits to prevent fire risk to plants. It is also prescribed to prune the plants at periodic intervals to protect it from fire and promote stem growth.
- v) **Involvement of Yuvak Mandals/ Mahila Mandals/ Village Societies/EDCs** in forest fire fighting
- vi) **Registration of All Forest Staff** on FSI Fire Portal for receiving real time alerts regarding forest fires
- vii) **Procurement and Use of Tools:** It is strongly prescribed to use fire blower as it is a useful instrument in fighting forest fires in gentle slopes and silvipastoral landscapes. Along with fire blower, other necessary tools and protection gear may be procured and utilized by staff
- viii) **Counter Fire** wherever possible depending on the terrain and aspect
- ix) **Conducting Awareness programs:** It is prescribed to distribute pamphlets on fire awareness to various villages. Further, awareness videos shall be made and transmitted through social media. Awareness programs may be organized at panchayat level or gram sabha level.
- x) **Alternate Mechanism for Disposal of Horticultural Waste:** One of the primary causes of forest fires in the tract is the burning of horticultural waste after pruning in the winters. There is a need to address this hazard and provide an alternate disposal mechanism for managing the horticultural waste

- xi) **Coordination with Fire Department:** It is prescribed that Range Forest Officers shall maintain good coordination with fire department and fire tenders can be demanded wherever logistical conditions are favourable.
- xii) **Coordination with DDMA and SDMA:** It is prescribed that coordination be kept with District and State Disaster Management Authority especially in case of forest fires that are live for more than 3 days.
- xiii) **Formation of Crew Stations:** It is prescribed to depart from the traditional mode of engaging fire watchers in every beat as it does not translate into meaningful action owing to the large man power that forest fires require. There is only so much a single person can do. It is proposed to have crew stations at block level where a Rapid Response Team consisting of all forest guards, forest workers and engaged fire watchers/ volunteers can immediately act and reach the location of forest fire.
- xiv) **Forest Fire Master Control Rooms (MCRs)** can be established at Division level to monitor the occurrence and action taken with regard to forest fires. The MCR shall be operated by a ministerial staff under leadership of Division office superintendent and Deputy Conservator of Forests.
- xv) **Capacity building for forest staff and villagers** in forest fire management through training and application of mock drills.
- xvi) **Alternate use of Pine Needles:** The tract is having high flammable fuel load in the form of pine needles both in Chil and Kail forests. The program of state government for briquette formation and use in handicrafts be encouraged to reduce the fuel load of these forests.
- xvii) **Law Enforcement to deter offenders:** It is prescribed to take strict action against offenders kindling fire in forests by lodging FIR by name or by independently charge sheeting the offender under Indian Forest Act, 1927 for kindling of forest fire. The Section 79 of the act also provides it mandatory for all right holders to extend cooperation in dousing fires. The section may be utilized for ensuring cooperation in fire fighting. The timber distribution rights of those villages which are not cooperating in fire fighting may be suspended for a period of time.
- xviii) **Burnt Area Assessment and Updation in Fire Portal:** The burnt area assessment of fire affected areas shall be done as per the established protocol of HP Forest Department and as per the notified Fire Manual of the state. All details regarding the loss of fire shall be updated in the Integrated Forest Management System (FIRE) portal of HPFD.

6.7.4 Mining:

The tract is having the Pabbar river bed and riverine forests which are significantly vulnerable to Mining by way of manual extraction, mule, tractors and vehicles. The Pabbar river bed is a rich source of minerals especially sand, stone and bajri of which the state government is the custodian. The legal status of land along Pabbar also greatly complicates the matter considering there is high fragmentation of land with private lands interspersed with government lands. Although most of these government lands don't fall within notified forests, these are treated as forest land based on the 1952 notification which deems that all government owned waste land shall be treated as protected forests. The dearth of legal sources of sand nearby also greatly increases the chances of illegal mining.

Mining is also a prominent threat to forests in DodraKwar Range. The road to remote villages of Dodra Kwar, Jakha, Jiskoon and other link roads require frequent repair and maintenance owing to it being heavily snowbound area and release of moisture. This leads to a huge increase in demand for stones and sand for the construction activity in DodraKwar Range. The Rupin river bed and the road adjacent forests leading to Dodra village and onwards to Kwar/ Jiskoon is vulnerable to mining for sand and stone respectively.

Apart from the Pabbar river bed, mining for stones by excavation of hills wherever stones/ rocks are available is another key threat to the ecology of the tract. Road building activity is going on in the tract at break neck speed and there is increasing tendency among contractors of road building to excavate adjacent forest land and utilize the stone for the road construction therein.

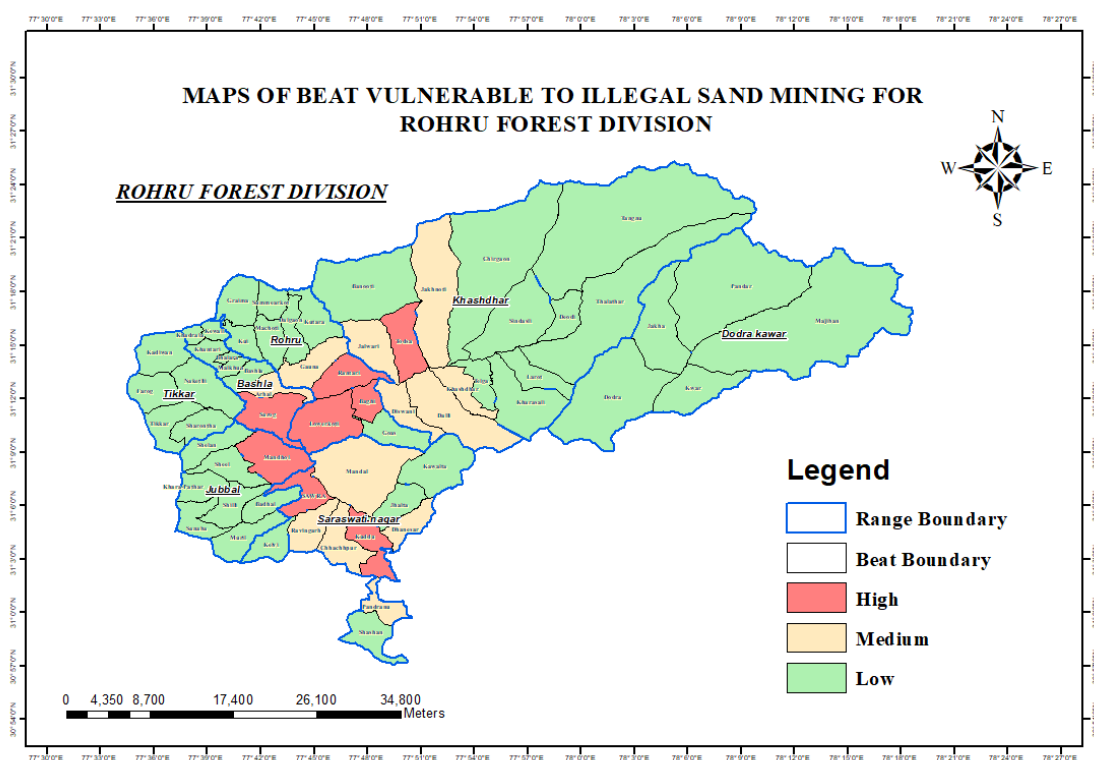
The following table summarizes the mining threat of forests in the tract:

Sr. No.	Year	Number of Cases detected	Type of Extraction / Transit (Manual/ Vehicle/ Mule)	Type of Mineral (Sand/ Stone/ Bajri)	Volume of Mineral involved (m3)	Number of vehicles seized	Damages collected for compounding offence
1	2014-15	11	Manual	Stone	32	0	27974
2	2015-16	25	Manual	Stone	57.9	0	81317
3	2016-17	10	Manual	Stone	90.8	0	85335
4	2017-18	9	Manual	Stone/Sand	33	0	32934
5	2018-19	6	Manual	Stone	20.9	0	22245
6	2019-20	21	Manual	Stone	96.2	0	88071
7	2020-21	26	Manual	Stone	303	0	350375
			Vehicle	Sand	10	3	
8	2021-22	49	Manual	Stone	118		452909
				Sand	10		
			Vehicle	Sand	25.5	7	
9	2022-23	53	Manual	Stone	326		953615
				Sand	202		
			Vehicle	Sand	30.3	11	
10		97	Manual	Stone	141		996464

	2023-24			Sand	90.4		
			Vehicle	Sand	67.1	32	
			Mule	Sand	27	15	
Total		307		Stone	1218.14	68	3091239
				Sand	462.3		

Table 6.4: Detail of Mining incidents during last 10 years in the tract

The following map depicts the sensitivity of the tract to mining for stones/ sand:



Map 6.2: Beat Level Vulnerability Map of Illicit Felling in the tract

6.7.4.1 Policy and Legal Position of Mining

The extraction of minerals in the state of Himachal Pradesh is regulated under Mines and Minerals (Development and Regulation) Act, 1957 and the rules notified thereunder i.e. Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2015.

The notified rules clearly define the procedure of approving the mining plan and the mining lease based on the inspection of joint committee and subject to clearance under Forest Conservation Act, 1980 if land involved is forest land. Till the time of writing this plan, no mining lease has been approved for any individual or contractor for the Pabbar river bed. One case of mining is pending for forest clearance under FCA. It is prescribed that it is in the interest of sustainable development and government revenue that at least few portions of land parcels along the Pabbar river needs to be leased out for mining after following due procedure under Forest Conservation Act, 1980. In the absence of the same, the tendency for illegal mining and lifting of stone and sand will continue to persist resulting in damage to ecology, loss of revenue and increase risk to floods.

While the above legislation is useful for enforcing law during transportation, storage, the Indian Forest Act, 1927 is itself a potent legislation which can address and enforce law when it comes to detection of excavation or extraction of mineral from forest land or in cases where it is proven that the mineral being transported is indeed from forest area. This is essential because the act defines forest produce in Section 2 as “the following when found in, or brought from a forest, that is to say” and mentions rocks and minerals thereafter. Subsequently, the extraction of stone/ sand from forest land shall attract Section 33(b) of Indian Forest Act which disallows removal of any forest produce from notified forests. The offences detected under this action are largely compounded as per the compounding rates for forest offences notified by Shimla Forest Circle.

The key aspect in case of applicability of the Indian Forest Act, 1927 pertains to the definition of forests and what constitutes a forest land as per the current jurisprudence. The legal definition of forest land is an ever evolving concept with legislations by the parliament and Supreme Court’s continuing interpretation in the T. N. Godavarman Case. The Parliament of India enacted the Van Sanrakshan Evam Samvardhan Act in 2023 amending the Forest Conservation Act, 1980 to exclude all areas which are not recorded as forest in forest or revenue record from definition of Forest. However, Supreme Court in

the T.N. Godavarman case had noted that legal protection of forest land shall apply to all lands based on the dictionary meaning of the word forest. The Supreme Court is still hearing the case at the time of writing this plan and the applicability of forest land shall be determined by the final outcome of the T.N. Godavarman case.

In the case of Himachal Pradesh, the 1952 notification has great applicability of definition of forest land. The notification provides that all government owned waste land shall be treated as Protected Forests as defined in Chapter IV of the Indian Forest Act, 1927. In the light of this notification, many areas of the Pabbar, Rupin River bed and other waste land areas prone to excavation which are not part of notified forests are in legal terms 'Protected Forests'. This enables and mandates that it shall be the responsibility of all forest staff to patrol these areas and take action against mining wherever noticed as per the Indian Forest Act.

6.7.4.2 Delegation of Powers

All Deputy Commissioners/ CFs, Divisional Forest Officers/ACF's and Range Forest Officers have been delegated with the powers under Sub Section (2) of Section 26 read with Section 21 (4) of the Mines & Minerals (Development & Regulation) Act, 1957 to empower to seize any minerals raised or transported or caused to be raised or transported by any person without any lawful authority, any mineral from any land for that purpose use any tool/equipment, vehicle or any other thing for this purpose.

All forest guards have been delegated with powers under Section 22 of the Mines & Minerals (Development & Regulation) Act, 1957 to make complaint in written in the court of competent jurisdiction in respect of any offence punishable under the said Act or any rules made thereunder. Similarly, Assistant Conservator of Forests and Range Officers have also been delegated with powers under the Act to make complaints in courts in writing in respect of any offence punishable under the Act or any rules made there under in their respective jurisdiction

The rules referred to above in Chapter VII discusses in detail the penalty provisions for illegal transportation and storage of minerals. All staff of forest department till the level of Forest Guard have been empowered by HP government to demand from any person transporting/ storing the mineral the form issued by mining department that certifies that the transport/ storage is not illegal in nature. The forest department is empowered to levy fines and penalties under the Mines and Minerals act as defined in the rules under

Section 22 and Rule 23(A)(1). It is prescribed that forest staff shall utilize this legislation and power delegated under it to levy penalties and deter offenders.

The powers to enter any premises and search any premises for the detection of illegally excavated minerals has also been devolved to authorized forest staff in accordance with Rule 23(B) and Rule 24(1).

The following Sub-Divisional Level Flying Squad has been constituted vide Notification No. Udyog (Chh) 7-3/90 dated 11-3-1993 and revised vide notification No. Udyog (Chh) 7-3/90 dated 20-11-1993.

1. Sub Divisional Magistrate: Chairman
2. Assistant Conservator of Forests/Range Officer
3. DSP or his representative having local jurisdiction

6.7.4.3 Penalties for Illegal Mining

The following penalties are defined under the Minerals and Mines Act:

Rule 21 (1) Whoever contravenes the provisions of sub-Section (1) or sub-Section (IA) of Section 4 shall be punished with imprisonment for a term which may extend to two years, or with fine which may extend to twenty-five thousand rupees, or with both.

(2) Any rule made under any provision of this Act any provide that any contravention thereof shall be punishable with imprisonment for a term which may extend to one year or with fine which may extend to five thousand rupees, or with both and in the case of continuing contravention, with an additional fine which may extend to five hundred rupees for every day during which such contravention continues after conviction for the first such contravention.

(3) Where, any person, trespasses into any land in contravention of the provisions of sub-Section (1) of Section 4, such trespasser may be served with an order of eviction by the State Government or any authority authorized in this behalf, by that Government and the State Government or such authorized authority may, if necessary, obtain the help of the police to evict the trespasser from the land.

(4) Whenever, any person raises, transports or causes to be raised or transported, without any lawful authority, any mineral from any land, and for that purpose, uses any tool, equipment, vehicle or any other thing, such

mineral, tool, equipment, vehicle or any other thing shall be liable to be seized by an officer or authority specially empowered in this behalf.

(4A) Any mineral, tool, equipment, vehicle or any other thing seized under sub-section (4) shall be liable to be confiscated by an order of the court competent to take cognizance of the offence under sub-section (1) and shall be disposed of in accordance with the directions of such court.

(5) Whenever, any person raises, without any lawful authority, any mineral from any land, the State Government may recover from such person the mineral so raised, or where such minerals [382] have already been disposed of the price thereof, and may also recover from such person, rent, royalty or tax, as the case may be, for the period during which the land was occupied by such person without any lawful authority.

(6) Notwithstanding, anything contained in the Code of Criminal Procedure, 1973, an offence under sub-section (1) shall be cognizable

The provision of seizure and confiscation of vehicle/ machine is a potent provision to deter illegal mining. It is noted that such seizure of vehicles/ machines engaged in illegal mining in the tract fosters great level of deterrence against the offenders.

6.7.4.4 Miscellaneous Prescriptions to Combat Illegal Mining

Considering that illegal mining has an organized crime character, the following prescriptions are made to protect forest land from illegal mining:

- **Anti Mining Squad:** A squad has been formed at the division level involving staff from multiple forest ranges to check illegal mining and take strong action. It is essential to keep the squad activated and organize frequent night raids along the Pabbar river belt to combat illegal mining. This is crucial as the jurisdiction of staff is highly fragmented and mining mafia often takes advantage of the blurring boundaries and lack of coordination
- **Vehicle for Night Raids:** The Achilles heel of the state of HP is that no vehicles exist at range level for patrolling. This has to be corrected if night raids are to be done effectively as most often the offenders with mineral are on the run from the mining site.
- **Focused Patrolling:** The mining menace is concentrated in certain areas like Mehndli, Patsari, Seema, Badiyara. There is a need for targeted patrolling in these areas during the early morning and night hours to

check illegal mining and mineral transportation. The bridge at Mehandli, Badiyara and the Seema belt are strategic points which most often yield success in night raids.

- **Drone based Monitoring:** The use of UAVs can be potent in checking illegal mining. It should be the endeavor of department to have specialized drones with large range which can detect and alert officials of illegal mining. AI based and thermal imagery drones shall be preferred.
- **Development of a Ground Level Intelligence Network** involving local interest groups and environmental conservation organizations
- **Joint Patrolling** with police officials and district administration
- **Nigh Nakas** at strategic points and check post demanding M form by authorized signatory
- **Destroying illegal paths/ Providing Fencing/ Barrier:** The vulnerability of Pabbar river bed to illegal mining stems from the accessibility offered by many kaccha paths that lead into the river bed from main roads. It is required to destroy or block of these paths using barricades/ fencing. However, it is to be observed that these need to done in pilot basis at SeemaKhatal before it is replicated for other mining sensitive areas considering the organized mining mafia may restore these paths or destroy the fencing/ barricading.
- **Law Enforcement and Levy of Penalties:** As discussed in the policy and law section, it is clear that the forest staff are delegated enough powers to not just detect offences of mining in forest and non-forest land but also levy penalties or take complaints to court in view of illegal mining, transportation or storage of minerals both under Indian Forest Act and the Mines and Minerals (Development and Regulation) Act. It is strongly prescribed that the forest guards, deputy rangers, Range officers patrolling the mining sensitive areas utilize these powers devolved and enforce the law. The powers of seizure of vehicles and compounding of offences with regard to mining have been extensively used in the past 3 years yielding increased revenue and penalties. It is recommended to continue using these provisions and increase the rate of patrolling to detect more offences.
- **Disposal of Seized Mineral:** The mineral seized shall be disposed off through conducting auction as defined under the Mines and Minerals Act by constituting a committee having mining department, revenue and forest officials. The timely disposal of mineral is necessary considering the need for safe keeping of the mineral resource.

6.7.5 Grazing

The tract is not having a significant threat from grazing except for certain parts. The tract being a horticultural economy, the dependence on cattle and livestock has over the years plummeted considerably. This has resulted in reduced demand for fodder grass for livestock. The apple crop has made its way into hitherto untouched parts of the tract including the remote villages of Dodra and Kwar. This transformation of the socio-economy of the area has reduced the grazing pressure on forests and reduced the threats resulting from local diurnal grazing.

However, the same cannot be said for migratory grazers especially the Gujjars. The migratory grazers have only increased their livestock and the number of livestock that actually graze in the forest is much larger than the actual number permitted by issuing of grazing permits. The Gujar population transcends to higher altitudes during summers where they enter the tract and recede to lower elevations where they move to districts of Sirmaur and Solan. The impact of migratory grazers is significant on the natural regeneration and plantations in the tract especially parts of Giri, Sanba forests (Jubbal Range), UF Lambidhar and Harshal Tibba (Tikker Range), Summerkot Block of Rohru Forest Range and Chhajpur Block of Saraswati Nagar Range.

The impact of local diurnal grazing is seen to be adverse in the forests of Dodra Kwar Range and parts of Khashdhar Range. The forests here are already having excellent growing stock and density. However, the young crop and plantations are adversely affected owing to the local grazing here.

The carrying capacity assessment of the tract was done in Part 1 of the plan and it is reproduced here below:

Total Area of Division (in Ha)	Area Closed for Plantation / ANR (in Ha)	Available Area for Grazing (in Ha)	Name of Cattle Animals	Number of Units	Number of Animals	Number of units in total	Required Grazing Area (in Ha)
130569.2	1075.55 ha.	17555.88ha.	Goat	1.5	3886	5829	2914.50
			Kine	4	5352	21408	10704
			Mule	5	563	2815	1407.50

			Sheep	1	23443	23443	11721.50
			Horse	4	426	1704	852
			Buffalo	6	30	180	90
			Donkey	3	229	687	343.50
							28043

Table 6.5: Detail of Grazing Carrying capacity in the tract

The assessment of carrying capacity reveals that the actual forest area of the tract being **130568.241 ha**. Whereas, the division actually requires an area of 28043 Hectare to accommodate all grazing animals.

The following prescriptions are made out with regard to controlling grazing and promoting sustainable management and utilization of resources in the light of grazing:

i) **Check on Number of Cattle of Migratory Grazers and Families:**

Number of Gujjar families arriving in the tract should be checked every year during the Summer season by concerned beat guard. In absence of permit, no families shall be allowed to settle in forest area. All forest guards shall enumerate the cattle in presence of grazer. If the number of cattle is greater than that given in the permit, he shall be asked to apply for permit in different area. Illegal grazers in the division should be identified and they should be immediately prosecuted and should be dealt under the provisions of Section 26 and 70 of the Indian Forest Act, 1927.

ii) **Permits and Carrying Capacity**

The carrying capacity of alpine pastures in the tract needs to be evaluated. As per the decision of the State Grazing Advisory Committee, no new grazing permit can be granted and number of cattle cannot be increased. The areas permitted for grazing should be reconciled with carrying capacity

iii) **Closures**

The areas which are highly disturbed due to grazing with extremely poor regeneration will be closed for regeneration for at least 10 years. The detail of all such areas are given below:

Sr.No.	Name of Range	Name of Forest Block	Name of Beat	Name of Compartment	Area prescribed for Closure
1	Bashla	Khadralla	Khadralla	UF Khadralla	15 ha.
2	Dodra Kavar	Kavar	Kavar	Kavar-I	20 ha.
3			Kavar	DPF Dogra	35 ha.
4			Kavar	UPF Hardwar gad	10 ha.
5			Kavar	Kavar-II	30 ha.
6		Kavar	Dodra	Gajainithach	80 ha.
7				UF Bhangru thach	165 ha.
8				DPF Kaibaltudhar	70 ha.
9				Bhog Thach	65 ha.
10		Jakha	Pandar	C.No. 69b pandar	120 ha.
11				DPF Amrich gad	400 ha.
12				DPF Ritkithui	150 ha.
13				Pisharagad	300 ha.
14			Jakha	DPF Tangankhai	150 ha.
15				DPF 69d Dodu	30 ha.
16				DPF Raigad	60 ha.
17				Khatuthach	160 ha.

Table 6.6. Detail of areas closed for regeneration

In such compartments being closed, inter link chain fencing/ solar fencing shall be used instead of barbed wire as it is durable, sturdy and cannot be easily broken in comparison to the wooden fencing/ barbed wire fencing which is frequently damaged by grazers. In case of closures, alternate grazing area may be provided to grazers which has healthy and young established crop. Grazing needs to be strictly prohibited in all plantations under maintenance and all ANR areas taken up in the last 10 years.

- iv) **Promotion of Stall Feeding:** The people should be encouraged for stall feeding. JFMCs/ Societies may develop mechanism of equal distribution of grass to villagers for stall feeding. The fodder grass can also be sold to neighboring villages through JFMCs.
- v) **Promotion of Grazing and Grass Collection in Established Forests:** It is to be seen that grazing and grass collection is greatly advantageous to forest management in forests which are established considering it greatly lowers the fuel load and checks forest fire incidents. In fact, grazing should be encouraged and promoted in such forest as it has a symbiotic relation with forest fire management. However, in young forests (PBIV) and plantations, only grass collection for stall feeding shall be permitted. With the advent of roads cutting across the hills, this has become a feasible proposal.
- vi) **Recognizing and Vesting Grazing Rights under Forest Rights Act:** There is a need to recognize and vest rights of Transhumant Pastoralist communities as Section 3(1) (d) of the Forest Rights Act confers the following rights to the community:

“Other community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access communities”

There is a need to settle, recognize and vest these rights clearly defining the limits of the rights in accordance with the carrying capacity of forests. In this context, it is important to evaluate the carrying capacity of the forests where such rights are claimed so that the extent of rights vested can be arrived at by the Sub Divisional Level Committee and District Level Committee under the act.

6.7.6 Muck and Debris Dumping: The forests in the tract as discussed above have numerous roads passing through them courtesy of massive diversions

under FRA, 2006 and FCA, 1980. The pace of road construction and widening is progressing at break neck speed. There are many roads which are being widened in the tract within acquired width. Apart from this, there is lot many construction activity going on in private and government lands owed by other department in the tract. These activities are generating muck and debris which are often arbitrarily dumped.

6.7.6.1 Impact of Dumping in Forest

- Adversely affects the ecology especially the young crop in the forest land
- Obstructs the smooth hydrological regime in forests: It is noticed that in many occasions debris dumping occurs in streams and catchment areas
- Prevents regeneration of the crop
- Alters the soil composition creating adverse conditions for vegetation

6.7.6.2 Prescriptions to Control Muck and Debris Dumping

- **Collection and Coalition of Road Development Works:** A potent way to control muck and debris dumping is to collect information from HPPWD regarding ongoing road development works. Based on this, patrolling and checking can ensue in these areas to check arbitrary dumping
- **Allotted Dumping Sites under Diversion Proposal:** Every forest diversion proposal is having dumping site allotted under it. A muck management plan is also part of the proposal. It is prescribed that beat guard and deputy ranger shall demarcate these areas in field and ensure that only such allotted sites are utilized for dumping
- **Strict Action Against Dumping:** The Indian Forest Act, 1927 is already having provisions to deal with the offence of unauthorized muck dumping. The rates of compensation for compounding of the offence are also notified by Shimla Forest Circle for the division. It is strongly prescribed that all beat guard and deputy rangers levy damages and take cognizance of muck/ debris dumping in forest land in accordance with the universally accepted principle of 'Polluter Pays'.
- **Seizure of Vehicles:** It is prescribed that all vehicles/ machines involved in the offence of debris dumping shall be seized under Section 52 of the Indian Forest Act, 1927 and be released only after the offence is compounded. The seizure of vehicles fosters great deterrence to offenders and sets an example to prevent such actions in future.
- **Inter Departmental Coordination:** There is a need to coordinate with HPPWD in this matter considering it undertakes maximum development activities in the state. An inter departmental committee involving

Executive Engineers of Rohru, Jubbal Divisions and Range officers has been formed to check on this aspect. This forum can be utilized to discuss the ongoing development works and how debris/ muck dumping can be avoided in forest land. HPPWD must be persuaded to ensure that for all developmental activities, they must have muck management and debris dumping plan incorporated into the DPR and tender document.

- **Rehabilitation of Dumped Sites:** The sites which have been brought under dumping for diversion may be gradually rehabilitated. Plantation is not prescribed on these lands in initial years especially in dumping sites having low soil depth. Broadcasting of grass seeds may be done in these sites initially to promote the growth of grass. At a later stage, plantation intervention may be made to rehabilitate dumping sites. A long term site specific plan is necessary to rehabilitate dumping sites.

6.7.7 Hunting and Poaching: The tract is not having any recorded case of hunting/ poaching of scheduled species under the Wildlife Protection Act, 1972. However, the tract is famous for a thriving gun culture in which guns are seen as a status symbol by the populace. Historically, hunting has also been part of the culture of the tract. In this context, it is gathered that hunting of wildlife is a major threat in the tract although it has been undetected for long periods of time.

The following prescriptions are made to control the threat of hunting and poaching of scheduled species:

- **Awareness Campaigns:** There is a need to enhance awareness among populace regarding importance of wildlife conservation and the presence of scheduled wildlife species like the Himlayan Black Bear, Common Leopard, Red Jungle Fowl, Khalij Pheasant, Western Tragopan, Himalayan Monal, Barking Deer, Himalayan Ghoral etc.
- **Increased Detection of Wildlife Crimes** through developing intelligence network, conduct of search/ seizures of wildlife articles and lodging complaint to the JMFC court as per the procedure detailed in the Wildlife Protection Act
- **Regulation of Gun Licenses:** The tract is having numerous gun licenses issued on account of self protection and crop protection. There is a growing need to regulate the number of these licenses taking into account if guns are really required for the applicant or not. Further, the district administration and police department needs to be requested to ask the residents to deposit guns having expired licenses.

- **Coordination with Wildlife Crime Control Bureau** to obtain intelligence, information and technical support

6.7.8 Unauthorized Collection of Minor Forest Produce

The tract is rich in Non-timber Forest Produce because of large number of medicinal plants which are found naturally in the region. In many cases, the smuggling and unsustainable utilization of these NTFPs have led to the decline of many species which are rare and threatened. These include the Rakhal, Bhojpatra trees found close to the tree line in the tract and the herbs/shrubs including Nag Chatri, Ban Kakadi, Kuth, Karu, Dhoop, Kashmal etc.

The following table summarizes the detail of NTFPs illegally collected or transported in the tract in last 10 years:

Sl. No	Range	Year	Name of Forest	Beat	Species	Volume/Quantity	DR No/ FIR No	Status of Case in Court
1.	KHASHDHAR	2021-22	UF Tangnu	Tangnu/Janglikh	Dhoop	6 Quntl	507/014 dt 16/2/2022	Compounded (30300/-
2.		2023-24	UF Dayara	Tangnu/Janglikh	Dhoop	100Kg	507/015 dt 4/9/2023	Compounded (6060/-
3.			UF Janglikh	Tangnu/Janglikh	Dhoop	7Quntl	507/016 dt 6/12/2023	Sent to DFO Rohru For Auction
4.	Rohru	2019-2020	C.No.55	Rantari	Guchi (Morche laesculenta)	5 kg	DR/No.003/50 to 10/50 8 No's DR chaked	Compounded for Rs. 6302.00

Table 6.7: Detail of unauthorized collection of NTFPs in the tract

Apart from the local people, the tract is also having threats of cross border smuggling of NTFPs in which Nepal internationals have been charge sheeted for smuggling of biological resources. In the year 2024, 3 Nepali nationals were arrested in the tract for smuggling of Maple Knots from Manjhivan beat of DodraKwar Forest Range. The extraction of Maple Knots by Nepali nationals and smuggling to Uttar Pradesh and Tibetan Monasteries is part of an organized crime in the state of Himachal Pradesh. The Rohru Forest

Division is also on the radar of these organized groups who keep targeting the patches with good density of Maple trees.



Figure 6.2: Rohru Forest Department Staff with Maple Knots Case Accused and Case Property

The following prescriptions are suggested for protecting the tract from unauthorized collection and transportation of NTFPs:

- **Survey and Documentation:** There needs to be a comprehensive study on presence, spatial distribution, abundance and density of NTFPs and medicinal plants in the tract
- **Strengthening of BMCs:** The Biodiversity Management Committees (BMCs) which is a statutory body under the Biodiversity Act, 2002 needs to be empowered. Currently, there is no coordination between BMCs and Forest Department with operation in silos. The BMCs need to be empowered for sustainable utilization of medicinal plants and improving benefit sharing
- **Developing Intelligence Network** of informants to provide information on smuggling of NTFPs
- **Law Enforcement:** The illegal collection and transportation of NTFPs need to be strictly acted upon by the forest staff utilizing the powers devolved under the Indian Forest Act Section 33 which prevents the removal of any forest produce from notified protected forests and Section 41 which prohibits illicit transport of forest produce. In case of foreign nationals, the powers devolved under the Biodiversity Act, 2002 shall also be used considering the act empowers Range officers to file complaints in

the court of law and provides for Secretary level officer in state to be an adjudicating officer delivering penalty to offenders under the act

- **Night Nakkas** during the period of harvesting post monsoon in the tract
- **Joint Patrolling at block level** during the possible period of NTFP harvesting can yield success
- **Enforcing the 4 year** NTFP harvesting and sustainable utilization cycle in respective beats.

6.7.9 Prosecution in Forest Offence Cases

There is a grave need in the tract to focus on prosecution in forest offence cases and improve rate of charge sheeting of offences in court after evidence collection. The following are the different laws and relevant sections in which powers have been delegated to forest officers to take cognizance of offence:

- **Indian Forest Act, 1927:** The offences of illicit felling, encroachment, muck dumping, unauthorized collection of NTFP, illegal grazing and mining can be dealt with by enforcing this legislation. The following powers can be used under the act
 - **Section 33:** This section details the various offences under the act which includes illicit felling, clearing or breaking up of land, removal of forest produce etc.
 - **Section 41:** This is the most frequently used section of the act which calls the illicit transit of forest produce as a violation. It is a potent section read with HP Forest Produce Transit (Land Routes) Rules, 2013
 - **Section 52:** Seizure of forest produce along with vehicle, tools, carts etc
 - **Section 52 A** (Included by the Second Amendment of the IFA by State of Himachal Pradesh in 1991): This is a potent section which enables the confiscation of the vehicle used in illicit transport of forest produce by the authorized officer i.e. the Divisional Forest officer
 - **Section 55:** Confiscation of the forest produce and the vehicle seized
 - **Section 64:** Power to arrest without warrant any suspect involved in an offence committed under the act.
 - **Section 68:** Power to compound offences under the act. The compounding powers and rates are further periodically notified by Shimla Forest Circle.

- **Section 72:** Power to Issue search warrant and to hold inquiry into a forest offence has been delegated to Divisional Forest officers in state of Himachal Pradesh. On basis of information placed before him, the DFO can issue search warrant to Range officer/ his authorized staff enabling them to collect evidences related to forest offence

➤ **Wildlife Protection Act, 1972**

- **Section 50** provides for the power to enter, search and seize wildlife articles and other vehicles, traps, weapons, tools used in committing wildlife crime
- **Section 50(8)** authorizes all officers above ACF rank to issue search warrants under the act to collect evidences in the investigation
- **Section 50(3)** provides for powers to detain a person provided to forest officer not below rank of Sub Inspector
- **Section 54** provides the power to officers above rank of DCF to compound offences except for offences in which minimum period of imprisonment is prescribed as per Section 51
- **Section 55** enables all officers above rank of RFOs in HP as notified by state government to file complaints to court under the act to take cognizance of wildlife crimes

➤ **Mines and Minerals (Development and Regulation) Act**

- As per government Notification dated 30.4.2011 all forest officials right from forest guard and above are competent to make complaints to court
- All forest officials above rank of RFOs are authorized to seize unauthorized extracted minerals along with vehicles and tools vide state government notification
- Rule 77(3): Any person who transports the mineral and who is required to carry a transit pass in Form-‘W’ or Supplementary Form-‘X’ on demand shall produce such pass to any authorized forest officer in this behalf;
- Joint Inspection Committee involving ACF/ROs who are to inspect mining/ quarrying site and report prior to leasing out. If land is forest land, then it requires to be countersigned by DFO.
- Rule 73 prescribes clear penalties for mining and forest officers are authorized under section 22 to levy such penalties and compound offence for first 2 times.
- Rule 81 provides for illegal transportation of mineral penalties

- **Himachal Pradesh Public Premises (Eviction and Rent Recovery):** The state government has notified DFOs as collectors under the act enabling them to issue eviction orders under Section 9 of the Act.
- **Biodiversity Act, 2002:**
 - **Section 3:** Prohibits foreign nationals from accessing biological resources in the tract. This section can be used to charge offenders engaging in cross border smuggling of minor forest produce
 - **Section 7:** Requires individuals accessing biological resources to intimate biodiversity board except for bonafide uses and indigenous practices
 - **Section 55 and 55A:** These sections of the act provide for penalties, adjudication of penalties by authorized officer of Secretary rank in state government. After the amendment, the offences under the act are no longer criminal in nature but attract fines and penalties as decided by the adjudicating officer
 - **Section 55B:** The section provides power to enter, search and inspect premises and the power to issue search warrants for DCF rank officers
 - **Section 61A:** This section read with Government of India notification enables Range Forest Officers to make complaints to the court for taking cognizance of offence

6.7.9.1 Prosecution Prescriptions and Procedure

There is an increasing tendency among the forest personnel to lodge FIR with police for all forest offences and sit idle on the case. This is an alarming tendency in the state which must be addressed immediately. There is a grave need to train forest staff in the state on techniques of investigation, evidence collection and charge sheeting cases independently in court. It is strongly prescribed that all forest offence cases except where the scale of offence is large and organized in nature needs to be investigated independently by the forest department. The following points may be noted by staff in prosecuting offence:

- **Lodging Forest Damage Report:** The Forest Damage Report lodged by the forest guard of the beat is equivalent to an FIR filed by the police. The beat guard shall clearly indicate the offence that was detected in his forest damage report and refer to the sections of the act which is violated in the damage report. The signature of the offender shall be taken in case offender is known and offence is compounded. If the offender is not known and only the offence is detected, then FDR shall be lodged for unknown offender mentioning the details of the offence detected.

- **Investigation Procedure:** In cases of forest offences, the investigation shall be done by the concerned Deputy Range Officer who shall be the IO of the case. A special team may be formed for investigation if deemed fit by Range officer and Deputy Conservator of Forests. The IO shall lead the investigation into the offence in terms of finding the culprits and also collecting the evidences in the process including statement of witness and accused. A case diary detailing each and every aspect of investigation shall be maintained by the IO which may be produced in court anytime during the trial
- **Arrest Procedure:** While making an arrest under any act, the forest officer shall follow principles laid down in Article 22 of the Constitution of India. This involves that the person shall be informed of the reason for arrest and his family shall be informed telephonically and by way of letter. The district legal services authority may also be informed of the arrest as per the mandate of Honourable Supreme Court. An arrest memo detailing the identity of the arrested person and the offence for which he is suspected to be involved shall be made recording his arrest. It shall have the date, time and location of the arrest.
- **Seeking Forest Custody:** In case of offenders arrested under the provisions of any act, their custody can be sought under Section 187 of BNSS by the forest department within 24 hours of making arrest by producing them before the Judicial Magistrate and seeking custody for interrogation and collection of further evidences. If their custody is deemed not essential, then they may be arrested and released on bail by an officer not below rank of RFO. There is a great need to develop facilities in the tract wherein such offenders can be safely kept under custody. Currently, the jail facilities of Police Department are being used for keeping arrested persons remanded in forest custody.
- **Seizure Memo:** Whenever forest produce or vehicles or any other case property is seized, then seizure memo with hammer mark shall be made by the concerned Deputy Ranger/ Forest Guard seizing the case property. The seizure memo shall clearly detail all the items seized. The forest guard concerned shall be responsible for the safe custody of all case property.
- **Complaint under Section 223 BNSS:** The Range officers can lodge complaints to magistrate under Section 223 so that courts take cognizance of forest offence. The complaint shall be comprehensive detailing the facts of the case and presenting all evidences collected during the course of investigation as admitted under the Bharatiya Sakshya Sanhita. The following documents shall be ensured to be part of the complaint lodged to court as a reference:

- Brief outline of the Complaint detailing offence and sections of the law violated
- Affidavit by the Range Officer
- Challan
- Parcha to Accompany Forest Offence
- Brief Facts of the Case
- Copy of Forest Damage Report lodged against offender
- Sketch Map of the spot of forest offence
- Seizure Memo recording the seizures of case property
- Statement of Accused recorded
- Witness Statements recorded
- Photographs of offence spot and case property
- Forensic reports if any
- Notification of the Forest under Indian Forest Act, 1927
- Demarcation Report of offence spot and Jamabandi
- Arrest Memo if any
- Bail Order if any
- Case Diary / Jimni detailing the course of investigation
- Call Data Records if any
- Certificate under Section 65-B for admissibility of electronic evidence
- Compartment History File of the forest in which offence occurred
- Registration Certificate of the Vehicle involved in forest offence

Considering these aspects as outlined above, it is strongly prescribed that forest guards, deputy rangers and range officers be trained and up skilled in independently investigating forest offences and taking offenders to court after completing the investigation procedure. It is strongly prescribed that workshops and training programs be organized along with law academies or police department for taking up forest offence prosecution.

6.7.7 Pests and Diseases: There are various insects, which cause damage to many tree species as defoliators, borers, moths, termites, caterpillars, grasshoppers etc. The main species being affected are Deodar, Chil, Kail etc. Damage to species at various stages, starting from the nursery, are being caused by different varieties of fungi. Root rot, damping -off are being caused in the seedlings in the nurseries. *Pythium*, *Fusarium* and *Cylindrocladium* are the major species causing damage in the deodar and Chil nurseries.

In plantations, heart rot, dryness of crown, root rot, cankers etc. have been observed. The tree species affected are mainly fir, spruce, deodar, Kail etc. *Cylindrocladium* has been found to cause a lot of damage mainly to the deodar trees and seedlings and the crop gives a look of a fire-damaged crop, when affected.

The intervention in such cases needs to be specialized. It is prescribed that if any such unusual dryness of trees is reported from the field, the institution of HFRI be sought for technical understanding, pathological analysis and setting up protocol for treatment.

Chapter-7

Grassland Conservation (Overlapping) WC

7.1 Name of Working Circle: Grassland Conservation (Overlapping) Working Circle

7.2 General Constitution of Working Circle: This working circle shall deal with the panwis and Alpine Pasture area of the tract. The main objective behind constitution of this working circle is to recognize the unique grassland eco system of both the dry grasslands in temperate and sub tropical areas and the alpine grasslands above the tree line and to conserve the eco system so that they continue to provide eco system services of provisioning fodder, biodiversity services and wildlife habitat.

7.3 General Characteristics of the Vegetation: General vegetation of this working circle is absent of trees or silvipastoral landscapes where trees are sparsely distributed in nature. The character of vegetation in the circle involves herbs, shrubs characteristic of dry grass land and alpine areas.

7.4 Felling Series, Cutting Sections and JFM areas: No felling is proposed in the working circle as the objective of constitution is to conserve grassland and not to harvest timber or remove salvage.

7.5 Blocks, Compartments and JFM area: The detail of grasslands covered through Panwi name and Alpine grassland area where the working circle shall operate is given as follows:

Khashdhar Range				
Sr.No.	RANGE	Name of Panwi	Geo Coordinates (Centre Point of Panwi)	Area (in Ha)
1	Khashdhar	Tului,Dhank	31°15'18.65"N 77°56'35.94"E	63
2		Mishni,Sheethra upto Katoch Dhank	31°14'27.68"N 77°54'34.39"E	75
3		Phundiani,Dhimi Dhank	31°15'29.57"N 77°57'55.58"E	325
4		Bara Panoo	31°16'11.78"N 77°52'46.36"E	75
5		Jabbal &Khatholigad	31°18'42.66"N 77°53'18.75"E	25
6		Kasholi Panoo	31°14'21.66"N 77°53'08.92"E	250

7	Khashdhar	Baghi Panoo	31°15'35.32"N 77°52'54.16"E	88
8		Sawni	31.2349259N 77.8513951E	500
9		Chanti Panoo	31.2372685N 77.8736119E	43
10		Garbu and Panwi	31.3001386N 77.8685640E	475
11		Pottuki Dhar	31.208747N 77.807733E	313
12		Anchishala	31.183702N 77.825098E	50
13		Jakhlinu	31.201420N 77.840902E	50
14		Tolga	31.201523N 77.826049E	3
15		Dhantatg	31.206798N 77.832368E	38
16		Topi tir okheti	31.174006N 77.839021E	50
17		Khashdhar Panwi	31°12'55"N 77°52'30"E	13
18		Pamshlu	31°12'13"N 77°51'25"E	15
19		Jatalta	31°11'45"N 77°51'05"E	0
20		Telga Khun Sandara	31°13'28"N 77°54'09"E	8
21		Gumausu	31°14'11.4"N 77°54'50.4"E	15
22		Sawani	31°13'27.24"N 77°50'28.07"E	313
23		Udru	31°18'18.87"N 77°48'15.96"E	88
24		Jalwari 1	31.249954° 77.808154°	50
25		Jalwari 2	31.240725° 77.812855°	44
26		Jalwari 3	31.266761° 77.808551°	13
27		Jalwari 4	31.221413° 77.825131°	13

28		Banoti 1	31.286907° 77.789743°	50
29		Banoti 2	31.294219° 77.795103°	25
30		Banoti 3	31.302222° 77.783339°	19
31		Banoti 4	31.308357° 77.790216°	13
32		Todsa 1	31.277964° 77.838670°	56
33		Todsa 2	31.241045° 77.835488°	38
34		Jakhnoti 1	31.235033° 77.863403°	150
35		Jakhnoti 2	31.287734° 77.850728°	75
36		Jakhnoti 3	31.297979° 77.865842°	63
37		Jakhnoti 4	31.301760° 77.880216°	13
38		Jakhnoti 5	31.324633° 77.883888°	25
39		Jakhnoti 6	31.330964° 77.880803°	13
40		Chirgaon 1	31.241460° 77.889174°	75
41		Sindasli 1	31.242557° 77.898650°	50
42		Sindasli 2	31.244578° 77.902791°	15
43		Sindasli 3	31.240888° 77.909853°	44
44		sindasli 4	31.248551° 77.919832°	94
45		Sindasli 5	31.255361° 77.941854°	88
46		sindasli 6	31.258859° 77.956036°	44
47		Diudi 1	31.256295° 77.966773°	188
48		Diudi 2	31.268898° 77.997710°	25

49		Khashdhar	31.210362° 77.877265°	13
50		Dalli	31.208963° 77.845115°	6
51		Diswani 1	31.202016° 77.814898°	25
				4191
Rohru Range				
Sr.No.	Range	Name of Panwi	Geo Coordinates(Centre Point of Panwi)	Area (in ha.)
1		Jhorla Panwi	31°15'01"N 77°45'31"E	150
2		Daun Panwi	31°14'05"N 77°45'31"E	0
3		Kutu Panwi	31°13'38"N 77°45'34"E	313
4		Mawi Panwi	31°14'22"N 77°46'54"E	649
5		Kothil Panwi	31°14'12"N 77°44'10"E	38
6		Buthara Kupa Ponoo Sortand	31°15'05"N 77°45'04"E	75
7		Suam Panwi	31°16'16"N 77°45'14"E	0
8		Hati Panwi	31°16'05"N 77°44'13"E	38
9		Samthi	31°15'41"N 77°45'17"E	2338
10		Sathali	31°15'44"N 77°44'43"E	63
12		Lamma andBulta	31°17'09"N 77°44'33"E	25
13		Bammala and Dalgaon	31°14'32"N 77°43'50"E	43
14		Sara Panwi	31°31'47.23"N 77°68'03.69 E	150

15	Rohru	Sanal Panwi	31°15'02"N 77°40'15"E	25
16		Khilargi (Mardi)	31°15'12"N 77°42'59"E	75
17		Khilargi (Duna Dhank)	31°26'04.77"N 77°07'18.754"E	13
18		Khanola(Banri Kar Dhank)	31°16'18"N 77°42'56"E	78
19		Bari (Mardi)	31°25'25.40 N 77°07'18.860 E	6
20		Noi (Pandli)	31°14'06"N 77°43'00.6"E	10
21		Noi (Pattnal Rarralgori Dhank)	31°13'57"N 77°42'31"E	15
22		Agai	31°10'55.52"N 77°49'00.72"E	5
23		Pijori Panoo	31°10'48.73"N 77°44'56.55"E	25
24		Danda& Sackle	31°10'48.88"N 77°44'01.13"E	75
25		Shilla Panoo	31°10'42.89"N 77°44'00.10"E	50
26		Bari & Tikuri	31°10'26.27"N 77°45'53.0 0"E	25
27		Kamli Dhar Panoo	31°09'43.38"N 77°46'24.45"E	325
28		Thamti & khaljun Panoo	31°10'04.43.38"N 77°46'12.04"E	25
29		Baggi	31°10'52.51"N 77°46'41.32"E	25
30		Goripith	31°09'59.94"N 77°43'41.30"E	188
31		Bahli Panoo	31°11'23.92"N 77°45'14.24"E	75
32		Khopru Panoo	31°11'32.60"N 77°44'41.96"E	25

33	Shaddar Panoo	31°11'14.91"N 77°45.06.91"E	20
33	Chhahal & Khashadhar Panoo	31°11'41.29"N 77°45'00.52"E	13
34	Kalini Panoo	31°11'58.27"N 77°46'24.04"E	38
36	Sirman & Koima Panoo	31°11'14.84"N 77°44'01.69"E	65
37	Sangrot ohar Nagadhar Sharmal & Dol Panoo	31°10'06.99"N 77°44'43.96"E	63
38	Gauri Panoo	31°10'01.82"N 77°44'20.46"E	30
39	Dagoli Panoo	31°11'49.88"N 77°46'44.20"E	50
40	Birhul Panoo	31°11'34.15"N 77°46'48.23"E	25
41	Lop letee	31°10'35.20"N 77°45'21.45"E	50
42	Rantari 1	31.224578° 77.763822°	75
43	Rantari 2	31.217712° 77.770495°	100
44	Dashalni Panwi	31.207079° 77.764088°	19
45	Samoli Panwi	31.212492° 77.781741°	38
46	Bijori Panwi	31.216734° 77.784528°	38
47	Samoli2	31.208412° 77.773682°	13
48	Rantari 6	31.214805° 77.763980°	13
49	Parsa	31.190647° 77.754516°	19
50	Lowerkoti 1	31.175513° 77.745392°	13
51	Shekhal	31.160953° 77.743295°	63

52		Sandour dhank and Panwi	31.151562° 77.747925°	75
53		Lowerkoti 1	31.161744° 77.752345°	50
				5808
Bashla Range				
Sr. No.	Range	Name of Panwi	Geo-Coordinates (Centre Point of Panwi)	Area (in ha.)
1	Bashla	Tharoo Panoo	31.189936 N 77.713381E	100
2		Phatoo Panoo	31.195621 N 77.703031E	13
3		Manghoo Dhar	31.199339 N 77.698573E	38
4		Rohal	31.186731 N 77.720779E	88
5		Banu, Deota Dhar	Not Known	0
6		Patrooni Panoo	31.192045N 77.730773E	38
7		Jamraski Panoo	31.187949N 77.726092E	0
8		Guttu ki Dhar	31.193084N 77.732806E	25
9		Mankla, Belti Suar	31.198369N 77.729360E	50
10		Bagor ki Dhar	31.199260N 77.736819E	38
11		Darkoti Dhar	31.156814N 77.728670E	63
12		Panpanoo	31.170332N 77.703542E	100
13		Karali Dhank	31.164989N 77.716528E	63
14		Shagar Panoo	31.178372N 77.705711E	100
15		Kala Kupar	31.170664N 77.712459E	63
16		Thinta Ka Dhank	31.176007N 77.718193E	38

17		Jamraski Panoo		63
18		Sharog 1	31.188201° 77.685825°	13
				888
Jubbal Range				
Sr. No	Name of Range	Name of Panwi	GPS Location	Area (in Ha)
1	Jubbal	Methi, Kalgaon & Ganga Nagar (Bangi Teer)	31°08'19" N77°37'44" E	5
2		Kot Dher	31°16'02" N 77°41'20" E	50
3		Mandhol & Cheewa	31.121320 N 77.694725 E	25
4		Matasa & Nakroari	31.135882 N 77.742004 E	38
5		Kala Dhank	31.150766 N 77.709453 E	30
6		Banoti & Chhianoo	31.162041 N 77.711628 E	0
7		Toni Jathan & Jhorki Dhar	31.134826 N 77.726721 E	163
8		Naktara Salawkra	31.111176° 77.656969°	31
9		Kaina	31.122947° 77.678912°	31
10		astandli	31.119059° 77.696055°	38
11		Astandli 2	31.120913° 77.714830°	13
12		Sari	31.125581° 77.724507°	50
13		Johta	31.137375° 77.722916°	6
14		thali	31.140861° 77.732507°	13
15		Sari	31.134407° 77.741430°	13
16		Badrol mandhol	31.135861° 77.700445°	13
17		Jharag		13
18		Shallan		6
19		Ganganagar		25

				560
Tikkar Range				
Sr. No	Name of Range	Name of Panwi	GPS Location	Area (in ha.)
1	Tikker	Dhula Dhank	31°12'94"N, 77°46'68"E	202
2		Dhale Bathoch	31°14'13"N, 77°37'42"E	152
3		Chambi + Pannu	31°13'16"N, 77°36'43"E	192
4		Sharsoo	31°13'38"N, 77°38'22"E	152
5		Khala Dhank	31°14'01"N, 77°38'20"E	152
6		Kausar Panu	31°13'66"N, 77°37'09"E	101
7		Nawaga Panu	31°13'09"N, 77°3	152
8		Naksetli 1	31.199345° 77.679424°	50
9		Kuthari	31.244800° 77.629073°	13
		Total		1165
Saraswati Nagar Range				
Sr. No	Name of Range	Name of Panwi	GPS Location	Area (in ha.)
	Saraswati Nagar	Mandal 1	31.145436° 77.750827°	25
1		Hatkoti	31.138586° 77.752949°	19
2		Mandal 2	31.135297° 77.761075°	188
3		Mandal 3	31.123586° 77.761340°	25
4		Mandal 4	31.139310° 77.785084°	13
5		Mandal 5	31.108168° 77.774715°	13
6		Mandal 6	31.108248° 77.787677°	50
7		Mandal 7	31.104688° 77.782613°	50
8		Mandal 8	31.097562° 77.807381°	50

9		Mandal 9	31.126048° 77.804952°	63
10		Kothu Panwi	31.096571° 77.795805°	150
11		Giltari Panwi	31.109793° 77.816441°	25
12		Giltari panwi 2	31.114533° 77.819688°	31
13		Jhalta Panwi	31.087435° 77.825722°	125
14		Chaunri	31.072089° 77.824594°	50
15		Dhanser 1	31.083814° 77.831511°	88
16		Mugra	31.060990° 77.805708°	100
17		Kuddu	31.089774° 77.794943°	13
18		Salna 1	31.036045° 77.814198°	88
19		Salna 2	31.042114° 77.799636°	100
20		Shashan	30.983404° 77.802305°	25
21		Malog	31.093064° 77.764446°	88
22		Ghyan Panwi	31.102803° 77.757836°	50
23		Sawra 1	31.093867° 77.738950°	21
Sub Total				1446
Grand Total				14058

Table 7.1: List of Panwis in the tract

Total area: Panwis+Alpine Pasture- 14058+38670.33= 52728.33 ha

7.6 Special Objectives of Management: The following are the objectives of management:

- i) To evaluate and assess the carrying capacity of the area with respect to the goat, sheep and cattle for grazing.
- ii) To regulate of closure of grazing in vulnerable areas.

- iii) To develop and improve Silvi-pastoral system in vacant areas.
- iv) To conserve the unique grassland eco system recognizing the eco system services and preventing the change of ecological character

7.7 Silvicultural System: No silvicultural system is prescribed for the working circle as it largely is forest land without any tree cover.

7.8 Miscellaneous Prescriptions for Management

7.8.1 Fire Protection in the case of Panwis

A large number of forest fire incidents occur in the Panwi area of the tract considering these are dry grasslands with fuel load vulnerable to fires. There is a great threat that these grassland eco systems in future may turn out to be net carbon emitting in nature and contribute to climate change in a negative manner. In this context, there is a great need to prevent and mitigate fire incidents especially with regard to Panwis. The following are the main measures prescribed to prevent and mitigate fire incidents in Panwis:

- **Control Burning:** It is prescribed to control burn Panwis especially along road side for a width of at least 3 meters along the length of road. This can greatly help relieve fuel load and prevent occurrence of stray fire incidents emanating from miscreants.
- **Management of Horticulture Waste:** There is a great need in the tract to devise proper management and disposal of Horticulture waste. In this regard, an incentive based model of procurement of horticulture waste for bio fuel production is prescribed.
- **Taking Needful Legal Action:** There is a rampant disdain among horticulturists towards forest fires and dry grassland fires especially in the dry winter period. There is a need to enforce law and utilize provisions under Indian Forest Act to deter those fire kindling horticulturists who endanger forest and grassland wealth.

All other associated measures as suggested for fire protection is to be followed for Panwis also wherever applicable and feasible.

7.8.2 Conservation of Grassland Eco system

It is prescribed to prevent the change of true ecological character of the grassland ecosystem whether it is dry grassland/ alpine grassland. It is strongly prescribed to avoid plantation in both Panwis and Alpine grassland as it will result in undue interference with the natural ecosystem which is unique and

provides eco system services of provisioning fodder, climate regulation and water provisioning.

Further, there is a threat of soil erosion and landslides in alpine pastures in certain areas. In this regard, various soil moisture conservation measures are prescribed in terms of check dams, check walls, crate wire structures, brushwood check dams based on site specific attributes and necessity.

7.8.3 Regulation on Local Grazing

The tract has witnessed a drastic drop in diurnal grazing and local grazing with many of the residents of the tract being very affluent owing to apple crop. In this context, there is no major step required to be taken to regulate local grazing. The complete detail of livestock for all panchayat in the tract is given in Appendix-XXV in Volume-II of this working plan.

There is a need to encourage grass collection from Panwis and facilitate grazing in this dry grassland eco system to reduce the fuel load and prevent fires. Stall feeding can be encouraged to prevent stray incidents further.

7.8.4 Regulation on Migratory Grazing

There are numerous areas in the tract where migratory grazers are given recorded permits in the tract. This include the tribal communities of Van Gujjar and Gaddi Tribe which are dependent on the alpine grassland and other forest areas for fodder. These nomadic and transhumant who have been for generations dependent on forest land and grassland eco systems. There is a need to recognize the rights of these traditional forest dwelling scheduled tribes to safeguard their dignity as per the Forest Rights Act, 2006.

As per Section 3(1)(d) of the Forest Rights Act, the rights of these communities have been described as other community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastoralist communities. It is strongly prescribed to recognize the rights of these nomadic pastoralist communities in order to correct historical injustice and vest formally the rights of these communities who are dependent on forests.

There is a need to evaluate the carrying capacity of the forests in which rights are to be vested/ currently permits are issued in order to compare the number of cattle units possessed by the grazer against the available forest area. It is prescribed to strictly restrict the number of cattle units below the carrying capacity in the respective forests on the basis of 0.5 Ha per cattle unit.

The route of migratory grazers shall also be monitored to ensure that higher alpine reaches where there are threatened and endemic species exists are prevented from being accessed for grazing. It is strongly prescribed to define and enforce the route of grazing in order to safeguard the biodiversity of alpine area in the tract.

7.7.5 Long Term Ecological Monitoring

It is prescribed to lay permanent research plots for LTEM in order to understand the effects of climate change and the trend of biodiversity in alpine areas. It is generally noticed that there is a drastic increase in temperatures and reduction in glacial and alpine areas greatly changing the biodiversity of this landscape. The alpine areas of Chanshal Pass, Moral Danda, Chandernahan, Rupin Pass are required to be surveyed for this exercise to essentially document the trends of biodiversity in the backdrop of global warming.

Chapter-8

Plantation (Overlapping) Working Circle

8.1 Name of Working Circle: Plantation (Overlapping) Working Circle

8.2 General Constitution of Working Circle: This working circle covers the blank areas and under stocked forests of DPF and UF in the entire tract. The poorly stock forests and blank areas will be taken up for plantation of suitable species to increase forest cover, carbon stock and productivity of forests of Rohru forest division. This Working Circle will include forest areas suitable for plantation taking into account factors of fire vulnerability, previous plantation and its survival, grassland character, terrain.

8.3 General Characteristics of the Vegetation: This working circle is proposed for poorly stocked natural forests of Rohru Forest Division which are mostly open forests, moderately dense forest and scrub lands. The forest areas targeted in this working circle involve low density forests.

8.4 Felling Series, Cutting Sections and JFM areas: Since this working circle is plantation working circle no felling will be carried out.

8.5 Blocks, Compartments and JFM area: It is strongly prescribed to undertake plantation in encroachment evicted forest lands. The following table gives information on forest compartments which is included in this overlapping working circle which is having the potential of plantation:

Sr No.	Range	Name of Forest	Area Available for Plantation currently (in Ha.)	Area Available for plantation in Future (in Ha.)
1	Bashla	C.No.35b Barara	0.7065	
2		UPF Bahali	2.4857	
3		UPF 012 ferly	24.5957	
4		UPF Antapu	3.675	
5		UPF Kanda	4.6225	

6		NAC Gantoli	0.3555	
7		C.No.32b	1.01	
8		C.No.32a	4.4372	
9		UPF011	10.0019	
10		C.No.31a (i)	7.363	
11		C.No.31 b Koti	6.0296	
12		C.No.31a (iv)	0.0565	
13		C.No.31a (v)	1.4936	
14		C.No.31a (iii)	0.0436	
15		DPF Bashla	0.5498	
16		UPF09	11.6692	
17		DPF Malkhoon	3.4088	
18		UPF Mundiban	0.4346	
19		C.No.30 d	0.3098	
20		C.No 30 c (i)	0.3098	
21		DPF Bhalara	0.2342	
22		C.No.30 b	162	
23		C.No.30 b (i)	0.2733	
24		C.No. 29 d	0.152	
25		C.No. 29 c	1.3421	
26		UPF 08	24.3234	
27		C.No.28 b	2.3202	
28		C.No.29 a	3.0199	
29		UPF Rehri	0.9599	
30		C.No. 28 a	0.9599	

31		C.No.41 c	4.9786	
32		DPF Kewli	1.1182	
33		C.No.41b	0.7097	
34		UPF Pekhadhar	0.2439	
35		C.No.41 a	0.2394	
36	DodraKawar	UPF Kawar I & ii	12.0755	
37		UPF Raigad	2.1244	
38		UPF Dodu	1.1717	
39		UPF Paba	1.737	
40	Jubbal	C.No. 11 Kalgaon	3.97106	
41		C.No.18a Mandhal	8.2661	
42		C.No.18b Sari	3.6913	
43		C.No.19a Jharag	3.1562	
44		C.No.19b Jharag	1.4872	
45		C.No.17 Baral	1.8111	10
46		C.No.13a &13b Ganga Nagar	0.221	0.8
47		C.No.12 Nahal	0.209	
48		C.No. 14c Sheel	0.9585	
49		DPF Giri 1a	6.6763	14.00
50		UPF Badhal	36.7477	
51		UPF Chunjar	21.2455	
52		UPF KalgaonTeer	141.5682	
53		UPF Kalontha	0.9018	
54		UPF Kohlara	7.7395	

55		UPF Sanaba	13.1071	
56		UPF Sundli	0.8319	
57		UPF Deem	4.2558	
58		UPF Jachli	7.2745	
59		UPF Mural	1.6724	
60		UPF Ori	8.5755	
61		Orthers	83.0343	
		DPF Giri 1b		2
62	Rohru	C.No.85	1.0258	
63		UPF Dhara	8.0949	
64		UPF Parsa	1.5667	
65		C.No.84 b	3.4347	
66		UPF Munakdhar	5.1102	
67		UPF LowerKot	2.0294	
68		UPF Diyari	5.7424	
69		UPF Baggi	1.4911	
70		C.No.82 a	4.8435	
71		C.No.82b	0.1811	
72		C.No.83a	0.8521	5
73		C.No.83c(ii)	0.94	5
74		UPF Baggi	0.4008	
75		C.No.83 b(iii)	2.2957	
76		DPF Nirja	3.0503	
77		UPF Jhatwari	1.0575	
78		C.No.83 b	0.1635	

79		C.No.83 b(ii)	1.2306	
80		C.No.83 b(i)	0.2822	
81		C.No.83cii)	0.5486	
82		UPF Sanji	0.4809	
83		C.No.52 b	0.5863	3
84		UPF18	6.2326	
85		C.No.51 a(i) Brethle	10.8323	
86		UPF jakhar	1.7493	
87		UPF Bari Nalla	0.9193	
88		UPF Bhamnala	2.0633	
89		UPF 19	1.5415	
90		UPF Kurki	1.5956	
91		UPF Kashkandi	6.5521	
92		UPF Kutara	11.4082	
93		UPF BauliNala	1.605	
94		UPF17	2.5814	
95		C.No.53 a	0.4	
96		UPF Katmori	10.3655	
97		UPF Kutu Parnw	7.0731	
98		UPF 21	2.1878	
99		UPF Kharsu	5.9522	
100		UPF 22	5.3334	
101		C.No.53 b(i)	0.9396	
102		C.No.54	0.4516	
103		UPF ManuPanu	1.4339	

104		UPF Bijori	3.172	
105		C.No.55 a	4.7552	
106		UPF Majani	0.2845	
107		C.No.37C	2.8589	
108		C.No.40a	2.6362	
109		C.No.37d	1.0792	
110		C.No.37a	2.6771	
111		C.No.37b	1.0118	
112		C.No.36	0.457	
113		C.No.46 a(ii)	3.3814	
114		UPF Sharmali	0.2124	
115		C.No.40 b	0.3758	
116		C.No.43a(i)	0.8931	
117		C.No45 b(i)	3.0332	
118		C.No46 b(ii)	0.6708	
119		C.No46 b(i)	0.944	
120		C.No.44	0.3755	
121		C.No.47	0.4159	
122		C.No.50	3.2774	
123		UPF Bari	6.0051	
124		UPF Bhoot	8.2616	
125		UPF Jagothi	0.8935	
126		UPFNoi	0.901	
127		UPF Khanola	0.5546	
128		DPF Khanola	0.3813	

129	khashdhar	C.No.61A Jakhnoti	2.116	
130		C.No.61A& B Jakhnoti	2.2676	
131		CNO.57 Bahali	11.2288	
132		UF Dhagoli	0.1694	
133		C.No.59 bhamphar	0.2335	
134		UF Giyari	1.2878	
135		C.No.62a Chiroti	2.3201	
136		UF Andra	0.8965	
137		C.No.60 Dunna	3.1899	20
138		C.No.62b Chiroti	0.2223	
139		C.No.58 Pujarli	1.4928	
140		UF Gonsari	1.5718	
141		UF Baghi	1.8917	
142		UF Mangyari	0.8495	
143		UF Rausi	0.8315	
144		Uf 34 Dolizan	3.0999	
145		C.No.65A Khabal	0.41	
146		UF betyani	0.8368	
147		UF Diudi	0.3712	
148		UF denwari	3.527	
149		UF Gad Panu	0.5181	
150		UF Masli	1.3354	
151		UF Telga	8.7087	

152		C.No.73 a Telga	2.9534	
153		C.No.81B Kayani	0.2221	
154		UF Diswani	3.2159	
155		C.NO.73C Telga	0.305	
156		UF Sandasu	2.0255	
157		C.No.80A Diswani	4.2404	
158		C.NO.81A Kayani	1.4157	
159		UfKhasdhar	6.6572	
160		C.No.74A11 Khasdhar	0.7722	
161		UF Masli	0.4276	
162		C.No.77A Dhak	0.822	
163		UF Dali	0.7575	
164		C.No74A1 Khasdhar	0.146	
165		UfJakhi	0.4195	
166		UF 49 Telga	0.4988	
167		72b Gumma	1.1295	
168		UF Larot	4.1775	
169		UF 45 Larot	0.9111	
170		UF Thali	1.4065	
171		UF Nandla	1.6235	
172		UF Banoti	1.733	
173		UF Ranol	0.2674	
174		UF Thana	0.7173	
175		UF Koila	0.9653	

176		UF Gumna	0.904	
177		UF Amboi	2.0936	
178		72A kharshali	0.3894	
179		UF jhalwari	0.4981	
180		DPF Mathla	0	5
		DPF Pokhridhar 81 b	0	3
180	Sarswati Nagar	C No 1 Jond	3.019	
181		C No 2 Jond	22.836	
182		UPF Saskir	10.8502	
183		UPF Chhajpur	7.397	
184		UPF Shallar	31.1	
185		UPF Jharashli	9.0943	
186		KathasuMuhall	6.7966	
187		DPF Chhajpur	1.88	
188		UPF Malog	1.6274	
189		UPF Shirol	19.7562	
190		UPF Giltari	15.804	
191		UPF Jhalt	13.476	
192		UPF Dharmana	1.2061	
193		UPF Sainj	0.4833	
194		UPF Dhansar	1.601	
195		UPF Kawalta	0.7726	
196		UPF Sharana	4.9989	
197		DPF Naliban	0.6488	

198		UPF Ghyan	0.1539	
199		UPF Mihana	0.0859	
200		DPF Kayala	0.826	
201	Tikkar	UF Umladwar	3.882	
202		UF Lambidhar	1.7431	
203		UF Seri	1.9401	
204		C.No03 P harog	0.3612	
205		C.No04 Hanstari	3.4113	25
206		C.No06 b Tikkar	0.2264	
207		UF Shalni	1.6206	
208		C.No220Pujarli	5.7901	
209		UF Koti	9.4884	
210		UF Khalai	0.7583	
211		C.No. 21 Friunkoti	0.9005	
212		UF Kharla	0.3768	
213		UF Tutupani	6.1588	10
214		UF Jarla	2.9566	
215		UF Bamla	2.3165	
216		C.No06 c Kasheni	3.9936	12
217		UF Sitli	4.3147	
218		C.No07 Sharontha	12.9231	
219		UF Tangri	1.9301	
220		UF Fieldbag	3.6081	
221		UF Thanabag	1.2994	

222		C.No. 9 a Karchari	0.763	25
223		UF Sazar	0.6653	
224		UF Sholdu	3.3464	
225		UF Khangta	0.3763	
226		C.No 20 a Jagterly	0.7434	
227		UF seao	0.5413	
228		UF Harshal Tibba	33.4884	20
		Total	1192.48636	

Table 8.1: Encroachment evicted areas available for plantation

Sr.No.	Range	Name of Forest	Available Area
1.	Jubbal	UF Deem	20 ha.
2.		UF Jachli	5 Ha.
3.		UPF Muril	5 Ha.
4.		DPF Muril II	10 ha.
5.		UPF Ori	15 ha.
6.		UPF Snaba	10 ha.
7.		DPF Muril	15 ha.
8.		UPF Chunjar	10 ha.
9.		C.No. 12 Nahal	5 ha.
10.		C.No. 11 kalgaon	15 ha.
11.		C.No. 17 Brall	3 Ha.

12.		C.No. 19 b Jharag	3 Ha.
13.	Khashdhar	Uf Dalidhar	5hact.
14.		Uf Dali	5hact.
15.		UF Sandasu	5hact.
16.		UfChuwagad	10 hact.
17.		UF Gyari	3 hact.
18.		Uf Andhara	10hact.
19.		C.No.57 Bahali	5 hact
20.		UfGoskwari	10hact
21.		Uf Katargad	20 hact.
22.		Uf Diudi	10hact.
23.		UF Banoti Udru	20 hact
24.		UF Tiproli	5hact.
25.		UF 29 Devidhar	5hact.
26.		UF Nandla	10hact.
27.		UF Jhalwari	10hact.
28.		Uf Riot	10hact.
29.		C.No.72b 1 &11 Gumma	5hact.
30.		C.No.71b Naluk	5hact

31.		UF Larot	5hact.
32.		DPF Jailot	5 hact.
33.		UPF Pujarli	3 hect.
34.		UPF Daula Tir	10 hect.
35.		UPF Gaonsari	5 Hect.
36.		UPF Jabal	20 hect.
37.		UPF Khabal	30 hect.
38.	Rohru	UPF -Pathrala Thach	5 hac
39.		UPF -53	10 hac
40.		C. No. 84 c (i)	2 hac.
41.		Kui	2hac.
42.		Kui	1.5 hac
43.		Kui	1.5hac
44.		Kui	1.5 hac
45.		UF Khanola	3hac
46.		UF Bhooth	5hac
47.		UF Badi	3hac

48.		47d	3 hac
49.		C.No.55 b Rantari	5 hac
50.		C.No.55 a Rantari	3 hac
51.		C.No.52	5 hac
52.		UPF Kutara	5 hac
53.		C.No.54a	15 hac
54.		C.No.44 Jaunli	5 hac
55.		C.No.46 a(ii)	5 hac
56.		C.No.46 a iii	3 hac
57.		UPF Katmori 21	5 hac
58.		UPF Kundgad	10 hac
59.		DPF c.No. 84a	2 hect
60.	DodraKawar	Nil	Nil
61.	Bashla	C.No.34 Sharog	3 Ha
62.		U.P.F.12 Ferly	7 Ha
63.		UF 11 Lambidhar	5 Ha
64.		C.No.31a(i)	4 Ha
65.		UPF-Rehri	3 Ha
66.		C.No.29a	5 Ha
67.		C.No.28b	3 Ha
68.	Tikkar	UF Sholdu	10 hac

69.		UF Harshal Tibba (Deorighat)	30 hac
70.		C.No -4 ab Hanstari	10 hac
71.		UF Lambidhar	5 hac
72.		UF Koti	10 hac
73.		C.No-24 b Khalai	5 hac
74.		UF Bamla	20 hac
75.		C.No -7	5 hac
76.		C.No -9 b	3 hac
77.		UPF Chambi 3	5 ha.
78.		UPF Shalni	10 ha.
79.		DPF Kadiwan	10 ha.
80.	Saraswati Nagar	UPF Dhadi	5 ha
81.		DPF Salantu	10ha
82.		UPF Saskir	5 ha
83.		DPF Jakhi C No 4	5 ha
84.		DPF Naliban	5 ha
85.		UPF raika	5 ha
86.		UPF Malog I	5 ha
87.		UPF Malog II	5 Ha

88.		UPF Mugra	10 ha.
89.		UPF Salna	10 ha.
90.		UPF Sainj	20 ha.
91.		Shiroli	10 ha
92.		DPF Jakhi C.No. 3	5 ha.
93.		UPF Dhanser	10 ha
94.		DPF Chaounriser	10 ha.

Table 8.2 Forests compartments available for plantations

8.5 Special Objectives of Management: The special objectives of management are:

- (i) To improve carbon and growing stock of understocked forests in the tract
- (ii) To manage the degraded, sparsely stocked and blank forests on scientific basis to increase the area under forest cover in line with the national forest policy targets
- (iii) To enhance carbon sinks in the recorded forest area and make meaningful contribution to the intended nationally determined contributions of government of India with respect to the goal “ To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030”
- (iv) To provide wood and fodder to meet the needs of rural people living in and around forests as mandated by the national forest policy.
- (v) To protect and nurse the existing plantations and natural young growth from forest fires and drought conditions by clearing fire lines, removing grass and watering of plants.
- (vi) To protect and consolidate forests from encroachment by fencing and undertaking plantation in evicted forest lands

8.6.1 Analysis of crop:

Stock maps have been prepared using modern technologies of open series maps (OSMs) on a scale 1:15000 both in digital and analogue form. The maps have been placed in Compartment History files.

The area under the working circle is having poor regeneration and is not rich in NTFP bearing species. The site quality of these forests are also lagging in nature.

Density: The crop density in these forests are low considering they are understocked forests with blank portions and scattered tree growth. These are largely open density forest which needs to be converted to moderate density forests.

8.7 Plantation Prescriptions: Based on availability of different types of lands outside the forest area and the need of the local people, the following plantations are proposed to be taken up under this working circle-

- i. Enrichment Plantations in Recorded Forest Area (RFA)
- ii. Social Forestry
- iii. Extension Forestry

- i. **Enrichment Plantations:** The main objective behind enrichment plantation in RFA is to improve the population density of the forest along with the species richness with regard to improving the growing stock and carbon sinks in the tract. In prescribing such enrichment plantations, it is prescribed to have site specific norms and selection of species based on the altitude, edaphic factors, climate and other factors. Wherever the number of plants per Ha is on the lower side, it is prescribed to go for tall plants.

There is a need to have site specific plantation estimates considering each site has its own unique characteristics. Some sites in the tract are having rocky terrain needing the import of soil. Few of the barren blank sites are requiring bio engineering interventions along with plantation. The sites in the tract are also having differences in accessibility with some of these sites being road side plantation sites and some of the sites being remote and away from main road. This also affects the choice of fence posts whether RCC fence posts be utilized or wooden fence posts be utilized. Considering these aspects, it is prescribed to have site specific plantation models wherever feasible. It is prescribed to

undertake enrichment plantations in potential plantation areas listed in table 8.2.

It is prescribed to not undertake any plantation in following areas strictly:

- Plantations may not be undertaken in Panwis or dry grasslands which is completely blank and having high vulnerability of fire
- Plantations may be avoided in Chil forest working circle considering the predominance of Chil in these forests and the presence of flammable biomass on the forest floor
- The alpine pastures above tree line shall not be taken up for any plantation activity whatsoever
- Blank areas having extremely refractory slopes, severely steep terrain with acutely low soil depth are to be avoided

The following forests may not be taken up for any plantation related activity:

1. Forests under Chil working circle may not be taken up for plantation:

Reserve Forests			
Range	Block	Beat	Compartment
Saraswati Nagar	Kuddu	Kuddu	Batar
Demarcated Protected Forests			
Bashla	Bashla	Bashla	Jhaltu 31 a (vi)
Saraswati Nagar	Chhajpur	Sawra	Naliban
	Kuddu	Kuddu	Kuddu
			Kashta 2

		Pandranu	Sainj
			Saran a
			Saran b
			Shashan 11
			Shashan 12
		Shashan	Salantu
			Shashan 1
			Shashan 2
			Shashan 5 a (i)
			Shashan 5 a (ii)
			Shashan 5 b
			Shashan 7 a
			Shashan 7 b (ii)
			Shashan 7 b(i)
			Shashan 9 a
			Shashan 9 b
	Mandal	Dhansar	Chaunri-Ser (i)

			Chaunri-Ser (ii)
Newly Notified Demarcated Protected Forests			
Range	Block	Beat	Compartment
Saraswati Nagar	Chhajpur	Chhajpur	DPF Dharmana
	Mandal	Jhalta	DPF Kharshal
	Kuddu	kuddu	DPF Kudu
Un Demarcated Protected Forests			
Range	Block	Beat	compartment
Rohru	Gawas	Lowerkoti	Goripith
Saraswati Nagar	Mandal	Dhanser	Dhanser part- II
		Dhanser	Chaunri
		Mandal	Jherashali
	Chhajpur	Chhajpur	Sansog
	Kuddu	Kuddu	Dhadi
			Salna
			Mungra
			Kudu
		Shashan	Saskir
		Pandranu	Sainj

Table 8.3 List of compartments of Chil WC not prescribed for plantation

2. Dense and Fire prone forest compartments not prescribed for plantation:

Reserved Forests				
Sr. No.	Range	Block	Beat	COMPARTMENT
1	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur 14 a(i)
2	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur 14 a(ii)
Demarcated Forests				
1	Bashla	Arhal	Arhal	Brasli 33 a
2	Bashla	Arhal	Arhal	Brasli 33 b
3	Bashla	Arhal	Sharog	Brara 35 a
4	Bashla	Arhal	Sharog	Kargad 35 b
5	Bashla	Arhal	Sharog	Sharog 34
6	Bashla	Bashla	Bashla	Bashla 31 a (i)
7	Bashla	Bashla	Bashla	Bashla 31 a (ii)
8	Bashla	Bashla	Bashla	Jhaltu 31 a (iii)
9	Bashla	Bashla	Bashla	Jhaltu 31 a (iv)
10	Bashla	Bashla	Bashla	Jhaltu 31 a (v)
11	Bashla	Bashla	Bashla	Jhaltu 31 a (vi)
12	Bashla	Bashla	Bashla	Koti 31 b
13	Bashla	Bashla	Bhalara	Balara 30 a
14	Bashla	Bashla	Bhalara	Balara 30 b

15	Dodra Kawar	Jakha	Jakha	Dhudu 69d
16	Dodra Kawar	Jakha	Jakha	DPF Jakha
17	Dodra Kawar	Jakha	Jakha	DPF Tangan Khai
18	Dodra Kawar	Jakha	Jakha	Paba 69 c
19	Dodra Kawar	Jakha	Manjivan	DPF Bhujod Dhar
20	Dodra Kawar	Jakha	Manjivan	DPF Kalyan Thach
21	Dodra Kawar	Jakha	Manjivan	DPF Kandarthach Gad
22	Dodra Kawar	Jakha	Manjivan	DPF Manjhiwan
23	Dodra Kawar	Jakha	Manjivan	DPF Moti Dhar
24	Dodra Kawar	Jakha	Manjivan	Pandhar 69 a
25	Dodra Kawar	Jakha	Pandhar	DPF Amrich Gad
26	Dodra Kawar	Jakha	Pandhar	DPF Miyan
27	Dodra Kawar	Jakha	Pandhar	DPF Pandar
28	Dodra Kawar	Jakha	Pandhar	DPF Pisar Gad

29	Dodra Kawar	Jakha	Pandhar	DPF Radki Thui
30	Dodra Kawar	Jakha	Pandhar	Jakha 69 b
31	Dodra Kawar	Kawar	Dodra	Batari gad 69 f (i)
32	Dodra Kawar	Kawar	Dodra	Batari gad 69 f (ii)
33	Dodra Kawar	Kawar	Dodra	DPF ButariGad
34	Dodra Kawar	Kawar	Dodra	DPF Dodwaltigad
35	Dodra Kawar	Kawar	Dodra	DPF GajyaniThach
36	Dodra Kawar	Kawar	Dodra	DPF Kaivaltu
37	Dodra Kawar	Kawar	Dodra	DPF Kalapani
38	Dodra Kawar	Kawar	Dodra	DPF KhaituThach
39	Dodra Kawar	Kawar	Dodra	DPF Kharshuwala
40	Dodra Kawar	Kawar	Dodra	DPF Moryantu
41	Dodra Kawar	Kawar	Kawar	Chineon 69e
42	Jubbal	Jubbal	Badhal	Giri 1a
43	Jubbal	Jubbal	Badhal	Giri 1b

44	Jubbal	Jubbal	Badhal	Giril 1c
45	Jubbal	Jubbal	Muril	Muril 4 a (i)
46	Jubbal	Jubbal	Muril	Muril 4 a (ii)
47	Jubbal	Jubbal	Muril	Muril 4 b (i)
48	Jubbal	Jubbal	Muril	Muril 4 b (ii)
49	Jubbal	Jubbal	Muril	Muril 4 b (iv)
50	Jubbal	Jubbal	Muril	Muril 4 c
51	Jubbal	Jubbal	Muril	Muril4 b (iii)
52	Jubbal	Jubbal	Shilli	Giri 2a
53	Jubbal	Jubbal	Shilli	Giri 2b
54	Jubbal	Jubbal	Shilli	Giri 2c
55	Jubbal	Jubbal	Shilli	Giri 3a
56	Jubbal	Jubbal	Shilli	Giri 3b
57	Jubbal	Jubbal	Snabha	Giri 4a
58	Jubbal	Jubbal	Snabha	Giri 5a
59	Jubbal	Jubbal	Snabha	Giri 5b
60	Jubbal	Jubbal	Snabha	Giri 5c
61	Jubbal	Jubbal	Snabha	Giri 5d
62	Jubbal	Sheel	Mandhol	Jharag 19b
63	Jubbal	Sheel	Mandhol	Kadol 19a
64	Jubbal	Sheel	sheel	Badrol 15b
65	Jubbal	Sheel	sheel	Gadgaon 14b
66	Jubbal	Sheel	sheel	Sheel 14c

67	Jubbal	Sheel	sheel	Tumbru 14a
68	Khashdhar	Chirgoan	Chirgoan	Jabal 64
69	Khashdhar	Chirgoan	Duidi	Ambot 67 a
70	Khashdhar	Chirgoan	Duidi	Diudi 67 b
71	Khashdhar	Chirgoan	Duidi	DPF Diudi
72	Khashdhar	Chirgoan	Duidi	DPF Tangnu
73	Khashdhar	chirgoan	Jakhnoti	DPF Koti
74	Khashdhar	Chirgoan	Sindasali	Gokaswati 66 b
75	Khashdhar	Chirgoan	Tangnu	DPF Raktu gar
76	Khashdhar	Khashdhar	Dalli	Dalli78a (ii)
77	Khashdhar	Khashdhar	Dalli	Dalli78a(i)
78	Khashdhar	Khashdhar	Dalli	DPF Rikhran
79	Khashdhar	Khashdhar	Dalli	Jakhi75a
80	Khashdhar	Khashdhar	Dalli	Jatalta 74b
81	Khashdhar	Khashdhar	Dalli	Rikshal 78b
82	Khashdhar	Khashdhar	Dalli	Shaldhar 76
83	Khashdhar	Khashdhar	Diswani	Diswani 80b(i)
84	Khashdhar	Khashdhar	Diswani	Kayani 81a
85	Khashdhar	Khashdhar	Diswani	Pokhridar 81b
86	Khashdhar	Larot	Kharshali	DPF Lamba Thach
87	Khashdhar	Larot	Kharshali	DPF Nalti Thach
88	Khashdhar	Larot	Kharshali	Kharshali 72 a

89	Khashdhar	Larot	Kharshali	Munga Jaki 70 b (i)
90	Khashdhar	Larot	Kharshali	Munga Jaki 70 b (ii)
91	Khashdhar	Larot	Kharshali	Munga Jaki 70 b (ii)
92	Khashdhar	Larot	Kharshali	Topi Nigasan 70 a
93	Khashdhar	Larot	Larot	Kandi 70 d (i)
94	Khashdhar	Larot	Larot	Kandi 70 d (ii)
95	Khashdhar	Larot	Larot	Urassa 70 c
96	Khashdhar	Larot	Thalathar	DPF Chhragli
97	Khashdhar	Larot	Thalathar	DPF Nirgani Gad
98	Khashdhar	Larot	Thalathar	DPF Varshil
99	Khashdhar	Larot	Thalathar	DPF Velimel
100	Khashdhar	Todsa	Banoti	DPF Devvan
101	Khashdhar	Todsa	Banoti	DPF Dumreda
102	Khashdhar	Todsa	Banoti	DPF Kolsa
103	Khashdhar	Todsa	Banoti	DPF Mathla
104	Khashdhar	Todsa	Banoti	DPF Pesku khech
105	Khashdhar	Todsa	Todsa	DPF Jangla
106	Khashdhar	Todsa	Todsa	DPF Shangli
107	Khashdhar	Todsa	Todsa	Todsa 56 a
108	Khashdhar	Todsa	Todsa	Todsa 56 b

109	Rohru	Gawas	Baghi	DPF Jhatwari
110	Rohru	Gawas	Bhagi	Sainjibasa 83 b (iii)
111	Rohru	Gawas	Gawas	DPF Gawas
112	Rohru	Gawas	Lowerkoti	Parsa 84 a
113	Rohru	Gawas	Lowerkoti	Shekal 85
114	Rohru	Summerkot	Graima	Graima 43 a (i)
115	Rohru	Summerkot	Graima	Graima 43 a (ii)
116	Rohru	Summerkot	Graima	Graima 43 b
117	Rohru	Summerkot	Graima	Jaunli 44
118	Rohru	Summerkot	Graima	Shirmali 46 a (i)
119	Rohru	Summerkot	Graima	Shirmali 46 a (ii)
120	Rohru	Summerkot	Graima	Shirmali 46 a (ii)
121	Rohru	Summerkot	Graima	Sungri 46 b (i)
122	Rohru	Summerkot	Graima	Sungri 46 b (ii)
123	Rohru	Summerkot	Kui	Bamnoli 40 a (i)
124	Rohru	Summerkot	Kui	Bamnoli 40 a (ii)
125	Rohru	Summerkot	Kui	Bamnoli 40 b
126	Rohru	Summerkot	Kui	Dunga dobal 39
127	Rohru	Summerkot	Kui	Kui 37 (a)
128	Rohru	Summerkot	Kui	Kui 37 (c)
129	Rohru	Summerkot	Kui	Kui 37 (d)
130	Rohru	Summerkot	Kui	Kui 37 (e)

131	Rohru	Summerkot	Kui	Shakli 38
132	Rohru	Summerkot	Machoti	Khonola 49 a
133	Rohru	Summerkot	Machoti	Khonola 49 b
134	Rohru	Summerkot	Summerkot	Nasari 48 b (i)
135	Rohru	Summerkot	Summerkot	Nasari 48 b (ii)
136	Rohru	Summerkot	Summerkot	Nasari 48 b (iii)
137	Rohru	Summerkot	Summerkot	Nasari 48 b (iv)
138	Rohru	Summerkot	Summerkot	Satigad 48 a (i)
139	Rohru	Summerkot	Summerkot	Satigad 48 a (ii)
140	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -13 a
141	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -13 b
142	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -17 a (ii)
143	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -17 b (i)
144	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -17 b (ii)
145	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -17a (i)
146	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -18 a
147	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -18 b
148	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -19 a

149	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -19 b
150	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -19 c
151	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur -20
152	Saraswati Nagar	Chhajpur	Kelwi	Baghain 1
153	Saraswati Nagar	Chhajpur	Kelwi	Baghain 2a
154	Saraswati Nagar	Chhajpur	Kelwi	Baghain 2b
155	Saraswati Nagar	Chhajpur	Kelwi	Baghain 3
156	Saraswati Nagar	Chhajpur	Kelwi	Baghain 4
157	Saraswati Nagar	Chhajpur	Kelwi	Jond 1
158	Saraswati Nagar	Chhajpur	Kelwi	Jond 2 a
159	Saraswati Nagar	Chhajpur	Kelwi	Jond 2 b
160	Saraswati Nagar	Chhajpur	Kelwi	Jond 3 a
161	Saraswati Nagar	Chhajpur	Kelwi	Jond 3 b
162	Saraswati Nagar	Chhajpur	Kelwi	Jond 4
163	Saraswati Nagar	Chhajpur	Kelwi	Jond 5 a
164	Saraswati Nagar	Chhajpur	Kelwi	Jond 5 b
165	Saraswati Nagar	Chhajpur	Ravingahr	DPF Malog-I

166	Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -1
167	Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -2 a
168	Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -2 b
169	Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -3
170	Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -4 a
171	Saraswati Nagar	Chhajpur	Ravingarh	Chhajpur -4 b
172	Saraswati Nagar	Chhajpur	Sawra	DPF Ghiyan
173	Saraswati Nagar	Chhajpur	Sawra	DPF Khouni
174	Saraswati Nagar	Mandal	Dhansar	Jakhi 4 a
175	Saraswati Nagar	Mandal	Dhansar	Jakhi 4b
176	Saraswati Nagar	Mandal	Dhansar	Jakhi 4c
177	Saraswati Nagar	Mandal	Jalta	Jakhi 3a
178	Saraswati Nagar	Mandal	Jalta	Jakhi 3b
179	Saraswati Nagar	Mandal	Jalta	Jakhi 3c
180	Saraswati Nagar	Mandal	Jalta	Jakhi 3d
181	Saraswati Nagar	Mandal	Jhalta	DPF Jhalta-I
182	Saraswati Nagar	Mandal	kawalta	Dhedar 1

183	Saraswati Nagar	Mandal	kawalta	Dhedar 2
184	Saraswati Nagar	Mandal	kawalta	Dhedar 3
185	Saraswati Nagar	Mandal	kawalta	Dhedar 4 a (i)
186	Saraswati Nagar	Mandal	kawalta	Dhedar 4 a (ii)
187	Saraswati Nagar	Mandal	kawalta	Dhedar 4 c
188	Saraswati Nagar	Mandal	kawalta	Dhedar 4d
189	Saraswati Nagar	Mandal	kawalta	Dhedar 4e
190	Saraswati Nagar	Mandal	kawalta	Dhedar 4f
191	Saraswati Nagar	Mandal	kawalta	Dhedar 4g
192	Saraswati Nagar	Mandal	kawalta	Dhedar4 b
193	Tikkar	Tikkar	Farog	Dhanoti 5 (a)
194	Tikkar	Tikkar	Farog	Dhanoti 5 (b) (I)
195	Tikkar	Tikkar	Farog	Dhanoti 5 (b) (ii)
196	Tikkar	Tikkar	kadiwan	DPF Shalni- Ganasi
UNDEMARCATED PROTECTED FORESTS (UPF)				
1	Bashla	Khadrala	Kewli	Pekha Dhar UF 7
2	Bashla	Khadrala	khangteri	Basuni UF 8
3	Bashla	Bashla	Malkhun	Pani Khich UF9

4	Bashla	Bashla	Bashla	Dandi Gad UF 10
5	Bashla	Bashla	Bashla	Lambi dhar UF 11
6	Bashla	Arhal	Sharog	Pheril UF 12
7	Bashla	Bashla	Malkhun	Mundiban
8	Bashla	Khadrala	Khadrala	Khadrala
9	Dodra Kavar	Jakha	Jakha	Raigad
10	Dodra Kavar	Kavar	Kavar	Dogra
11	Dodra Kavar	Jakha	Manjivan	Jawan gad
12	Dodra Kavar	Jakha	Manjivan	Silgad
13	Dodra Kavar	Jakha	Manjivan	Badgii gad
14	Dodra Kavar	Kavar	kavar	Haridwar
15	Dodra Kavar	Kavar	Dodra	Bagru thach
16	Dodra Kavar	Kavar	Kavar	Kavar-ll
17	Dodra Kavar	Kavar	Kavar	Rohal panoo
18	Khashadar	Khashadar	Dalli	Rikharn a (ii)
19	Khashadar	Khashadar	Dalli	Rikharn a (iil)

20	Khashadar	Khashadar	Dalli	Rikharn a (iv)
21	Khashadar	Larot	Larot	Basolgad
22	Khashadar	Larot	Thalathar	Sirad gad
23	Rohru	Summerkot	summerkot	Dungsa UF 13
24	Rohru	Summerkot	summerkot	Khanortu UF 14
25	Rohru	Summerkot	Machoti	Bhut UF 15
26	Rohru	Summerkot	Machoti	Bhut Kanon UF 16
27	Rohru	Rohru	Dalgoan	Jakhar UF 17
28	Rohru	Rohru	Dalgoan	Chameltu UF 18
29	Rohru	Rohru	Kutara	Khurki Suki UF 19
30	Rohru	Rohru	Kutara	Sanal Gad UF 20
31	Rohru	Rohru	Gauna	Katmori UF 21 a
32	Rohru	Rohru	Gauna	Katmori UF 21 b
33	Rohru	Rohru	Gauna	Nauna UF 22 a
34	Rohru	Rohru	Gauna	Nauna UF 22 b
35	Rohru	Gawas	Gawas	Wani Thach UF 54 a
36	Rohru	Gawas	Gawas	Wani Thach UF 54 b
37	Rohru	Gawas	Gawas	Wani Thach UF 54 c
38	Rohru	Gawas	Lowerkoti	Diwari UF 55
39	Rohru	Rohru	Gauna	Khorsu

40	Rohru	Summerkot	Graima	Shadi thach
41	Rohru	Summerkot	Graima	Graima
42	Rohru	Summerkot	Kui	Karetli
43	Rohru	Summerkot	Machoti	Khanola
44	Rohru	-	-	Barnola
45	Rohru	Summerkot	Graima	Labadi
46	Rohru	Rohru	Kutara	Badoda
47	Rohru	Rohru	Kutara	Sadgad
48	Rohru	Rohru	Kutara	Kundgad
49	Rohru	Rohru	Kutara	Kutara
50	Rohru	Rohru	Rantari	Jakhar
51	Rohru	Rohru	Dalgoan	Bamnala
52	Rohru	Summerkot	Machoti	Bari
53	Rohru	Rohru	Gauna	Kaneora
54	Rohru	Rohru	Rantari	Manjena
55	Rohru	Rohru	Rantari	Bajauri
56	Rohru	Rohru	Rantari	Kandrol
57	Rohru	Rohru	Kui	Tilri
58	Rohru	Rohru	Gauna	Kansa Koti
59	Rohru	Gawas	Lowerkoti	Baghi
60	Rohru	Gawas	Lowerkoti	Munaik dhar
61	Rohru	Gawas	Lowerkoti	Chiuni
62	Rohru	Gawas	Lowerkoti	Dhara

63	Rohru	Gawas	Lowerkoti	Panipanwi
64	Rohru	Gawas	Gawas	Thapti
65	Rohru	Gawas	Lowerkoti	Goripith
66	Saraswati Nagar	Chhajpur	Sawra	Raika
67	Saraswati Nagar	Chhajpur	Sawra	Sarot
68	Saraswati Nagar	Chhajpur	Sawra	Sherhana
69	Saraswati Nagar	Mandal	Dhanser	Dhanser part-l
70	Saraswati Nagar	Mandal	Dhanser	Dhanser part-ll
71	Saraswati Nagar	Mandal	Jhalta	Jhalta part-ll
72	Saraswati Nagar	Mandal	Dhanser	Chaunri
73	Saraswati Nagar	Mandal	Jhalta	Giltari
74	Saraswati Nagar	Mandal	Mandal	Jherashali
75	Saraswati Nagar	Chhajpur	Sawra	Sawra
76	Saraswati Nagar	Chhajpur	Ravinghar	Shillar
77	Saraswati Nagar	Chhajpur	Chhajpur	Chhajpur
78	Saraswati Nagar	Chhajpur	Ravinghar	Sanoli
79	Saraswati Nagar	Chhajpur	Sawra	Khouni

80	Saraswati Nagar	Mandal	kawalta	Kawalta
81	Saraswati Nagar	Mandal	Jhalta	UF Jhalta part -I
82	Saraswati Nagar	Mandal	Mandal	Shiroli
83	Tikkar	Tikkar	Farog	Chambi UF 3/Umladwar
84	Tikkar	Tikkar	Kadiwan	Jarla UF4
85	Tikkar	Tikkar	Kadiwan	Tutupani UF 5
86	Tikkar	Tikkar	Kadiwan	Tanju UF 6
87	Tikkar	Tikkar	kadiwan	Ganasi
88	Tikkar	Tikkar	Kadiwan	Nalaban
89	Tikkar	Tikkar	Kadiwan	Tutupani
90	Tikkar	Tikkar	Kutara	Pauligad
91	Tikkar	Tikkar	Kadiwan	Bambla-I
92	Tikkar	Tikkar	Kadiwan	Bambla-II
93	Tikkar	Tikkar	Kadiwan	Jamoch thach
94	Tikkar	Tikkar	Tikkar	Harshal tiba
95	Tikkar	Tikkar	Sharontha	Field bag
96	Tikkar	Tikkar	Sharontha	Tangri

Table 8.4: List of Dense/ Fire prone Forest compartments not prescribed for plantation

Plantations in rocky steep terrains shall be taken up only on the basis of site specific plantation models and not under normal departmental plantations. It is prescribed to have plantation of only native species in recorded forest area in accordance with the composition of the forest compartment.

Based on previous data and experience, it is gathered that forest fires are the main threat to plantation and its survival. Fires that ravage the tract in winters especially lead to total destruction of plantation resulting in significant wastage of public money. Considering this, it is strongly prescribed to undertake removal of entire fuel load from these plantations through grass cutting, removal, control burning and creation of fire lines across the perimeter of the plantation to prevent fires from invading and destroying it. Based on the prevailing scheme and financial resources, it is also suggested to have plantation watchers for upkeep and care of plantation. The fact that this simple activity can result in saving of the plantation and lakhs of rupees spent on it cannot be understated.

Apart from fire, the next major threat to survival of plantation in the tract is prevailing dry weather for long periods which results in drought like conditions. As a climate adaptation strategy, this requires that plantation be watered at periodical intervals whenever required through manual/ piped irrigation mechanisms.

The success of enrichment planting efforts shall be supplemented by trenches in staggered or contour form as this can help enhance soil moisture and prevent prevailing drought like conditions and supplement the growth of plants.

The division is having sufficient pool of financial resources in terms of compensatory afforestation fund in lieu of forest diversions undertaken under Forest Conservation Act, 1980 and Forest Rights Act, 2006. These funding sources can be utilized to carry out plantation efforts.

ii. Social Forestry: Apart from undertaking plantation in recorded forest area, plantation can be undertaken in non forest lands to promote trees outside forests (ToF). The various components of such a social forestry programme in the tractis as follows:

- a) Agroforestry
- b) Urban Forestry

c) Community Forestry

d) Extension Forestry

a) Agroforestry: Farmers can utilize their lands on sustainable basis by planting trees for fulfilling their daily needs of fuel, fodder and NTFPs and to raise their income. The major objective of agroforestry is to optimize production and economic returns per unit area, while respecting the principle of sustainable development.

The tract is having a demographic composition that utilizes large volume of timber for needs of construction and repair of houses, construction of cowsheds and other miscellaneous purposes. In this context, it is important that tree growth on private lands is promoted so that the timber requirements of the populace in the tract to a great extent can be met from outside recorded forest area. This can help in reducing the pressure on recorded forest area and help preserve these forests from illicit felling.

The tract is renowned for being the apple belt of the state and is having horticultural characteristics. It is noted that there is an increasing tendency among orchardists to remove native forest trees from private lands in order to make space and promote apple cultivation. In order to achieve the same, people tend to resort to lopping till the top or girdling of native species like Deodar/ Kail. There is hence a growing need to raise awareness and promote plantation in private lands by providing incentives and support. This can be in the form of distribution of saplings of native forest species and by encouraging the youth and children to undertake planting in their own yards. A partnership program can be run to increase plantations in private lands involving NGOs, Civil Society Organizations and Local Panchayat bodies.

b) Urban Forestry: Urban forestry or urban green is a new and still-developing research field. It constitutes creation, planning and management of urban woodlands as well as trees in streets and parks. Due to rapid urbanization and population growth, all the available open spaces are gradually being covered up. Trees in urban system provide a variety of ecosystem services including biodiversity conservation, removal of atmospheric pollutants, oxygen generation, noise reduction, mitigation of urban heat island effect, microclimate regulation, stabilization of soil, groundwater recharge, prevention of soil erosion and carbon sequestration. The planning of urban forestry will include,

- Development of Eco/ Nature parks as recreational spaces in town of Rohru/ Jubbal.

- Initiatives to extend urban green cover, such as engagement of NGOs, schools, colleges, civil society, media and corporate groups are necessary to extend urban green cover.
- Trees are largely planted for their high growth rate and decorative appearance. Need to plant trees that provide multiple benefits to individual and society, particularly in house compounds for providing edible pods, flowers, fruits, leaves etc. like *Aesculus indica*, *Bauhina purpurea*, *Albizia stipulata*, *Morus serrata*, *Alnus nitida*, *Cedrela serrata*, *Myricaopida* etc. Mainly ornamental plants will be preferred for planting in such areas, as *Cedrus deodara*, *Pinus roxburghii*, *P. wallichiana*, *Cupres sustorulasa*, *Salix alba*, *Jacaranda mimosifolia*, *Polyalthia longifolia*, *Callistemon viminalis*, etc. and in median strips between roads for shades and ground water recharge like *Populus ciliata*, *Prunus armeniaca*, *Quercus spp.*, *Alstonias cholaris*, *Thespesia populnea*, *Terminalia catappa*, *Morus alba*, *Ficus palmata*, *Ficus racemosa*, *Kigelia africana* etc.

c) Community Forestry: This involves a participatory model of communities undertaking and maintaining plantations in the tract. The tract over the past few years has seen the participation of Village Forest Development Societies (VFDS) under the JICA Project for Strengthening of Forest Based Eco system Services and Livelihoods. Under this project, 22 VFDS have been registered in the tract across 4 forest ranges and each of these VFDS has undertaken 10 Ha area of plantation under Participatory Forest Management. Such models of plantation raising and maintenance is helpful in promoting community forestry where community is given a sense of ownership and responsibility.

The tract is having several NGOs, Civil Society Organizations, Mahila Mandals and Youth Clubs which are interested in undertaking and maintaining plantation sites. It is prescribed that such a model should be devised in which forest patches in recorded forest area/ common village lands can be allocated to these groups for undertaking and maintaining plantations. A memorandum of understanding or agreement can be reached in this regard.

d) Extension Forestry: Besides the wastelands and the fallow agriculture lands, there are scopes of planting trees on roads, canal or river side's, campus of schools, hospitals, holy places, ecotourism places, factories, office campus and as well as villages.

i. Institutional Plantations: Plantations can also be done in the campus of schools, colleges, hospitals, religious places, kabristans, factories, etc. Even if 20 to 50 plants are planted in their premises, it will not only increase the tree

cover outside forests in a large proportion, but will also help to improve the eco-climatic conditions in the area and add to its aesthetic values. Mainly ornamental plants will be preferred for planting in such areas. Medicinal plants as Anwala, Harar, Anar and Bahera should also be planted at suitable places.

ii. Linear Plantations: The roads, canals, river embankments and the ponds provide good space for linear plantations providing aesthetic values and at the same time increasing the tree cover. Plantation along river banks of Pabbar and other tributaries flowing in the area can be taken up. Other areas available along the road sides, canal sides, ponds can also be taken up. The division has a large fund pool of compensatory afforestation available in lieu of diversions under Forest Rights Act which can be utilized for this purpose.

8.8 Nursery Management in the tract

The division was having 8 nurseries for raising of plants for plantation across 7 ranges at the time of writing this plan. Thereafter, an assessment was made whether to keep these nurseries functional on the basis of climate, edaphic factors, logistics, current production quality of nursery stock and plantation requirement. Considering these aspects, it was decided to close down 4 nurseries in Sanaba (Jubbil Range), Manera Thatch (DodraKwar Range), Sholdu (Tikker Range) and Chhajpur Nursery (Sawra Range).

The tract has plantation requirements of 2 kinds: Deodars for plantation during the summer monsoon season and broad leaved varieties for plantation during winter. The idea behind development of nursery in the tract is that the demand of both these varieties can be sustained.

The Bashla Nursery over the years has seen substantial investments for upgrading of nursery infrastructure under the Modern Nursery Scheme in CAMPA. The nursery has polyhouse, root trainers, sprinkler irrigation, solar fencing and water supply. It is observed that this nursery is raising broad leaved plants of good height and collar girth suitable for planting. Deodars are also being raised in the nursery although its rate of growth is on the lower side. It is prescribed that this nursery can be the central modern nursery of the division providing for larger number of broad leaved plants like Khanor, Chuli, Bemi, Walnut, Ban Oak, Mohru Oak and also for conservation and rearing of endangered species like Rakhal.

The Shashan nursery located in Sawra forest range is situated at a lower altitude and is apt for raising of Deodars. It is prescribed that this nursery

considering its location and favourable climatic conditions shall be developed as the Central Nursery for raising of Deodars.

The Buthara Nursery in Rohru Forest Range and the Kharshali nursery is suited to raising of broad leaved species especially Horse Chestnut which is recorded to have excellent growth in both of these nurseries. It is prescribed to keep these nurseries exclusively for rearing broad leaved species and not utilize them for raising Deodars as the location and altitude of these nurseries is not suitable for raising Deodars.

Apart from the above nursery, efforts may also be taken to establish community nurseries/ private nurseries involving participation of local community and VFDS groups. It is noted that there is a great demand for plants during Van Mahotsav every year which the current stock of plants is not able to meet. In this context, a model may be devised where suitable area may be handed over to Self Help Group/ Civil Society Organization to raise plants.

Nursery protocol issued by forest department vide Pr. CCF (HoFF) HP office letter No. Ft. 15-434/10(D) DAP/2017-18/vol. III dated 21-02-2018 and year wise norms issued are to be followed strictly for the nursery raising operations in the field.

8.9 Miscellaneous Regulations:

- i. All Plantations should be closed for grazing and lopping for atleast 10 years.
- ii. All plantations should be strictly fire protected.
- iii. There should be a plantation journal with plantation lay out map of each plantation should be attached. The plantation journal will contain list of planted species, age of the plants, cost involved, maintenance of plantation. It shall also contain the periodical notes of the concerned staff in charge and inspecting officers on duty.
- iv. Subordinates who raise the successful plantation should be rewarded. The best plantation in each range should be selected each year by a committee formed for this purpose.
- v. The concerned officers at every level shall make meaningful effort to achieve the respective mandatory field inspection targets with respect to checking of plantations. Third party monitoring of plantations should be encouraged.
- vi. The reasons for low survival of plantations shall be duly noted and informed to higher authorities and be recorded in the plantation journal.

vii. All plantation sites shall be digitized and KML file of polygons shall be stored in hard disk and cloud servers. All plantations shall be uploaded in E Green Watch Portal for monitoring.

viii. All forest guards shall keep record of their beat plantations in their beat books and charge list which shall be handed over during the transfer of beat guard

The plantation prescriptions in this working circle are significantly guided based on the Forest Eco System Services Study Report annexed in Volume II of this plan. The detail of compartments prescribed based on understocking, fire vulnerability and local community participation.

Chapter- 9

Evicted Area Rehabilitation (Overlapping) Circle

9.1 Name of Working Circle: Evicted Area Rehabilitation (Overlapping) Circle.

9.2 General Constitution of Working Circle:

The main objective behind the constitution of this working circle is the rehabilitation of encroachment evicted areas in order to restore the true ecological character of the encroachment evicted landscapes. Considering that these prescriptions will be applicable only for areas where encroachment eviction has been carried out, this working circle shall apply in partly overlapping fashion to evicted areas alone. Such a special working circle is carved out considering that encroachment of forest land is the singular main threat in this tract and there is a need of data driven, focused approach in such cases.

9.3 General Characteristics of Vegetation:

The evicted areas are having varying characteristics of vegetation. There are some evicted areas where previously existing fruit crop has been removed and native tree plantation has been undertaken. In such landscapes, the vegetation character generally involves Deodar-Kail nature. There is also good natural regeneration in some of the evicted areas where previously fruit crop that existed was removed. In some of the evicted areas, a mixture of fast growing exotic species and weeds have taken up the forest floor.

However, there are some evicted areas where still fruit crops stand. In its order dated July 28, 2025 in SLP(civil) No. 40056/ 2025 the Honourable Supreme Court of India had prohibited the felling of fruit trees. This interim stay order has thereafter prevented felling of trees and restoring ecological character of evicted areas. Hence, there are several evicted areas where the fruit crop still stands.

9.4 Blocks, Compartments and JFM Areas: All forest compartments which have been recorded to have had encroached land is included in this working circle. The following are the list of compartments over which this working circle shall overlap:

Sr. No.	Name of Forest Range	Name of the Forest
1.	Bashla	C.No.35b Barara
2.		UPF Bahali
3.		UPF -12 ferly
4.		UPF Antapu
5.		C.No.32b
6.		C.No.32a
7.		UPF-11
8.		C.No.31a (i)
9.		C.No.31 b Koti
10.		C.No.31a (iv)
11.		C.No.31a (v)
12.		C.No.31a (iii)
13.		DPF Bashla
14.		UPF-9
15.		DPF Malkhoon
16.		UPF Mundiban
17.		C.No.30 d
18.		C.No 30 c (i)
19.		DPF Bhalara
20.		C.No.30 b
21.		C.No.30 b (i)

22.		C.No. 29 d
23.		C.No. 29 c
24.		UPF -8
25.		C.No.28 b
26.		C.No.29 a
27.		UPF Rehri
28.		C.No. 28 a
29.		C.No.41 c
30.		DPF Kewli
31.		C.No.41b
32.		UPF Pekhadhar
33.		C.No.41 a
1.	DodraKawar	UPF Kawari& ii
2.		UPF Raigad
3.		UPF Dodu
4.		UPF Paba
1.	Jubbal	C.No. 11 Kalgaon
2.		C.No.18a Mandhal
3.		C.No.18b Sari
4.		C.No.19a Jharag
5.		C.No.19b Jharag
6.		C.No.17 Baral

7.		C.No.13a &13b Ganga Nagar
8.		C.No.12 Nahal
9.		C.No. 14c Sheel
10.		DPF Giri 1a
11.		UPF Badhal
12.		UPF Kalontha
13.		UPF Kohlara
14.		UPF Sanaba
15.		UPF Sundli
16.		UPF Deem
17.		UPF Jachli
18.		UPF Mural
19.		UPF Ori
1.	Rohru	C.No.85
2.		UPF Dhara
3.		UPF Parsa
4.		C.No.84 b
5.		UPF Munakdhar
6.		UPF LowerKot
7.		UPF Diyari
8.		UPF Baggi
9.		C.No.82 a
10.		C.No.82b

11.		C.No.83a
12.		C.No.83c(ii)
13.		UPF Baggi
14.		C.No.83 b(iii)
15.		DPF Nirja
16.		UPF Jhatwari
17.		C.No.83 b
18.		C.No.83 b(ii)
19.		C.No.83 b(i)
20.		C.No.83cii)
21.		UPF Sanji
22.		C.No.52 b
23.		UPF18
24.		C.No.51 a(i) Brethle
25.		UPF jakhar
26.		UPF Bhamnala
27.		UPF 19
28.		UPF Kashkandi
29.		UPF Kutara
30.		UPF BauliNala
31.		UPF17
32.		C.No.53 a
33.		UPF Katmori

34.		UPF 21
35.		UPF 22
36.		C.No.53 b(i)
37.		C.No.54
38.		UPF Bijori
39.		C.No.55 a
40.		UPF Majani
41.		C.No.37C
42.		C.No.40a
43.		C.No.37d
44.		C.No.37a
45.		C.No.37b
46.		C.No.36
47.		C.No.46 a(ii)
48.		UPF Sharmali
49.		C.No.40 b
50.		C.No.43a(i)
51.		C.No45 b(i)
52.		C.No46 b(ii)
53.		C.No46 b(i)
54.		C.No.44
55.		C.No.47
56.		C.No.50

57.		UPF Bari
58.		UPF Bhoot
59.		UPF Jagothi
60.		UPF Khanola
61.		DPF Khanola
1.	Khashdhar	C.No.61A Jakhnoti
2.		C.No.61A& B Jakhnoti
3.		CNO.57 Bahali
4.		UF Dhagoli
5.		C.No.59 bhamphar
6.		UF Giyari
7.		C.No.62a Chiroti
8.		UF Andra
9.		C.No.60Dunna
10.		C.No.62b Chiroti
11.		C.No.58 Pujarli
12.		UF Gonsari

13.		UF Baghi
14.		UfMangyari
15.		UF Rausi
16.		Uf 34 Dolizan
17.		C.No.65A Khabal
18.		UF betyani
19.		UF Diudi
20.		UF denwari
21.		UF Gad Panu
22.		UF Masli
23.		UF Telga
24.		C.No.73 a Telga
25.		C.No.81B Kayani
26.		UF Diswani
27.		C.NO.73C Telga
28.		UF Sandasu
29.		C.No.80A Diswani
30.		C.NO.81A Kayani
31.		UfKhasdhar
32.		C.No.74A11 Khasdhar
33.		UF Masli
34.		C.No.77A Dhak
35.		UF Dali

36.		C.No74A1 Khasdhar
37.		UfJakhi
38.		UF 49 Telga
39.		72b Gumma
40.		UF Larot
41.		UF 45 Larot
42.		UF Thali
43.		UF Nandla
44.		UF Banoti
45.		UF Ranol
46.		UF Thana
47.		UF Gumna
48.		UF Amboi
49.		72A kharshali
50.		UF jhalwari
1.	Sarswati Nagar	C No 1 Jond
2.		C No 2 Jond
3.		UPF Saskir
4.		UPF Chhajpur
5.		UPF Shallar
6.		UPF Jharashli
7.		DPF Chhajpur
8.		UPF Malog

9.		UPF Shirolī
10.		UPF Giltari
11.		UPF Jhalta
12.		UPF Dharmana
13.		UPF Sainj
14.		UPF Dhansar
15.		UPF Kawalta
16.		UPF Sharana
17.		DPF Naliban
18.		UPF Ghyan
19.		UPF Mihana
20.		DPF Kayala
1.	Tikkar	UF Umladwar
2.		UF Lambidhar
3.		UF Seri
4.		C.No-3 Pharog
5.		C.No-4 Hanstari
6.		C.No-6 b Tikkar
7.		UF Shalni
8.		C.No22-Pujarli
9.		UF Koti
10.		DPF Khalai
11.		C.No-21 Friunkoti

12.		UF Tutupani
13.		UF Jarla
14.		UF Bamla
15.		C.No-6 c Kasheni
16.		C.No-7 Sharontha
17.		UF Tangri
18.		UF Fieldbag
19.		C.No-9 a Karchari
20.		C.No-20 a Jagterly
21.		UF Harshal Tibba
22.		Total

Table 9.1: List of compartments allotted to the working circle

9.5 Special Objects of Management: The Special Objectives of Management in this working circle shall be the following:

- To restore the encroachment evicted area to its true ecological character so that it continues to provide eco system services
- To prevent the re encroachment of evicted forest lands
- To secure the boundaries of evicted forest lands through permanent boundary markers
- To document and digitize the record of evicted lands

9.6 Miscellaneous Prescriptions for Encroachment Evicted Area Rehabilitation

9.6.1 Creating a Digital Database of Evicted Lands: It is essential to record KML files of evicted lands. It is often noticed that there is no continuity in management of evicted areas and owing to transfer of forest personnel, there is no knowledge of evicted lands for concerned beat guard, block forest officer, range officer or DFO. In this context, it is strongly prescribed to identify, map and digitize all evicted lands in the tract through making GPS polygons and KML files. Every official from concerned beat guard to DFO shall have a soft

copy of the evicted lands and the digital database shall also be stored in the cloud in online database. The list of all such lands where eviction has been carried out is given in the Appendix-XIV in Volume-II of this working plan.

This is essential as it will nullify the repeated requirement to get the evicted lands demarcated and re demarcated for which the presence of revenue department staff is repeatedly sought and often not secured. It will also help to have permanent record aiding in continuity of management and preventing possibility of re encroachment.

9.6.2 Removal of Fruit Crop: It is strongly prescribed that wherever there are fruit trees on evicted forest land, they shall be removed through either felling or girdling or any other acceptable silvicultural method in consultation with horticulture department. It is prescribed to bring to the attention of Judiciary in the appropriate manner clearly mentioning the need for scientific management of these forests and to restore the true ecological character of native forests by replacing commercial monocrop plantations.

9.6.3 Fencing of Evicted Areas and Plantation of Native Forest Species: In all evicted areas, it is strongly prescribed to undertake fencing after felling of fruit crop. The fencing of area is essential to prevent re encroachment and to initiate plantation/ assisted natural regeneration. Thereafter, native forest species shall be planted and in areas adjacent to Himalayan Blue Pine Forests, seeds of Himalayan Blue pine can be broadcasted. The choice of species of plantation is left to the discretion of Deputy Conservator of Forests and Range Forest Officer on basis of Site Specific considerations. There are already a few evicted land parcels in the tract where plantation has already been undertaken after eviction and removal of fruit crop. It is prescribed to monitor the health of these plantations and ensure its survival for re-establishment of native forests. The detail of such plantation is given in the table below:

Sr. No.	Name of Forest Range	Name of Forest	Area Evicted (in Ha.)	Year of Eviction	Whether Planting undertaken? (Yes/ No)
1	Rohru	UPF Kutara, C.No53	1.6936	2016-17	Yes
2		C.No.84 b	1.6129	2016-17	Yes
3		DPF Nirja	1.5731	2016-17	Yes

4		UPF Dyari	1.4805	2016-17	Yes
5		UPF Khashkandi	0.9622	2016-17	Yes
6		UPF Munchara	0.9387	2016-17	Yes
7		UPF Jakhar	0.9154	2016-17	Yes
8		C.No.40 a	0.8686	2016-17	Yes
9		UPF Dhara	0.8442	2016-17	Yes
10		C.No.40 a	0.7942	2016-17	Yes
11		C.No.84b Lowerkoti	0.7936	2016-17	Yes
12		UPF Katmore	0.6278	2016-17	Yes
13		C.No.40 a	0.1676	2016-17	Yes
14		C.No.40 a	0.1469	2016-17	Yes
15		C.No.40 a	0.1392	2016-17	Yes
16		UPF BhauliNalla	0.8307	2018-19	Yes
17		UPF BhauliNalla	0.7743	2018-19	Yes
18	Bashla	UFP 12 Ferly	1.0000	2015-16	Yes
19		UFP 12 Ferly	1.2346	2015-16	Yes
20		UFP Kanda	1.4965	2015-16	Yes
21		UPF -11Lambidhar	1.2000	2015-16	Yes
22		UPF -11Lambidhar	1.1991	2015-16	Yes
23		C.No. 31 a (i)	0.8130	2015-16	Yes

24		UPF Kanda	1.0003	2016-17	Yes
25		UPF 9 Panikhech	1.2000	2016-17	Yes
26		UPF 12 Ferly	1.0952	2016-17	Yes
27		UPF-8 Bashuni	0.1798	2016-17	Yes
28		UPF-8 Bashuni	0.46-06	2016-17	Yes
29		UPF-8 Bashuni	0.5490	2016-17	Yes
30	Jubbal	UPF Kutu PaniJharag	2.3552	2017-18	Yes
31		DPF 18 Sari	1.7758	2017-18	Yes
32		DPF 18 a Mandhol	2.5033	2017-18	Yes
33	Sawra	C No 1 Jond	3-01-90	2018	Yes
34		C No 2 Jond	22-83-60	2016 - 18	Yes
35		UPF Saskir	5.8069	2016	3.1115
36		UPF Chhajpur	5.7537	2018	No
37		UPF Shallar	1.41	2018	No
38		UPF Jharashli	9.0943	2016 -18	2
39		KathasuMuhali	5.7630	2016 - 18	1.1216
40		DPF Chhajpur	1.88 -12	2018	1.8812
41		UPF Shirolu	12.3087	2016 - 18	1.5280
42		UPF Giltari	14.1189	2016- 17 &18	1.6510
43		UPF Jhaltu	10.6284	2016 -17& 18	2.0705

44		UPF Sainj	0.4833	2016	0.8435
45		UPF Dhansar	1.601	2016	No
46		UPF Sharana	3.8633	2016 - 18	No
47		DPF Naliban	0.6488	2016	No
48		UPF Ghyan	0.1539	2016	No
49		UPF Mihana	0.0859	2016	No
50		DPF Kayala	0.826	2016	No
51		Sawra	2.4336	2016	No
52	Khashadhar	UPF Giyari	1.7030	2011-12	Yes
53		UPF Masli	1.6041	2016	Yes
54		UPF Khashadhar	1.9595	2016	Yes
55		UPF Amboi	1.2024	2015	Yes
56		UPF Thana	1.2129	2015-16	Yes
57		UPF Banoti	0.9453	2016	Yes
58		UPF Koila	0.9653	2019-20	Yes
59	Tikkar	C.No.4 Hanstari	1.7263	2017	Yes
60		C.No.7 Sharonta	0.8210	2017	Yes
61		UPF Tutupani	2.6523	2017	Yes
62		UPF HarshalTiba	1.4958	2017	Yes
63		UPF Koti	1.7152	2017	Yes

64		UPF Tangri	0.8217	2017	Yes
65		UPF Sitli	2.3310	2017	Yes
		Total	155.4907		

Table 9.2: List of the status of Encroachment Evicted Forests and plantation undertaken

It is prescribed to undertake plantation in other areas where eviction and felling has already been executed and also in area where potential exists for future eviction and forest land reclamation. Indicative list of potential plantation areas where eviction has been done

Sr No.	Range	Name of Forest	Area Available for Plantation currently	Area Available for plantation in Future
1	Bashla	C.No.35b Barara	0.7065	
2		UPF Bahali	2.4857	
3		UPF 12 ferly	24.5957	
4		UPF Antapu	3.675	
5		UPF Kanda	4.6225	
6		NAC Gantoli	0.3555	
7		C.No.32b	1.01	
8		C.No.32a	4.4372	
9		UPF 11 Lambidhar	10.0019	
10		C.No.31a (i)	7.363	
11		C.No.31 b Koti	6.0296	
12		C.No.31a (iv)	0.0565	
13		C.No.31a (v)	1.4936	
14		C.No.31a (iii)	0.0436	
15		DPF Bashla	0.5498	

16		UPF09	11.6692	
17		DPF Malkhoon	3.4088	
18		UPF Mundiban	0.4346	
19		C.No.30 d	0.3098	
20		C.No 30 c (i)	0.3098	
21		DPF Bhalara	0.2342	
22		C.No.30 b	162	
23		C.No.30 b (i)	0.2733	
24		C.No. 29 d	0.152	
25		C.No. 29 c	1.3421	
26		UPF 08	24.3234	
27		C.No.28 b	2.3202	
28		C.No.29 a	3.0199	
29		UPF Rehri	0.9599	
30		C.No. 28 a	0.9599	
31		C.No.41 c	4.9786	
32		DPF Kewli	1.1182	
33		C.No.41b	0.7097	
34		UPF Pekhadhar	0.2439	
35		C.No.41 a	0.2394	
36	DodraKawar	UPF Kawar I & ii	12.0755	
37		UPF Raigad	2.1244	
38		UPF Dodu	1.1717	
39		UPF Paba	1.737	
40	Jubbal	C.No. 11 Kalgaon	3.97106	

41		C.No.18a Mandhal	8.2661	
42		C.No.18b Sari	3.6913	
43		C.No.19a Jharag	3.1562	
44		C.No.19b Jharag	1.4872	
45		C.No.17 Baral	1.8111	10
46		C.No.13a &13b Ganga Nagar	0.221	0.8
47		C.No.12 Nahal	0.209	
48		C.No. 14c Sheel	0.9585	
49		DPF Giri 1a	6.6763	14.00
50		UPF Badhal	36.7477	
51		UPF Chunjar	21.2455	
52		UPF KalgaonTeer	141.5682	
53		UPF Kalontha	0.9018	
54		UPF Kohlara	7.7395	
55		UPF Sanaba	13.1071	
56		UPF Sundli	0.8319	
57		UPF Deem	4.2558	
58		UPF Jachli	7.2745	
59		UPF Mural	1.6724	
60		UPF Ori	8.5755	
61		Orthers	83.0343	
		DPF Giri 1b		2
62	Rohru	C.No.85	1.0258	
63		UPF Dhara	8.0949	

64		UPF Parsa	1.5667	
65		C.No.84 b	3.4347	
66		UPF Munakdhar	5.1102	
67		UPF LowerKot	2.0294	
68		UPF Diyari	5.7424	
69		UPF Baggi	1.4911	
70		C.No.82 a	4.8435	
71		C.No.82b	0.1811	
72		C.No.83a	0.8521	5
73		C.No.83c(ii)	0.94	5
74		UPF Baggi	0.4008	
75		C.No.83 b(iii)	2.2957	
76		DPF Nirja	3.0503	
77		UPF Jhatwari	1.0575	
78		C.No.83 b	0.1635	
79		C.No.83 b(ii)	1.2306	
80		C.No.83 b(i)	0.2822	
81		C.No.83cii)	0.5486	
82		UPF Sanji	0.4809	
83		C.No.52 b	0.5863	3
84		UPF18	6.2326	
85		C.No.51 a(i) Brethle	10.8323	
86		UPF jakhar	1.7493	
87		UPF Bari Nalla	0.9193	
88		UPF Bhamnala	2.0633	

89		UPF 19	1.5415	
90		UPF Kurki	1.5956	
91		UPF Kashkandi	6.5521	
92		UPF Kutara	11.4082	
93		UPF BauliNala	1.605	
94		UPF17	2.5814	
95		C.No.53 a	0.4	
96		UPF Katmori	10.3655	
97		UPF Kutu Parnw	7.0731	
98		UPF 21	2.1878	
99		UPF Kharsu	5.9522	
100		UPF 22	5.3334	
101		C.No.53 b(i)	0.9396	
102		C.No.54	0.4516	
103		UPF ManuPanu	1.4339	
104		UPF Bijori	3.172	
105		C.No.55 a	4.7552	
106		UPF Majani	0.2845	
107		C.No.37C	2.8589	
108		C.No.40a	2.6362	
109		C.No.37d	1.0792	
110		C.No.37a	2.6771	
111		C.No.37b	1.0118	
112		C.No.36	0.457	
113		C.No.46 a(ii)	3.3814	

114		UPF Sharmali	0.2124	
115		C.No.40 b	0.3758	
116		C.No.43a(i)	0.8931	
117		C.No45 b(i)	3.0332	
118		C.No46 b(ii)	0.6708	
119		C.No46 b(i)	0.944	
120		C.No.44	0.3755	
121		C.No.47	0.4159	
122		C.No.50	3.2774	
123		UPF Bari	6.0051	
124		UPF Bhoot	8.2616	
125		UPF Jagothi	0.8935	
126		UPFNoi	0.901	
127		UPF Khanola	0.5546	
128		DPF Khanola	0.3813	
129	Khashdhar	C.No.61A Jakhnoti	2.116	
130		C.No.61A& B Jakhnoti	2.2676	
131		CNO.57 Bahali	11.2288	
132		UF Dhagoli	0.1694	
133		C.No.59 bhamphar	0.2335	
134		UF Giyari	1.2878	
135		C.No.62a Chiroti	2.3201	
136		UF Andra	0.8965	
137		C.No.60 Dunna	3.1899	20

138		C.No.62b Chiroti	0.2223	
139		C.No.58 Pujarli	1.4928	
140		UF Gonsari	1.5718	
141		UF Baghi	1.8917	
142		UfMangyari	0.8495	
143		UF Rausi	0.8315	
144		Uf 34 Dolizan	3.0999	
145		C.No.65A Khabal	0.41	
146		UF betyani	0.8368	
147		UF Diudi	0.3712	
148		UF denwari	3.527	
149		UF Gad Panu	0.5181	
150		UF Masli	1.3354	
151		UF Telga	8.7087	
152		C.No.73 a Telga	2.9534	
153		C.No.81B Kayani	0.2221	
154		UF Diswani	3.2159	
155		C.NO.73C Telga	0.305	
156		UF Sandasu	2.0255	
157		C.No.80A Diswani	4.2404	
158		C.NO.81A Kayani	1.4157	
159		UfKhasdhar	6.6572	
160		C.No.74A11 Khasdhar	0.7722	
161		UF Masli	0.4276	

162		C.No.77A Dhak	0.822	
163		UF Dali	0.7575	
164		C.No74A1 Khasdhar	0.146	
165		UfJakhi	0.4195	
166		UF 49 Telga	0.4988	
167		72b Gumma	1.1295	
168		UF Larot	4.1775	
169		UF 45 Larot	0.9111	
170		UF Thali	1.4065	
171		UF Nandla	1.6235	
172		UF Banoti	1.733	
173		UF Ranol	0.2674	
174		UF Thana	0.7173	
175		UF Koila	0.9653	
176		UF Gumna	0.904	
177		UF Amboi	2.0936	
178		72A kharshali	0.3894	
179		UF jhalwari	0.4981	
180		DPF Mathla	0	5
		DPF Pokhridhar 81 b	0	3
180	Sarswati Nagar	C No 1 Jond	3.019	
181		C No 2 Jond	22.836	
182		UPF Saskir	10.8502	
183		UPF Chhajpur	7.397	

184		UPF Shallar	31.1	
185		UPF Jharashli	9.0943	
186		KathasuMuhali	6.7966	
187		DPF Chhajpur	1.88	
188		UPF Malog	1.6274	
189		UPF Shirola	19.7562	
190		UPF Giltari	15.804	
191		UPF Jhalti	13.476	
192		UPF Dharmana	1.2061	
193		UPF Sainj	0.4833	
194		UPF Dhansar	1.601	
195		UPF Kawalta	0.7726	
196		UPF Sharana	4.9989	
197		DPF Naliban	0.6488	
198		UPF Ghyan	0.1539	
199		UPF Mihana	0.0859	
200		DPF Kayala	0.826	
201	Tikkar	UF Umladwar	3.882	
202		UF Lambidhar	1.7431	
203		UF Seri	1.9401	
204		C.No 03 Pharog	0.3612	
205		C.No 04 Hanstari	3.4113	25
206		C.No 06 b Tikkar	0.2264	
207		UF Shalni	1.6206	
208		C.No220Pujarli	5.7901	

209		UF Koti	9.4884	
210		UF Khalai	0.7583	
211		C.No. 21 Friunkoti	0.9005	
212		UF Kharla	0.3768	
213		UF Tutupani	6.1588	10
214		UF Jarla	2.9566	
215		UF Bamla	2.3165	
216		C.No06 c Kasheni	3.9936	12
217		UF Sitli	4.3147	
218		C.No07 Sharontha	12.9231	
219		UF Tangri	1.9301	
220		UF Fieldbag	3.6081	
221		UF Thanabag	1.2994	
222		C.No. 9 a Karchari	0.763	25
223		UF Sazar	0.6653	
224		UF Sholdu	3.3464	
225		UF Khangta	0.3763	
226		C.No 20 a Jagterly	0.7434	
227		UF seao	0.5413	
228		UF HarshalTibba	33.4884	20
		Total	1192.48636	

Table 9.3: List of plantation potential areas in encroachment affected forests

9.6.4 Maintenance of Plantation in Evicted Areas: There are several evicted areas which are currently been brought under plantation. It is prescribed to maintain the plantation in these evicted lands and to ensure that if required the areas be kept under Assisted Natural Regeneration (ANR) till the time of establishment of native forest eco system.

9.6.5 Monitoring of Evicted Lands: It is strongly prescribed to enforce a system of monitoring for evicted lands once digitized. The beat guard of concerned beat where evicted lands are situated shall inspect the evicted land at least once in every month and report whether there is any re encroachment in the concerned evicted land. Similarly, the Block Forest Officer and Range officer should inspect at least 50% and 20% of evicted lands under their jurisdiction every month. The ACF/DFO shall inspect randomly evicted lands every month in order to ascertain re encroachment. A clear regime of monitoring along with documentation shall prevent the re encroachment of the evicted lands and ensure it stays secured with forest department.

9.6.6 Management of Boundary Pillars: The Boundary Pillar is the major infrastructure of forest department that permanently secures boundaries. It is strongly prescribed to construct boundary pillars securing Demarcated Protected Forests (DPF). All prescriptions regarding boundary pillars are given in Protection Working Circle which needs to be carried out on priority for this working circle considering the forest area of this working circle is highly vulnerable to encroachment. There is also a need to monitor the status of boundary pillars frequently in order to ensure their upkeep, maintenance as there is high chance of BPs being destroyed in this working circle. It is strongly prescribed that every forest guard perambulate the forest boundaries at least once in a month and report the status of boundary pillars. Any act of destroying or defacing boundary pillars shall be taken immediate cognizance of and exemplary conviction be secured under Indian Forest Act, 1927.

9.6.7 Digitization of Record Room of Collector Court: It is prescribed to digitize all files and records of Collector-cum-DFO Court. The same may be stored remotely in google drive and also in hard disc/ pen drive in division office. Currently, all available case files pertaining to encroachment under HP Public Premises and Land (Eviction and Rent Recovery) Act, 1971 have been digitized and stored in Google Drive of Gmail account rohrudfo@gmail.com, encroachmentcases@gmail.com, encroachmentrohru@gmail.com and rohuencroachment@gmail.com .

9.7 Regeneration: It is prescribed to undertake measures for assisted natural regeneration in evicted land parcels. This includes the following:

- Fencing of Evicted land parcels with barbed wire fencing.
- Bush cutting and cleaning of evicted land parcels to facilitate establishment of young native crop

- Phased removal of exotic tree species and shrubs which prevent natural regeneration of native species
- Soil Moisture conservation measures including staggered contour trenches and other water retention structures

Chapter-10

Ecotourism (Overlapping) Working Circle

10.1 Name of Working Circle: Ecotourism (Overlapping) WC

10.2 General Constitution of Working Circle: This overlapping working circle is prescribed for certain parts of the tract which is having potential for eco tourism. This involves area which are already seeing visitor footfall and other parts of the tract which in future can be developed as an eco-tourism site. This working circle shall therefore extend to the following eco tourism sites:

- Chanshal Pass and adjoining forests in Larot beat
- Kharshali lake and adjoining forests
- Giriganga Temple and forests of Giri
- Trek Routes from Rupin to Dayara Thatch
- Trek Route from Tangnu Janghlik to Chandernahan/ Buranghati
- Trek route from Giri to Kuppar Grassland
- Trek Route from Sungri and Dumrehra to Moral Danda peak
- Trek Route from Kharshali to Saru Lake to Chanshal
- Kwar Barasar Lake Trekking Route
- Deorighat and Lambidhar Forests of Tikker Range adjoining peaks of Ghanasidhar and Shradoodhar
- Camping Site in Larot
- Camping Site in Kharshali
- Camping Site in Moral Danda
- Camping Site in Dawash
- Camping Site in Dungri Thatch Chanshal
- Newly proposed eco tourism sites as defined in the plan below
- Any other Eco Tourism site as notified by Governing Board of Shimla Forest Circle ECOSOC / HP Eco Tourism Society during the period of operation of this plan

10.3 General Characteristics of Vegetation: The vegetation of Rohru forest division has been described in chapter-3 of Part-I.

10.4 Blocks, Compartments and JFM areas: This working circle is overlapping hence allotment of blocks and compartments is not required. However, important eco-tourism sites of Rohru forest division are as follows:

Sr No.	Name of Division	Range	Trek Name	Description of Trekking Route (Ten lines)	Trek start point (Name and coordinates)	Altitudinal range of start and end points (in feet)
1	Rohru	Khashdar	Janglik-Chandranahan-Buran Ghati	Very famous trekking route among locals, non - locals and foreigners. Serene locations present along the route for camping like dyara, Litham, BuranGhati. Mild trek route Offers the taste of local village culture and cuisines to the outsiders.	Janglik village 31° 19' 07.59" N 78° 00' 42.08" E	9400 ft to 15530 ft
2	Rohru	Rohru	Sungri-Moral Danda-Dumrera	Famous trekking route among locals and non - locals. The route borders the Rampur Forest division and passes through certain serene and beautiful meadows. Mild trek route. Offers the taste of local village culture and cuisines to the outsiders.	Sungri Village 31° 18' 33.22" N 77° 42' 07.19" E	8600 ft to 12200 ft
3	Rohru	Dodra kwar	Jiskoon-Rupin Pass	Very famous trekking route among locals, non-locals and foreigners. Serene locations present along the route for camping like Dandryash Thach, Lower waterfall and upper waterfall. Moderate trek route Offers the taste of local village culture and cuisines to the outsiders.	Jiskoon village 31° 14' 35.43" N 78° 05' 55.47" E	7800 ft to 15400 ft

4	Rohru	Dodra kwar	Kawar-Brarasar Lake	Famous trekking route among locals and non - locals. Serene locations present along the route for camping like Pandar and Jiskoon. Hard trek. Offers the taste of local village culture and cuisines to the outsiders. Culminates at high altitude Brarasar Lake	Kawar village 31° 12' 56.46" N 78° 05' 41.98" E	7550 ft to 14900 ft
5	Rohru	Khashdar	Kharshali-saru lake-Chanshal pass	Serene locations for camping at Dwash and Dungri thatch. Provides a bird's eye view of Rohru apple valley from Chanshal top. Starts from Ancient Hateshwari temple at Kharshali and passes through high altitude lake saru. Apple valley Rohru Acts as a base camp for Trekking to Chanshal and Saru lake.	Kharshali Eco-cultural Site/Kharshali Village 31° 13' 35.21" N 77° 55' 26.46" E	7800 ft to 12500 ft
6		Jubbal	Kharapathar-Giriganga-Kuppad	A mild day trek from base at Giriganga temple to the top witnessing medicinal plants and grass lands.	Kharapathar 31° 06' 45.06" N 77° 37' 44.43" E	8500 ft to 11000ft
Camping Site						
Sr No.	Division	Range	Name of Property/Camping site	No. of suits (name, type of available	Description of properties (10 lines)	Location of properties GPS coordinates

1	Rohru	Khashdar	Camping site Larot.	Paid Tenting/camping allowed at the spot	Serene location for camping. Provides a bird eye view of Rohru Apple valley. Nearest attractions are Chanshal pass Dodra Kwar Maa Hateshwari temple Kharshali.	31°23'05.01 N 77°09'54.069 S
2	Rohru	Khashdar	Eco Cultural site Kharshali	For sightseeing only	Original place of Maa Hateshwari Hatkoti. A spiritual location. A natural marshy lake makes the place more soothing.	31°22'59.78 N 77°09'19.468 S
3		Rohru	Camping site Moral danda	2 Trekker huts of single room	Serene location for camping. On the famous Moral Danda Trk Route provides a bird 's eye view of Ramapur and Rohru both from Moral Danda peak	31°32'35.70 N 77°07'59.288 S

4	Rohru	Khashdar	Camping site Dawash	Single room trekker hut Trek route camping allowed from 01 May to 15 September on deposition of fee	Serene locations for camping Provide a bird's eye view of Rohru apple valley. Falls on Kharshali- Saru- Chanshal Trek route. Nearest attractions are Chanshal pass, Dodra- KawarMaa Hateshwari temple Kharshali, Apple valley Rohru Acts as a base camp for Trekking to Chanshal Saru lake.	31°12'28.11"N 77°55'37.52"E
5	Rohru	Khashdar	Camping site Dungri Thach	01 Single room trekker hut Trek route camping allowed from 01 May to 15 September on deposition of fee	Serene locations for camping Provide a bird's eye view of Rohru apple valley. Falls on Kharshali- Saru- Chanshal Trek route. Nearest attractions are Chanshal pass, Dodra Kawar, Maa Hateshwari temple Kharshali, Apple valley Rohru	31°11'34'42"N 77°58'41.82"E
6	Rohru	Khashdhar	Camping Site at Mandli FRH Premises	Camping platforms developed in Mandli FRH premises suitable for camping in summers	Riverside camping along the Pabbar river valley provides a relishing experience to the visitor	

Table 10.1 List of Ecotourism sites in the tract

10.5 Special Objectives of Management: The primary objective of Eco-tourism is to show case the natural resource to different segments of the society for education, awareness and recreation values and to propagate the message of conservation of nature and environment. The main objectives of this working circle are as follows:

- To generate awareness amongst the different stake holders, as the public authorities, the private sector, the civil society and the consumers regarding conservation of natural and cultural heritage in their natural areas of existence.
- To provide income generation opportunities to the local inhabitants, especially the poor, on the principles of sustainable development.
- To generate revenue for the state government and HP Eco Tourism Society
- To identify and develop potential eco tourism sites in the tract
- To form Eco Development Committees for each unit of eco tourism involving the local population to enable it to function as self sustaining unit of management
- To allow participation of the local people in the planning, regulation, management and monitoring the conservation of the natural resources to guarantee its long-term sustainability.
- To promote low impact high value nature tourism based on the concepts of precautionary principle and polluter pays to minimize the environmental impact of eco tourism.

10.6 Current Policy and Legal Status of Eco Tourism in State of Himachal Pradesh

The state of Himachal Pradesh is renowned for being an avid tourist destination in which eco tourism is a crucial part of the tourist circuit given the green state Himachal is courtesy of pristine natural landscapes and forests. The state attracts close to 2 crore tourists annually which is a significant number given its population is less than 50% of the same. This poses the challenge of sustainability and the need to focus on eco tourism which is sustainable and conservation oriented.

It is to be noted however that the footfall of tourism is heavily skewed in the state with large parts of the tourists flocking towards Manali, Shimla and Dharamshala. The tract discussed in this plan sees part of the tourists visiting Shimla and avid trekkers from all over the country and beyond visit the tract.

The state of Himachal was one of the first state in the country to have an eco tourism policy in the year 2005. The theme of the policy was to decongest and disperse city tourist destinations and bring tourists closer to nature and provide revenue opportunities for the state and its people.

The HP Eco Tourism Society is the principal body organization that manages all eco tourism activities in the state. It is a registered society under the HP Societies Registration Act, 2006. The governing body of the society is chaired by Honourable Chief Minister, Himachal Pradesh and Secretary (Forests) is the Member Secretary. The Executive Committee of Society is headed by Secretary (Forests) with CCF/ APCCF Eco Tourism as the Member Secretary.

The society is the umbrella organization that manages eco tourism activities in the state. Under the state level ECO SOC, each forest circle is having circle level eco tourism societies. All revenue generated in state from eco tourism is collected at Circle Level Eco Tourism Societies. The HP ECO SOC has adopted a revenue sharing model of 60% revenue that lies towards the Circle Level ECO SOC, 20% that lies towards the State Level HP ECOSOC and 20% which shall lie towards the HP State Government. The Annual Plan of Operation is approved at the Circle Level Society for the pool of money available in Circle Level ECO SOC whereas the State Level ECOSOC Executive Committee approves the funds being sought from the state level pool.

The HP ECO SOC has identified list of potential eco tourism sites in the state and has entered into PPP models of operation and maintenance of eco tourism sites involving private individuals to run the eco tourism sites. The ECO SOC has also brought under its ambit many of the Forest Rest Houses which are being booked online through the HP ECO SOC portal. The HP ECO SOC has also mapped the various trek routes in the state and also provided option of booking the trek routes/ camping sites online via the web portal.

10.6.1 Definition of Eco-tourism: Eco-tourism may be defined as ‘responsible travel to natural area that conserve the environment and improve the well-being of local people’. Forests and wildlife are elements of nature and inseparable parts of the environment. Because of the intricate nature of interface between nature and human beings, nature conservation must entail participation of people as non-negotiable component. The participation in this endeavor includes not only the forest fringed dwellers, but also those who may be living away from the forests. Eco-tourism activities are performed in the forest areas including protected, reserve, sanctuaries and national parks. It also applied in nature reserves, sacred groves, eco-parks and village forests. Eco-tourism besides educating the visitors can also provide livelihood opportunity for the

local communities. It is also prime importance that profile of the natural forests may not be disturbed.

10.6.2 Need for special planning: The following points should be considered while formulating the ecotourism planning-

- i. All eco-tourist spots and spiritual places in the forest area and those en-routes in non-forest area shall be identified and mapped indicating their approach roads, food, water, eco-parks, petrol pumps etc.
- ii. The introduction should contain a brief history of the site as well as the main points of historical and of cultural importance.
- iii. The eco tourism promoted shall be sustainable and shall also facilitate livelihood and income generation of locals.
- iv. Camping and picnic sites should be identified and marked prominently on the map.
- v. One day or two days ecotourism circuit tours should be chalked out including necessary required halts at suitable intervals for various places required by the tourists and in consultation with the facilitators.
- vi. For specific purposes during ecotourism such as trekking, shooting, etc. charges of tourist guide, use of camera, etc. should be mentioned.
- vii. Works/ behaviors of tourists not permissible and penalties levied should be clearly and loudly displayed at different places so that it is very much clear to the tourists at the start of the tour itself. Display boards may also be erected on roads for protection of biodiversity from poaching, cutting of trees and forest fires.
- viii. No compromise with the principles of conservation of forests and wildlife protection shall be made.
- ix. A feedback system from the tourists will also be developed and good suggestions be implemented within the conservation limits.

x. Entry fees etc. for the places will be charged and revenue will be maintained by JFM committees.

xi. The management of eco-tourism primarily vests on local communities as the principal stakeholders. Thus, the benefits flowing from the tourists in the area must also accrue to the local communities.

xii. The paths and roads of ecotourist places will be maintained regularly and construction of new paths and roads will be commenced by the division.

xiii. The activities will be eco-friendly and no permanent structures will be established in violation of Forest (Conservation) Act, 1980.

10.7 Eco-tourism Sites and Potential in Tract:

The geophysical environment of Rohru is characterized by the unique climatology, physiography, geology and hydrology of the area. Hence, there is enormous potential owing to great wealth of forests, wildlife and land features in the region. The ecotourism would encompass components of forest, wildlife, riverine ecosystem and local tribal religion of Rohru forest division. These activities would be mainly recreational, religious and aesthetic in nature enabling visitors to understand and appreciate the eco system services that the forests in the tract provides.

The major eco tourism sites are already given in Table 9.1 above. Trekking/ hiking is the major activity of eco tourism in the tract and lions share of the revenue generated from eco tourism comes from trekking/ hiking. The main trekking routes in operation are also listed in the table. Camping is an associate activity of hiking as camping is essential for multi day treks. These two activities are the main components of eco tourism in the tract.

10.7.1 Chander Nahan and Buranghati Trek: Chander Nahan Lake is situated in between beautiful snowy mountains at an elevation of 4,000 m (approximately) from sea level in the Pabbar Valley in Rohru forest division. Chander Nahan is a beautiful valley full of Meadows, lakes and flowers. From Rohru there is a road which goes to village Tangnu and Janglikh villages. The traditional customs of villagers can be seen in these villages along with tastes of local foods if somebody is interested in knowing the actual traditional culture of Himachal Pradesh. From the village Tangnu, it is an eight-hour trrk to Chander Nahan Lake with a stop at beautiful Litham Meadow. The trekking

route is the most popular one and renowned trekking operators of the country like India Hikes operate in this route after obtaining permissions of forest department.

10.7.2 Chanshal Pass: Chanshal Pass is a high mountain pass at an elevation of 3,800 m. Chanshal Pass is a beautiful place in Pabbar valley track. Chanshal Pass is 50 km from Rohru. The Chanshal pass is snow bound and closed for vehicular access for almost 6 months in a year. Over the years, it has seen a massive increase in footfall and popularity especially considering vehicular access from the Rohru-Chirgaon Road.

10.7.3 Giriganga Temple and Trek to Kuppar: The site is a popular pilgrimage cum nature lovers destination with a heritage temple located at Giri and a serene trek route that culminates in the grassland of Kuppad through the Giri forests. Due to its religious heritage and nature, the site attracts visitors from across the state and country. The Giri temple now being connected via pucca road enables large number of visitors to access the temple and from their trek to the grass land atop. However, this site is also closed for visitors after the first snowfall from December till April.

10.7.4 Rupin Pass Trek: This is a famous trek route that starts from village of Jiskoon in Dodra Kwar range and culminates in Sangla in Kinnaur district with Dayara Thatch being the border of the tract. The operation of this trekking route provides gainful livelihood and income generation opportunities to the villages of Jiskoon, Jakha, Pandar and Matyanu which are remote and far flung villages lying unconnected for almost 6 months in a year.

10.7.5 Kharshali Lake and Temple: This is the most renowned wetland in the tract which needs to be studied for documenting biodiversity and mapping of the springs. This lake and temple is a unique eco tourism site immersed in spirituality, mythology and nature. Its access through road from the main road leading to Chanshal pass enables it to function as a satellite eco tourism site. It has also seen growing popularity among visitors on account of this reason and the majestic conifer forests that adjoin the lake.

10.7.6 Moral Danda Trek: This trek route is accessible from the twin towns of Sungri and Dumrehra. The trek from Sungri is long but picturesque and scenic with breathtaking changes in vegetation. The route currently is seeing an increased footfall owing to increased popularity across sections i.e. the local population and foreign nationals who frequent this route.

10.7.7 Camping Sites in the tract: The current practice of camping in the tract is 2 fold. There are certain areas where the department or HP ECO SOC has developed and earmarked camping sites for operation. This includes the camping sites of Larot, Moral Danda, Kharshali, Dungri Thatch, Dawash and Mandli Forest Resthouse. These camping sites have not yet been fully operationalized due to difficulties in logistics and operation. The operation of camping sites of Larot and Kharshali have been leased out to individuals/ trek operators to run the camping site and provide revenue to HP ECO SOC.

Apart from these developed camping sites where there are concrete platforms, huts or fences, camping is also permitted in forest based on permit system as per the rates fixed in the Governing Board meeting of HP ECO SOC. Currently, permits are being issued to tour/ trek operators who guide groups of people for camping in forest based on the number of tents/ number of people going on the trek.

10.8 Proposed Eco Tourism Sites in the Tract

As detailed above, the tract has rich potential of eco tourism which is spelt out through the trek routes. It is prescribed to continue the operation of eco tourism in the various sites as detailed above and to focus on improving the experience of visitor undertaking eco tourism through information awareness boards, skill development of local population and provision of nature guides and pamphlets.

The tract has also potential in developing new eco tourism sites to provide recreational and aesthetic services to visitors and enable them to gain better understanding of nature and eco system services provided by the Himalayan Forests. The following table gives the detail of eco tourism sites or activities which can be operationalized during the period of this working plan in consonance with the 'Guidelines on Sustainable Eco Tourism in Forest and Wildlife Areas 2021' notified by the Ministry of Environment, Forest and Climate change:

Sr.No.	Name of Site	Type (Nature Trail/ Trekking Trail/ Cycling Trail/ Camping Site/ Eco Park)	Range	Beat	Brief Description

1	Shradoodhar	Cycling/ Walking Trail/ Camping	Tikker	Farog	The site is accessible from the main road that leads to Deorighat. It has lush green meadows and a defined path which can be utilized for multifarious activities including cycling, walking and camping.
2	Rohru- Chirgaon Roadside along Pabbar River	Eco Park and Walking Trail	Rohru/ Khashdhar	Rantari	The Pabbar river bed offers great potential for development of an eco urban park which can offer recreational and aesthetic service to visitors.
3	Kayla (DPF Kayla)	Eco Park and Nature Trail	Saraswati Nagar	Mandal	The roadside plantation done under JICA project is a magnificent Deodar forest along with streams which can be developed into nature park/ trail
4	DPF Mandhol C18A	Nature Trail/ Cycling Trail	Jubbal	Mandhol	The majestic conifer forests of Mandhol is a delightful walk for nature enthusiasts and adventure cycling lovers.
5	UPF Bamla I	Natural trail	Tikkar	Kadiwan	The Nature trail offers a picturesque walk for ecotourist and religious visitors.
6	Kohlara to Chhatardhar	Treking	Jubbal	Shilli and Muril	A short one day trek for ecotourists through the forests of Giri.

7	Bashla to Malkhun	Eco Trail	Bashla	Bashla	A gentle trail from Bashla forest rest House to Village Malkhun amidst pure deodar forests
8	Bashla Rest House to Dhurla Heights	Treking	Bashla	Bashla	Short one day trek from Forest Rest House Bashla to Dhurla offering scenic views of Pabbar river valley.
9	Larot to Tikkari	Treking	Khashdhar	Larot	A trek from Forest Rest House Larot to Tikkar giving visitor a natural experience of High altitude blue pine and silver Fir trees.
10	Larot to Chanshal	Treking	Khashdhar	Thalathar	A day trek through high altitude forest, pink rhododendron shrub forest and alpine grasslands upto chanshal pass.
11	Shiv Guffa Shashan	Treking	Saraswatinagar	Shashan	Approx. 3 km trek to Shiv Guffa
12	Ruhil Saur / Kat Bauri / Nag Mandir	Treking	Saraswatinagar	Chhajpur	This site offers visitors experience of natural water bodies alongwith religious tourism
13	Baghi to Gawas	Trekking	Rohru	Gawas	Scenic trek through broad leaved forest culminating in Gawas temple

Table 10.2: Proposed ecotourism Sites in the tract

It is also prescribed that apart from the above sites, any other eco tourism site may be developed in the tract only subject to approval by Governing Board of Shimla Forest Circle Eco Tourism Society and ratification by HP State ECOSOC and strictly in accordance with the Guidelines on Sustainable Eco

Tourism in Forest and Protected Areas as notified by MoEFCC. Each such site being developed for purpose of eco tourism shall have brief plan of action which is approved in the GB of Circle Level ECOSOC.

10.8 Prescriptions for Eco Tourism Management:

- **Formation of Eco Development Committees:** A participatory model of eco tourism management needs to be encouraged in the tract. This requires that EDCs be formed at each eco tourism site involving the local people. The EDC shall be responsible for the smooth conduct of eco tourism in site. In case of trekking routes, EDC can help provide homestays, nature guides, ensure cleanliness in the trekking route and operate the ticket counter while keeping a check on the number of visitors.

The Eco Development Committees shall be registered society under the HP Societies Registration Act, 2006. Each EDC formed for the purpose of eco tourism in the tract shall be registered and function under the umbrella of Shimla Forest Circle Eco Tourism Society. The revenue sharing agreements shall be worked out with the EDCs on the basis of site, potential of revenue, income generation opportunities for local people and other site specific factors.

The broad framework of EDC shall be that it has an elected chairperson along with Range Officer as Member Secretary. The EDC shall pass resolutions and the same shall be placed before the Executive Supervision Committee of Eco Tourism Society at Division level prior to being taken to Circle Level ECO SOC. The EDC shall be the field level functional unit which shall be responsible for day to day ecotourism and management activities.

- **Permit Fees for Entry and Camping:** Currently, there are separate permit fees being levied from visitors who are trekking/ hiking in forest areas. It is proposed to keep the separate rate and adjust it for inflation in the coming times to ensure that the ecological footprint of the visitor can be compensated for. The rates for entry and camping shall be decided time to time by Governing Board/ Chairman of the Shimla Forest Circle ECOSOC. It is prescribed to check the permits through check post at entry points of the trek route and if any visitor is found without permit it is prescribed to levy fines and penalties on such visitors in accordance with the rates fixed by GB of Circle Level ECO SOC.

- **Environmental Preservation Fees for Vehicles:** It is proposed to levy environmental preservation fees for vehicles passing and onwards towards Giriganga Temple and Chanshal Pass as these two routes pass through and culminate in rich biodiverse forests. There is a need to charge environmental preservation fees from eco tourists visiting this area to offset the damage caused to environment and enable sanitation, cleanliness and solid waste management in the site. The fees shall be fixed by the Governing Board of Shimla Forest Circle Ecotourism society.
- **Plastic cum Entry Check Post:** It is prescribed to establish plastic cum entry check post at the start of all trek routes and vehicular routes to keep a check on plastic and collect entry/ environmental preservation fees. Wherever possible, these check posts shall be operated by EDC members. The plastic check post is much required in Gaonsari (mid point of Kharshali and Chanshal) and also in the start point of the road leading to Giri temple.

The Plastic cum Forest Protection Check are proposed to be installed on routes to these eco tourism sites at strategic positions. These check posts shall be operated by Eco Development committees consisting of local people and involving concerned forest guard. They shall levy plastic fees as decided by the Executive Committee of Rohru Division Chapter of Shimla Forest Circle ECO SOC and ensure that the same is either disposed off properly by visitor and if not caution deposit be forfeited to ECO SOC account

➤ **Carrying Capacity Considerations:**

Carrying capacity in eco tourism refers to the maximum number of visitors/ vehicles that a landscape/ eco tourism site can sustainably sustain without adverse impacts to ecology, eco system services, forest and wildlife. It is prescribed that there is a growing need in hilly areas to lay down clear boundaries and limits to eco tourism as there is a dangerous tendency for tourism to be highly commercialized resulting in destruction of nature and its wealth. This is seen in many areas in the form of mushrooming of illegal hotels, encroachments, pollution of water sources, solid waste lying open and other such manifest forms of commercial tourism with disdain to environment. Considering these aspects, the carrying capacity of the eco tourism sites is prescribed based on the MoEFCC guidelines for sustainable eco tourism in protected areas

Physical Carrying Capacity (PCC) = Length of Trekking Route available for public use x Number of Persons per Km x Rotational Factor

For the trek routes in Rohru Forest Division, it is assumed that a total of 20 visitors can be accommodated in 1km with physical spacing of 50meters between persons. A rotation factor of 1.0 is assumed as there is no fixed closing or opening time for trekking/ camping. However, in case of Giri Kuppar Trek, rotation factor is considered as 2 as it is a short half day trek.

For camping sites, it is assumed that one person shall require at least 40 square meter of area and accordingly calculations are made for figuring out PCC. It is pertinent to mention here that PCC calculated in both these aspects is not strictly physical but the actual area that is reasonably required for visitor which is sustainable and comfortable both for the visitor and environment.

Physical Carrying Capacity (PCC) for Camping Sites = Area available for Public Use x Number of Persons per Unit Area x Rotational Factor

Correction Factors (Soil Erosion) = Highly vulnerable stretch (km) x Weightage factor + Moderately vulnerable stretch x weightage factor / Area available for use

Correction Factors (Wildlife) taking into considerations of breeding of wildlife in the tract

Correction Factors (Temporary Closing) considering that the tract and trek routes therein remains closed during monsoon and winters for at least a period of 4 months every year.

Real Carrying Capacity = $PCC (1-CF(SE))(1-CF(W))(1-CF(T))$

Effective Permissible Carrying Capacity = RCC x Managerial Capacity

Based on the above assumptions, the EPCC for each trek route in the tract is identified and computed in Table 10.3. It is prescribed that the number of visitors be capped at the maximum prescribed limit of EPCC fixed here for each route. The number of visitors visiting per day in each of these trek routes shall not exceed EPCC prescribed here for each trekking route.

Sr.No.	Trek Route/ Camping Sites	PCC	CF (Soil)	CF (Wildlife)	CF (TC)	Real Carrying Capacity	EPCC (at 80% MC)
1	Chandernahan/ Buranghatti Trek Route	$25 \times 20 \times 1 = 500$	$2.5 \times 3 / 25 = 0.3$	$2 / 12 = 0.16$	$= 0.33$	194	155
2	Rupin Trek Route	$25 \times 20 \times 1 = 500$	$2.5 \times 3 / 25 = 0.3$	$2 / 12 = 0.16$	$= 0.33$	194	155
3	Giri Kuppur Trek	$5 \times 20 \times 2 = 200$	$0.5 \times 2 / 6 = 0.16$	$3 / 12 = 0.25$	0.33	83	66
4	Moral Danda Trek	$18 \times 20 \times 1 = 360$	$3 / 18 = 0.16$	0.25	0.25	170	136
5	Kharshali Saru Lake Trek	$12 \times 20 \times 1 = 240$	$1.5 \times 2 / 12 = 0.25$	0.16	0.33	100	90
6	Larot Camping Site (Area: 0.3 Ha)	$3,000 \times 1 / 40 = 75$	0	$3 / 12 = 0.25$	0.33	37	30
7	Chanshal Camping Site (Area: 0.5 Ha)	$5,000 \times 1 / 40 = 125$	0	$4 / 12 = 0.33$	0.33	54	43
8	Kharshali Camping Site (Area: 1 Ha)	$10,000 \times 1 / 40 = 250$	0	$4 / 12 = 0.33$	0.33	108	88
9	Dawash Camping Site (Area: 1 Ha)	$10,000 \times 1 / 40 = 250$	0	$4 / 12 = 0.33$	0.33	108	88
9	Mandli FRH Camping Site (6 Camping Platforms)	24	0	0	0	24	19

Table 10.3 List of Ecotourism sites in the tract and carrying capacity prescriptions

- **Management of Camping Sites:** It is prescribed to outsource the operation of camping sites as department does not have enough man power to run these camping sites in the tract. The operation of these camping sites may be leased to individuals/ companies by HP Eco Tourism Society considering efficiency, visitor amenities and revenue generation possibilities as per prevailing eco tourism policy and

guidelines and in accordance with the Public Private Partnership model as defined by HP ECO SOC. If the local EDC is capable to manage the camping site, then it may be handed over to them based on site and capability of the EDC.

- **Non Permanent Structures:** All infrastructure developed for eco tourism in the tract will be of non permanent nature and thus as per the guidelines of the ministry will not be in violation of the Van Sanrakshan Evam Van Samvardhan Act, 1980
- **River Front Nature Park/ Nature Trail:** It is proposed to develop a river front nature park/ nature trail in the town of Rohru along the Pabbar river after clearly fencing and demarcating the area. This can help prevent mining and other illegal activities along the river side area. The nature park and trail can provide birds eye view to the visitor of the rich cultural and natural heritage of the tract. The themes of bio diversity, wildlife conservation and cultural heritage can be the focal points of this nature park.
- **Information and Awareness Boards:** It is prescribed to install bilingual signage and information boards in the various eco tourism sites and also to provide the eco tourists with pamphlets or brochures detailing the various do's and don't's while entering an ecologically sensitive area.
- **Maintenance of Trekking Route/ Path:** It is strongly prescribed to undertake periodical assessment of the trekking routes operated and evaluate its safety in coordination with trekking operators. The periodical maintenance of these routes are essential especially considering many of these routes are located beside rivers and glaciers which tend to overflow during the monsoon or post winter snow melt season.
- **Penalty for Defaulting Visitors:** It is strongly prescribed to levy fines for visitors violating the guidelines especially with regard to illegal camping, dumping of waste/ littering the tract. The rate of penalties shall be fixed by Executive Committee of Rohru Division chapter of Shimla Forest Circle ECO SOC
- **MoU with Hiking Operators:** It is prescribed to enter into a Memorandum of Understanding with the major tour/ trek operators in the routes in the tract with regard to entry, do's and don'ts, maintaining

cleanliness in the trails and following the carrying capacity and permit guidelines

- **Solid Waste Management Prescriptions:** The problem of solid waste is not seen to be adverse in trekking routes in the tract till date. However, it is forecasted that this may not be the case in future with increasing footfall and plastic consumption. Similarly, wherever vehicular access exists like with regard to Chanshal pass, Giri Temple, Kharshali temple, the problem of solid waste management seems to be serious. In this regard, cleanliness drives are prescribed to be conducted to relieve the forest of the solid waste and to transport them to nearest material recovery facility. The expertise of NGOs/ Civil Society organizations who work in this domain may be requisitioned on behalf of HP ECO SOC to manage the solid waste. It is prescribed to have non permanent waste segregation and processing infrastructure in the tract adjacent to ecotourism sites.
- **Skill Development and Capacity Building of Local Population:** It is prescribed to develop skills of EDC members and local population residing adjoining the site in eco tourism, nature guiding, operation of homestays and other such aspects so that they can benefit from eco tourism.
- **Development of Non Permanent Infrastructure for Eco Tourism:** It is proposed to develop non permanent infrastructure for development of eco tourism. This shall include the following
 - Solid waste management/ segregation facilities adjacent to eco tourism sites for waste processing and safe disposal
 - Basic sanitation and toilet facilities adjacent to popular eco tourism sites like Chanshal, Kharshali, Giriganga or any other eco tourism site as deemed fit by Circle Level ECO SOC GB
 - Portable Eco Shops/ Temporary Food Vans in eco tourism sites of Chanshal, Giriganga, Kharshali and any other eco tourism site as deemed fit by GB of circle level ECO SOC
 - Development of camping platforms and fencing of camping sites in designated camping sites as detailed above
 - Development of minimal water provision infrastructure at eco tourism sites for visitors and sanitation
 - Development of Thematic Gates for Eco Tourism Sites to attract visitors and develop awareness

- Development of Resting Points and Benches utilizing Wooden and other non permanent materials
 - Beautification of eco tourism sites utilizing non permanent materials
 - Any other eco friendly non permanent infrastructure solely for purpose of eco tourism with approval of Governing Board of HP ECO SOC at Circle Level
- **Adventure Tourism:** With regard to execution of adventure tourism activities like para gliding, river rafting, rappelling, mountaineering, skiing it is recommended and prescribed that such activities may be undertaken in the tract only permitted for those organizations and institutions which are registered, licensed and accredited with HP Tourism Department. Further, the implementing agency shall take permission and remit registration fees as fixed by Eco Tourism Society wherever and whenever such activities are to be executed. No permanent infrastructure shall be permitted for utilization of forest land in the tract for such activities. The following are indicative sites of adventure activities in the tract:

Sr.No.	Adventure Activity	Indicative Eco Tourism Site
1	Paragliding	Kulgaon- Pabbar River Bed
2	River Rafting	Pabbar River from Mandli to Hatkoti
3	Rapelling and Mountaineering	Giriganga, Buran Ghatti
4	Skiing	Harshal Tibba-Deorighat, Chanshal Pass

Table 10.4: List of Indicative Sites for Adventure Activities

The sites proposed above are indicative in nature and any activity shall be permitted only as per the guidelines of Van Sanrakshan Evam Van Samvardhan and approval of GB of HP Circle Level Eco Tourism Society. Any other site shall be permitted only with prior approval of Governing Board of HP

Eco Tourism Society and ratification of State Level HP ECOSOC. No kind of permanent infrastructure shall be allowed for any of these activities.

- **Utilization of Forest Rest Houses:** It is prescribed that the use of forest resthouses in the tract shall be confined as per the directions of Honourable Supreme Court with first preference given to officers on duty. However, all FRHs under the division in the tract may also be utilized for promotion of eco tourism and made available for eco tourists also in accordance with prevailing guidelines, eco tourism policy of state government and mandate of state level HP ECO SOC. It is also prescribed in view of increasing staff shortage that catering and housekeeping services be outsourced for the smooth and efficient running of rest houses. However, departmental control over rest house booking and operation shall continue and not be compromised for as per directions of Honourable Supreme Court.

10.9 Environmental Audit: The ecotourism strategy is based on three key elements i.e., it is nature based, involve education and is operated on a sustainable basis. Environmental auditing plays an important role in determining whether operations are bona fide ecotourism or not. It is therefore prescribed that DFO may do environmental auditing in all ecotourism sites. The general guidelines for environmental auditing are given below:

- Ensure that site plan is environmentally friendly, minimizing negative impacts on natural landscape, local biodiversity and any existing cultural features found nearby.
- Ensure that the design allows for possible future expansion, modification and retro fitting.
- Whenever possible, use local building materials and local hand labour.
- As far as possible try to use 'Renewable Source of Energy'.
- Ensure waste management by following quadruple principles: recycle, reuse, refuse and reduce.

Chapter-11

Biodiversity Management & Conservation (Overlapping) WC

11.1 Name of Working Circle: Biodiversity Management & Conservation (Overlapping) WC

11.2 General Constitution of Working Circle: Biodiversity can be defined as the diversity of the living world and is seen on several levels; intra specific genus (genetic diversity), species (inter specific) and ecosystems (ecological diversity). In broad terms, biodiversity covers a whole range of concepts-specific diversity, rarity, natural characteristics, vulnerability etc. Diversity means variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and the ecosystems (CBD, 1992).

This working circle is constituted mainly with a view to protect, conserve and provide a vision for sustainable utilization of biological resources to conserve biodiversity and ensure that benefits derived from utilization are shared equitably in accordance with Principle of Fair and Equitable Benefit Sharing enshrined in the Nagoya Protocol under Convention to Biological Diversity.

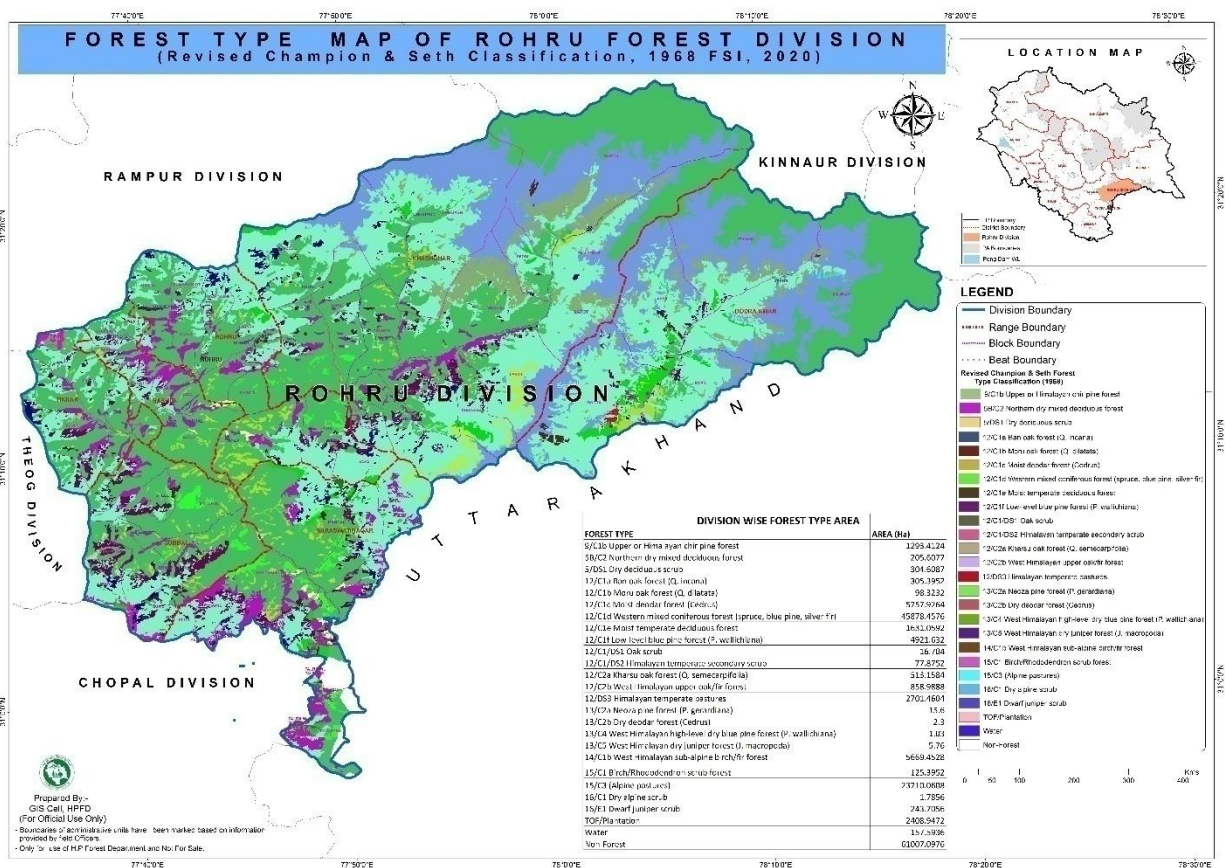
11.3 General Characteristics of Vegetation: The vegetation of Rohru forest division has been described in chapter-3 of Part-I.

11.3.1 As per Champion and Seth (1968) classification, following types of forests found in the division (table 11.1)

Groups	Forest Types	Symbol/Code
Group-9	Upper Himalayan Chirpine Forest	9/C1 (b)
Group-12	Lower Western Himalayan Temperate Forest	12/C1
	Ban Oak Forest (<i>Quercus leucotrichophora</i>)	12/C1 (a)
	Moru Oak Forest (<i>Quercus dilatata</i>)	12/C1 (b)

	Oak Scrub	12/C1/DS1
	Himalayan Temperate Secondary Scrub	12/C1/DS2
	Moist Deodar Forest	12/C1(c)
	Western Mixed Coniferous Forest	12/C1 (d)
	Moist Temperate Deciduous Forest	12/C1 (e)
	Low level Blue Pine Forest (<i>Pinus wallichiana</i>)	12/C1 (f)
	Montane Bamboo Brakes	12/DS1
	Himalayan Temperate Pastures	12/DS3
	Alder Forest	12/1S1
	Low level Bluepine Forest	12/2S1
	Upper West Himalayan Temperate Forest	12/C2 (a)
	Kharsu Oak (<i>Quercus semecarpifolia</i>)	12/C2(a)
	West Himalayan Upper Oak – Fir Forest	12/C2(b)
Group 14	West Himalayan Sub-Alpine Birch/Fir Forest	14/C1
	West Himalayan Sub-Alpine High-level Fir Forest	14/C1(a)
	West Himalayan Birch/Fir Forest	14/C1(b)
	Sub Alpine Pasture	14/ DS1
Group 15	Birch / Rhododendron Scrub Forest	15/C1
	Deciduous Alpine Scrub	15/C2
	Northern Dry Mixed Forest	15 B/C2
	Alpine Pasture	15/C3

Table 11.1 Types of Forests in Rohru Forest Division



Map 11.1: Forest Type Map of Rohru Forest Division

11.3.2 Species Diversity based on Forest Types:

11.3.2.1 Group 9: Sub-tropical Pine Forests: -This type of forests is found distributed at eastern portion of Saraswati range at an altitudinal range of 1200 -1500 m. The main species is Chir (*Pinus roxburghii*) along with associated tree species of *Quercus leucotrichophora*, *Lyonia ovalifolia*, *Bauhinia retusa*, *Prunus cerasoides* etc. The ground flora consisted *olebrookea oppositifolia*, *Coriaria nepalensis*, *Indigofera cassioides*, *Viburnum cotinifolium*, *Rubus ellipticus*, *Woodfordia fruticosa*, *Geranium nepalense*, *Desmodium parviflorum*, *Rosa brunonii*, and *Lepidagathis cuspidata*. Additionally, various grass species thrive here, such as *Arundinaria falcata*, *Sporobolus piliferus*, and *Cynodon dactylon*

11.3.2.2 Group 12: Himalayan Moist Temperate Forests:

11.3.2.2.1 Moist Deodar (*Cedrus deodara*) Forest: This forest is found distributed at an elevation range of 1800 -2500 m. On northern aspects, deodar

forest goes to lower altitude especially along streams and nallah areas. Deodar is predominant species and found on all types of soils. In most of the tract, it is found as pure crops or mixed crops with tree species of *Quercus leucotrichophora*, *Quercus dilatata*, *Lyonia ovalifolia*, *Rhododendron arboreum*, *Aesculus indica*, *Juglans regia*, *Pyrus pashia*, and *Alnus nepalensis*. Beneath this lush canopy, the forest floor supports a diverse understorey of herbaceous and shrubby species including *Artemisia vulgaris*, various species of *Berberis* spp., *Caragana brevispina*, *Daphne papyracea*, *Prinsepia utilis*, *Cotinus coggygia*, *Sarcococca saligna*, *Digitalis purpurea*, *Fragaria vesca*, *Fragaria nubicola*, multiple species of *Impatiens* spp., *Rumex hastatus*, various *Salvia* spp., as well as grasses such as *Andropogon* spp. and bamboos of the genus *Arundinaria* etc

11.3.2.2.2 Western Mixed Coniferous Forests: This type of forests is found in all over Rohru and Jubbal ranges. It is mixture of deodar, kail, and spruce. Kail is found as pure or mixed with deodar on southern slopes while deodar and spruce mixed forests are found on spurs and deep grounds. The type of forests is distributed on the elevation range of 2000-3200 m. In Kharsali and Chachapur areas, silver fir is mixed with deodar and kail. Central zone at above 2500 m supports pure stand of spruce with sprinkling stand of kail on the slopes. On the top most of the hills, silver fir is predominant. Other broad leaved species mixed with confers are *Quercus semecarpifolia*, *Q. dilatata*, *Prunus cornuta*, *Juglans regia*, *Rhododendron campanulatum*, *Ulmus wallichiana* etc. The ground flora is thick and consisted of *Neoliitsea* spp., *Cotoneaster* spp., *Deutzia staminea*, *Spiraea canescens*, *Saussurea lappa*, *Aconitum heterophyllum*, *Gentian kurroo*, *Impatiens* spp., *Potentillaspp*, *Polygonatum verticillatum*, *Polygonum*spp., *Swertiaspp.*, *Strobilanthes pentas temonoides* etc. The ground is covered with thick mat of humus and ferns which makes moist conditions of the ground. *Arundinaria falcata*, Ringal bamboo is also mixed with deodar and kail.

11.3.2.2.3 Moist Temperate Deciduous forests: This type of forest is found between 1600-2500 m of elevation range and confined to mist and damp locations along nallah and depressions unsuitable to conifers. Typical examples of the forests are Goas Janglik, Rohal and Pekha Pandar forests of Rupin valley. Top canopy consists of *Aesculus indica*, *Acer* spp., *Ulmus wallichiana*, *Betula alnoides*, *Prunus* spp., *Populus ciliata*, *Fraxinus floribunda* etc. The under storey consists of *Corylus colurna*, *Rhus* spp., etc. On well drained soils, spruce and kail form the competition.

11.3.2.2.4 Low level Blue Pine Forests: This is seral type of forest which is found all over the tract. It occurs between 1800 to 2800 m of elevation. Kail (*Pinus wallichiana*) is the predominant species. It also found mixed with other conifers. Kail is found as pure crop at lower elevation while spruce occurs at higher elevation near nallahs and depressions in the areas of Ransar and Spail valleys. Deodar is found mixed with kail particularly areas of Kashadhar, Kui, Devidhar, and Dodra-Kwar. Underground and ground flora is found same as in moist deodar forests.

11.3.2.2.5 Moist Alpine Scrub Forests: This forest is found on the upper parts of coniferous forests where high level fir (*Abies spectabilis*), *Rhododendron campanulatum*, *Betula utilis*, *Quercus semecarpifolia* are found. The tree branches and main boles are found bend due to snow pressure. The understory consists of *Viburnum spp.*, *Cotoneaster spp.*, *Lonicera spp.*, *Berberis spp.*, *Viola serpens*, *Valeriana jatamansi*, *Thalictrum spp.*, *Primula denticulata*, *Juniperus macropoda*, *Gaultheria trichophylla*, *Picrorhiza kurroa* etc.

11.3.3 Analysis of crop:

11.3.3.1 Diversity Assessment of Tree Species in Rohru Forest Division:

Sr. No.	Botanical name	Local name
1	<i>Abies pindrow</i>	Tosh
2	<i>Acer oblongum</i>	Parang
3	<i>Acer pictum</i>	Rikhandlu
4	<i>Acer caudatum</i> / <i>Acer villosum</i>	Rikhandlu
5	<i>Acer caesium</i>	Chirandru, Manderang
6	<i>Aesculus indica</i>	Khanoor, Poo
7	<i>Albizia lebbek</i>	Siris
8	<i>Alnus nitida</i>	Kosh, Kunish, Nyum
9	<i>Betula utilis</i>	Bhojpatra, Pad
10	<i>Betula alnoides</i>	Sheori, Kathbhoj, Shagra
11	<i>Buxus wallichiana</i>	Shamshad
12	<i>Carpinus viminea</i>	Khirkii, Lolti
13	<i>Castanea sativa</i>	Mitha Khanor, Poo
14	<i>Toona sinensis</i>	Darb, Krishing
15	<i>Cedrus deodara</i>	Deodar, Kelo, Diar, Kialmang
16	<i>Celtis australis</i>	Khirak, Koo
17	<i>Corylus jacquemontii</i>	Sharol, Banshari, Gebija

18	<i>Cornus capitata</i>	Kareeva, Khagsha, Saktaquas
19	<i>Cornus oblonga</i>	Kareeva
20	<i>Cupressus sempervirens</i>	Saru
21	<i>Cupressus torulosa</i>	Devidiar
22	<i>Euonymus tingens</i>	Barmelui, Kalachindwara
23	<i>Engelhardia spicata</i>	Samma
24	<i>Fraxinus xanthoxyloides</i>	Thum
25	<i>Fraxinus micrantha</i>	Angu
26	<i>Ficus palmata</i>	Phedu
27	<i>Ilex dipyrena</i>	Kandru
28	<i>Kydia calycina</i>	Pula
29	<i>Juglans regia</i>	Akhrot, Khor, ka
30	<i>Juniperus macropoda</i>	Guggal, Dhup, Shur
31	<i>Litsea</i> sp.	Paror, Chirindi
32	<i>Neolitsea pallens</i>	Paror, Chirindi
33	<i>Machilus duthiei</i>	Chan, Chirindi
34	<i>Melia azedarach</i>	Bakain, Drek
35	<i>Olea europaea</i> subsp. <i>cuspidata</i>	Kahu, Vee
36	<i>Picea smithiana</i>	Spruce, Rai, Rayang
37	<i>Pinus wallichiana</i>	Kail, Lim
38	<i>Pinus roxburghii</i>	Chil
39	<i>Pinus gerardiana</i>	Neoza, Chilgoza, Ri
40	<i>Lyonia ovalifolia</i>	Ayar, Yarta
41	<i>Pistacia integerrima</i>	Kakkar, Kakrian
42	<i>Populus alba</i>	Safeda, Mal
43	<i>Populus ciliata</i>	Poplar, Pahari Pipal, Chalun, Karamal, Mangal
44	<i>Prunus armeniaca</i>	Chulli, Chul
45	<i>Prunus cerasoides</i>	Paja
46	<i>Prunus persica</i>	Aaroo, Behmi, Reg
47	<i>Sorbus foliolos a</i>	Ranreg
48	<i>Sorbus lanata</i>	Ban Palti, Marpol
49	<i>Pyrus pashia</i>	Shagal, Batangi, Kainth, Lee

50	<i>Quercus baloot</i>	Breh
51	<i>Quercus leucotrichophora</i>	Ban, Bani
52	<i>Quercus semecarpifolia</i>	Kharshu, Kor
53	<i>Rhododendron arboreum</i>	Baras, Parag
54	<i>Rhus wallichii</i>	Hurku, Shush
55	<i>Robinia pseudoacacia</i>	Pahari kikar
56	<i>Salix babylonica</i>	Majnun, Shon
57	<i>Salix daphnoides / Salix alba</i>	Beuns
58	<i>Salix elegans</i>	Bhashal, Beuns, Shon
59	<i>Salix tetrasperma</i>	Beau, Shon
60	<i>Symplocos paniculata</i>	Lodar, Logh
61	<i>Taxus contorta</i>	Rakhal, Barmi, Neyamdai
62	<i>Ulmus wallichiana</i>	Marn, Maldung
63	<i>Ulmus villosa</i>	Maral, Maldung

Table 11.2 Diversity of Trees species of Rohru Forest Division

Dominant shrub species are as follows - *Berberis aristata*, *Berberis lycium*, *Berberis glaucocarpa*, *Chrysojasminum humile*, *Coriaria napalensis*, *Cotinus coggygia*, *Cotoneaster microphyllus*, *Desmodium elegans*, *Desmodium multiflorum*, *Deutzia staminea*, *Elaeagnus umbellata*, *Hypericum* spp., *Leptopus cordifolius*, *Sarcococca saligna*, *Daphne papyracea*, *Indigofera cassioides*, *Indigofera heterantha*, *Punica granatum*, *Rhamnus virgata*, *Roylea cinerea*, *Woodfordia fruticosa*, *Zanthoxylum armatum* etc.

11.4 Special Objectives of Management:

- i) Documentation of biodiversity of the tract for all orders of fauna and flora.
- ii) To evaluate the trends of biodiversity conservation.
- iii) To identify and enable protection and conservation of Rare, Endangered and Threatened species in the tract through ex situ and in situ conservation efforts.
- iv) To provide a framework for sustainably utilizing biological resources and equitable sharing of benefits arising from it based on the Biological Diversity Act, 2002 and Himachal Pradesh Biodiversity Rules notified under the act.

v) To enhance people's participation in management of biodiversity through the institution of Biodiversity Management Committees and formulating the People's Biodiversity Register.

vi) To enable livelihoods and gainful income generation for the right holders by promoting the sustainable use of forest produce.

vii) Documentation of traditional knowledge of biodiversity in the tract safeguarding it from bio piracy.

vii) To enforce the biodiversity act, 2002 and prevent the theft of biological resources by foreign nationals from the tract

11.5 Current Legal and Policy Status:

The Parliament of India passed the Biological Diversity Act, 2002 to protect biodiversity and facilitate the sustainable management of biological resources with the help of local communities. The Act was enacted to meet the requirements stipulated by the United Nations Convention on Biological Diversity (CBD), to which India is a party. The salient features of the act are:

- Regulation of access to biological resources of the country and enforcing penal provisions for bio prospecting, bio survey and access to biological resource without the permission of National Biodiversity Authority (NBA)
- Conservation and sustainability of biological diversity for commercial purpose through the institution of State Biodiversity Board
- Protecting the knowledge of local communities regarding biodiversity
- Secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources through the formation of Biodiversity Management Committees at local level and devolving powers to them to levy fees and penalties with regard to access to biological resources
- Establishment of funding pools at national, state and local level for biodiversity protection and conservation.

India's National Forest Policy, 1988 rightly focused, inter alia on "conservation of natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country."

The Himachal Pradesh government has notified the Himachal Pradesh Biological Diversity Rules under Section 63 of the Biodiversity Act, 2002. The

rules provide for the procedure of application for access to biological resources for commercial, bio survey, bio utilization and research laying down the principle of Access and Benefit Sharing (ABS). The HP government has notified that all DFOs shall function as authorized officer of the HP State Biodiversity Board in granting approval/ permission for access to biological resources. In case approvals are granted, then a standard agreement is to be made between the DFO and the person accessing the biological resource. In the tract, so far the following agreements have been made under the ABS agreement:

Detail of Access and Benefit Sharing

Sr. No.	Name Of Range	Year	Name and address	Permit issued for transit of produce /Species	Quantity	ABS amount deposited
1.	RFO Khashdhar	2023-24	Sh.Vinod Kumar S/O Sh. Hira Singh R/O Village Sheela Desh P.O Larot Tehsil. Chiraaon Diss tt Shimla H.P	Dhoop (Jurineamacrocephala=J.dolomoea)	300 kg	16605/- Sixteen Thousand Six Hundred Five Rupees Only
2.	Bashla	2024-25	Sh. Jojinder Singh S/O Sh. Kamla Nand R/O Village Sharog P.O. Arhal Trehsil Rohru Distt. Shimla H.P.	Goochi (Morchellaesculenta)	50 kg	15000/- Fifteen Thousand Only
3	Dodra Kawar	2024-25	Sh. Parmi Ram S/O Sh Bhag Dass R/O VPO Dodra Tehsil Dodra Kawar Distt. Shimla H.P.	Berberis aristata (Daruhaldi)	10000 kg	16000/+500/- = 16500/- Sixteen Thousand Five Hundred Only
4	Dodra Kawar	2024-25	Sh. Manjeet Singh S/O	Walnut bark (Juglan sregia)	10 Quintal	30000/- Thirty

			Sh.Deendiyal Singh R/O VPO Dodra Tehsil Dodra Kawar Distt. Shimla H.P			Thousand only
5	Dodra Kawar	2024 -25	Sh. Parmi Ram S/O Sh Bhag Dass R/O VPO Dodra Tehsil Dodra Kawar Distt. Shimla H.P.	Kashmal (Berberies) Daru Haldi	9000 kg	14850/- Fourteen Thousand Eight Hundred Fifty Only
6	Saras wati Nagar	2024 -25	Kedar Singh S/O Late. Sh Dhani Ram R/O Village Chajian P.O. Tikkari Teh. Nerwa Distt. Shimla H.P.	Knots/Pinusro xburghii (Chil Cones chilaru)	17000 kg	20400/- Twenty Thousand Four Hundred Only
7.	Saras wati Nagar	2024 -25	Kedar Singh S/O Late. Sh Dhani Ram R/O Village Chajian P.O. Tikkari Teh. Nerwa Distt. Shimla H.P.	Knots/Pinusro xburghii (Chil Cones chilaru)	10000 kg	12000/- Twelve Thousand only

Table 11.3: Detail of Access and Benefit Sharing

The person/ firm accessing the biological resource has to also provide Access and Benefit Sharing fees which shall lie deposited towards the State Biodiversity Board.

As per the notified rules in the state, local body is responsible for constitution of BMCs which shall document people's biodiversity register and take steps for protection and conservation of biodiversity in the region. The forest department is only provided a technical support role in the rules. However, considering that a major share of the biodiversity is located in the

forests, then it is vital that there is coordination between each BMC and the concerned forest staff whose jurisdiction overlap that of the BMC.

11.6 Threatened and over exploited species in Rohru Forest Division:

The IUCN (International Union for Conservation of Nature) Red Lists are the bearers of genetic diversity and the building blocks of ecosystems, and information on their conservation status and distribution provides the foundation for making decisions about conserving biodiversity from local to global levels. The IUCN Global Species Program working with the IUCN Species Survival Commission (SSC) has been assessing the conservation status of species, sub-species, varieties, and even selected sub-populations on a global scale for the past 50 years in order to highlight taxa threatened with extinction, and thereby promote their conservation. Following floral species of Rohru Forest Division are listed in Red Data book of IUCN.

Table 11.4 Plant species under IUCN- Red Data Book

Sr.No..	Botanical Name	Red Data Book Status	Altitudinal Range
1.	<i>Acer caesium</i>	Vulnerable	2130-3050 m.
2.	<i>Acer oblongum</i>	Vulnerable	2000-2500 m
3.	<i>Aconitum heterophylloides</i>	Vulnerable	3000-4500 m
4.	<i>Aconitum heterophyllum</i>	Vulnerable	2500-3500 m
5.	<i>Allium stracheyi</i>	Vulnerable	2400-2700 m
6.	<i>Berberis jaeschkeana</i> <i>var. apiculata</i>	Rare	1500-2400 m
7.	<i>Calanthedavidii</i>	Endangered	200-2500 m
8.	<i>Campanula wattiana</i>	Rare	2200-3900 m
9.	<i>Cyathea spinulosa</i>	Vulnerable	1500-2000 m

10.	<i>Cypripedium cordigerum</i>	Rare	2800-3400 m
11.	<i>Delphinium uncinatum</i>	Vulnerable	1200-1500 m
12.	<i>Eremurus himalaicus</i>	Rare	2400-2800 m
13.	<i>Erysimum thomsonii</i>	Rare	3200-4000 m
14.	<i>Gentiana kurroo</i>	Vulnerable	1700-2100 m
15.	<i>Hedysarum astragaloides</i>	Rare	2000-3200 m
16.	<i>Hedysarum microcalyx</i>	Vulnerable	2000-3200 m
17.	<i>Gagea himalensis</i>	Rare	3200-3600 m
18.	<i>Nardostachys grandiflora</i>	Vulnerable	3000-5000 m
19.	<i>Puccinellia kashmiriana</i>	Rare	3500-5000 m
20.	<i>Saussurea bracteata</i>	Rare	3500-5500 m.
21.	<i>Saussurea costus</i>	Endangered	3200-3800 m
22.	<i>Silene kunawarensis</i>	Rare	2300-3200 m
23	<i>Impatiens violoides</i>	IUCN 2024 Endangered [B1+2ab(iii)]	2500-3500 m

Table 11.4 Plant species under IUCN- Red Data Book

The list of various wild medicinal plants in the tract and their threat status based on the assessment conducted in years 2003 and 2010 is given in the table below:

Sr.No.	Botanical Name	Threat Status (Shimla 2003)	Threat Status (Shimla 2010)
1	<i>Aconitum chasmanthum</i>	EN	CR
2	<i>Aconitum deinorrhizum</i>	EN	CR
3	<i>Aconitum heterophyllum</i>	EN	CR
4	<i>Aconitum laeve</i>	VU	-
5	<i>Aconitum violaceum</i>	VU	VU
6	<i>Allium consanguineum</i> (= <i>A. stracheyi</i>)	VU	VU
7	<i>Angelica glauca</i>	CR	EN
8	<i>Arnebia benthamii</i>	CR	EN
9	<i>Arnebia euchroma</i>	CR	EN
10	<i>Artemisia maritima</i>	NT	-
11	<i>Atropa acuminata</i> (= <i>Atropa belladonna</i>)	CR	CR
12	<i>Balanopea involucrata</i>	DD	-
13	<i>Berberis aristata</i>	-	-
14	<i>Bergenia stracheyi</i>	VU	-
15	<i>Betula utilis</i>	EN	EN
16	<i>Bunium persicum</i> (= <i>Carum bulbocastanum</i>)	-	VU
17	<i>Ceropegia bulbosa</i>	DD	VU
18	<i>Cinnamomum tamala</i>	-	-
19	<i>Colchicum luteum</i>	-	-
20	<i>Dactylorhiza hatagirea</i> (= <i>Orchis latifolia</i>)	CR	CR
21	<i>Datisca cannabina</i>	EN	-
22	<i>Desmodium gangeticum</i>	-	NE
23	<i>Dictamnus albus</i>	LC	-
24	<i>Didymocarpus pedicellata</i>	VU	NT
25	<i>Dioscorea deltoidea</i>	VU	EN

26	<i>Embelia tsjeriam-cottam</i>	-	-
27	<i>Ephedra gerardiana</i>	EN	VU
28	<i>Eremostachys superba</i>	VU	-
29	<i>Eremurus himalicus</i>	-	-
30	<i>Ferula jaeschkeana</i>	VU	VU
31	<i>Ferula narthex</i>	-	-
32	<i>Fritillaria roylei</i>	EN	EN
33	<i>Gentiana kurroo</i>	CR	CR
34	<i>Gloriosa superba</i>	VU	-
35	<i>Habenaria edgeworthii</i>		CR
36	<i>Habenaria intermedia</i>	EN	EN
37	<i>Heracleum lanatum</i>		-
38	<i>Hippophae rhamnoides</i>	VU	-
39	<i>Hippophae salicifolia</i>	NT	NT
40	<i>Hyoscyamus niger</i>	EN	NT
41	<i>Hypericum perforatum</i>	VU	VU
42	<i>Hyssopus officinalis</i>	-	-
43	<i>Inula racemosa</i>	-	VU
44	<i>Juniperus communis</i>	-	-
45	<i>Juniperus polycarpus</i> (= <i>J. macropoda</i>)	EN	-
46	<i>Jurinea dolomiaea</i> (= <i>J. macrocephala</i>)	-	-
47	<i>Lilium polyphyllum</i>	CR	CR
48	<i>Litsea glutinosa</i> (= <i>L. chinensis</i>)	EN	-
49	<i>Malaxis acuminata</i>	-	-
50	<i>Malaxis muscifera</i>	CR	CR
51	<i>Meconopsis aculeata</i>	EN	EN
52	<i>Nardostachys grandiflora</i> (= <i>N. jatamansi</i>)	EN	NT
53	<i>Onosma hispidum</i>	NE	-
54	<i>Oroxylum indicum</i>	-	DD

55	<i>Paeonia emodi</i>	-	-
56	<i>Paris polyphylla</i>	EN	-
57	<i>Phytolacca praeralta</i>	VU	CR
58	<i>Picrorhiza kurroa</i>	EN	-
59	<i>Pleurospermum angelicoides</i>	DD	-
60	<i>Podophyllum hexandrum</i> (= <i>P. emodi</i>)	EN	EN
61	<i>Polygonatum cirrhifolium</i>	EN	EN
62	<i>Polygonatum multiflorum</i>	VU	EN
63	<i>Polygonatum verticillatum</i>	VU	EN
64	<i>Rauvolfia serpentina</i>	CR	-
65	<i>Rheum australe</i> (= <i>R. emodi</i>)	EN	VU
66	<i>Rheum moorcroftianum</i>	VU	EN
67	<i>Rheum spiciforme</i>	VU	NT
68	<i>Rheum webbianum</i>	VU	VU
69	<i>Rhodiola heterodonta</i>	-	-
70	<i>Rhododendron anthopogon</i>	VU	-
71	<i>Rhododendron campanulatum</i>	VU	-
72	<i>Rhododendron lepidotum</i>	VU	-
73	<i>Roscoea alpina</i>	-	VU
74	<i>Roscoea procera</i>	-	VU
75	<i>Roylea cinerea</i> (= <i>R. calycina</i>)	VU	-
76	<i>Sausurea costus</i>	-	-
77	<i>Sausurea gossypiphora</i>	CR	-
78	<i>Sausurea obvallata</i>	-	EN
79	<i>Selinum tenuifolium</i> (= <i>S. connifolium</i>)	-	VU
80	<i>Selinum vaginatum</i>	-	-
81	<i>Skimmia laureola</i>	-	VU
82	<i>Swertia chirayita</i> (= <i>S. chirata</i>)	CR	CR
83	<i>Symplocos paniculata</i>	LC	VU

84	<i>Taxus contorta</i>	EN	EN
85	<i>Uraria picta</i>	-	NE
86	<i>Valeriana jatamansi</i> (= <i>V. wallichii</i>)	VU	-
87	<i>Zanthoxylum armatum</i>	EN	EN

Table 11.5: Indicative list of RET species in the tract (Reference: Wild Medicinal Plants of Himachal Pradesh, An Assessment of their Conservation Status and Management Prioritisation)

It is prescribed to monitor the population status, abundance and distribution of these wild medicinal plants in the tract and initiate ex situ measures of conservation wherever requisite with appropriate scientific oversight.

It has been observed that people use plants and trees for their daily needs from the nearby forests of Rohru forest division for commercial uses. The species which are being over exploited is shown in the table below:

Sr. No.	Scientific name	Local Name	Seed collection Time
1.	<i>Acer caesium</i>	Kanju	September-October
2.	<i>Aconitum violaceum</i>	MeethaTeliya	October-November
3.	<i>Acorus calamus</i>	Ghor Bach	November-December
4.	<i>Aesculus indica</i>	Khanor	November-December
5.	<i>Alnus nitida</i>	Kosh cons	November-December
6.	<i>Bauhinia purpurea</i>	Kachnar	July-Aug
7.	<i>Berberis aristata</i>	Kilmora	Aug-Sept
8.	<i>Bergenia ciliata</i>	PatherChatta	June
9.	<i>Betula utilis</i>	Bhjajpatra	September-October

10.	<i>Boehmeria rugulosa</i>	Genthi	Dec-Jan
11.	<i>Celtis australis</i>	Kharik	May-June
12.	<i>Cinnamomum tamala</i>	Tejpatta	June-August
13.	<i>Dactylorhiza hatagirea</i>	Salempanja	November-March
14.	<i>Debregeasia saeneb</i>	Tusyari	Dec-Jan
15.	<i>Dioscorea deltoidea</i>	Ganj-Singli/Mingly	October-November
16.	<i>Ficus neriifolia</i>	Dhudhla	November-December
17.	<i>Ficus roxburghii</i>	Timla	June-July
18.	<i>Fritillaria roylei</i>	Van Lahsun/Mushtanda	October-November
19.	<i>Gentiana kurroo</i>	Karu	October-November
20.	<i>Girardinia diversifolia</i>	Bicchu Buti	October-November
21.	<i>Grewia optiva</i>	Bhimal	October-November
22.	<i>Juniperus macropoda</i>	Dhoop	September-October
23.	<i>Lichens</i>	Jhula	-
24.	<i>Litsea glutinosa</i>	Maida	December-January
25.	<i>Morchella esculenta</i>	Gucchi	June -August
26.	<i>Myrica esculenta</i>	Kafal	May-June
27.	<i>Paris polyphylla</i>	Satwa/Dudia Bach	September-October
28.	<i>Picrorhiza kurroa</i>	Karu/Kutki	November-December
29.	<i>Pinus roxburghii</i>	Chil	April-May
30.	<i>Pinus wallichiana</i>	Kail	September-October

31.	<i>Podophyllum hexandrum</i>	Ban Kakru	August-September
32.	<i>Polygonatum verticillatum</i>	King Solomon Seal	October-November
33.	<i>Prinsepia utilis</i>	Baikal	May -June
34.	<i>Prunus cornuta</i>	JangliBadam	September-October
35.	<i>Punica granatum</i>	Jamnoi	September-October
36.	<i>Pyrus pashia</i>	Mehal	November-December
37.	<i>Quercus dilatata</i>	Moru	October-November
38.	<i>Quercus leucotrichophora</i>	Ban oak	October-November
39.	<i>Quercus semecarpifolia</i>	Kharsu	August-September
40.	<i>Rhododendron arboreum</i>	Burans	January-February
41.	<i>Rubus ellipticus</i>	Hinsalu	April-May
42.	<i>Saussurea lappa</i>	Kuth	April-May
43.	<i>Swertia chirayita</i>	Chirayata	November-December
44.	<i>Taxus contorta</i>	Thuner	April-May
45.	<i>Thymus linearis</i>	Thymus	May-June
46.	<i>Trillium govanianum</i>	Nag Chhatri	October-November
47.	<i>Valeriana jatamansi</i>	Musk bala	April-May
48.	<i>Viola serpens</i>	Banasfa	April-May
49.	<i>Woodfordia fruticosa</i>	Dhaura	May-June
50.	<i>Zanthoxylum armatum</i>	Timru	Sept-Oct

Table 11.6 Important species prone to over exploitation in Rohru Forest Division

Impatiens violoides, a rare Western Himalayan endemic species characterised by its large white spurless flowers was rediscovered in the tract between Larot to Chanshal Pass and published in the study titled “Rediscovery of rare steno-endemic *Impatiens violoides* Edgew. ex Hook.f. (Balsaminaceae) from Western Himalaya, after 179 years of type collection” published by Ashutosh Sharma et. al 2024.

The major drawback for management and providing prescriptions for biodiversity conservation in the tract is the fact that there is a huge vacuum of data available with the forest department regarding current position of biodiversity. The documentation and survey of biodiversity has sadly been the most neglected part of forest management in the tract in the history of management. The sample plot data for shrubs, herbs and trees provides a meagre baseline data for assessing biodiversity. However, extensive studies focusing on threatened and exploited species is necessary. It is strongly prescribed that the department undertakes and publishes the data of such a study with reputed scientist/ research organizations working in the field of biodiversity.

11.7 Threats to Biodiversity Conservation in the Tract

- **Over exploitation:** As detailed above, there are certain plants which are over exploited in the tract in certain pockets. The unsustainable harvesting of these shrubs have prevented the propagation of species
- **Climate Change:** The changing climate and increasing temperatures is a significant threat to biodiversity in higher altitudes as they are experiencing abnormal temperatures throughout the year affecting their ability to regenerate and propagate. The Himalayas are experiencing greater changes in climate compared to the other part forcing species to move towards cooler habitat, increasing competition for spacing and promoting biodiversity risk creating conditions for local extinction.
 - ***Taxus contorta*:** It is an endangered species found in the tract above 2500m elevations in higher sub-alpine reaches of Bashla, Rohru, Khashdhar and DodraKwar Forest Ranges. However, it is noticed that the regeneration of the species is extremely poor in its habitat arch.
- **Over grazing:** It is noted that the areas rich in biodiversity are unfortunately overlapping with fringe villages which are dependent on livestock especially sheep and goats and suffer from diurnal and migratory grazing. This includes the forests of DodraKwar, Jakha, Tagnu

Janglik, Moral Danda which sees migratory and local grazing threatening the rare and endemic biodiversity.

- **Smuggling of Minor Forest Produce:** The unauthorized access and collection of minor forest produce is another grave threat to the biological resources in the tract. The medicinal plant parts fetch good price owing to their market value in various parts of the country. This leads to the arbitrary collection and smuggling of minor forest produce leading to unsustainable harvest from the tract. *Berberis aristata* (for roots), *Trillium govanianum*, *Jurinea dolomiaea* are some examples of plants in the tract which are highly vulnerable to illegal collection and smuggling. The indiscriminate removal of these species have pushed them to being endangered as per the IUCN red data book in the Himalayan Region.
- **Unsustainable Harvest:** The tract also sees bonafide dependence of the population on medicinal plants. However, the harvest of biological resource is often done outside the 4 year program of access to minor forest produce by right holders. This indiscriminate harvesting of biological resources threatens sustainability and survival of the species.
- **Invasive Species:** In past few decades there is increase in spread and number of exotic invasive species, in many cases the exotic invasive sp. got introduced from agriculture/horticulture activities around the forest lands and later they established them as a naturalised species. Major exotic invasive species that need regular population monitoring, check and selected eradication are as follows - *Ageratina adenophora*, *Ailanthus altissima*, *Erigeron annuus*, *Cotula australis*, *Crassocephalum crepidioides*, *Galinsoga parviflora*, *Iris tectorum*, *Nicandra physalodes*, *Lepidium virginicum*, *Parthenium hysterophorus*, *Robinia pseudoacacia* etc.

11.8 Prescriptions for Biodiversity Conservation

- **Documentation and Survey of Biodiversity:** There is a dire need of baseline data for biodiversity assessment and survey in the tract. In this context, it is strongly prescribed to conduct a biodiversity assessment study in the tract and document the diversity of flora in the tract clearly identifying the distribution, population status, threats, medicinal and ethnobotanical values of the biological resources. The funds available with the State Biodiversity Board may be utilized towards this purpose.
- **Coordination with Biodiversity Management Committees:** There are a total of 94 BMCs registered in the tract the detail of which is given in Volume II. The BMCs are currently not playing an active role in biodiversity conservation or sustainable utilization of biological

resources. It is prescribed that the forest department should strongly coordinate with the BMCs and utilize the platform of biodiversity management committees to frame decentralized rules to regulate access and benefit sharing of biological resource.

Currently, the practice being followed is that registered MFP contractors engage right holders to collect and store the biological resource which is later on sold with wholesale dealers located in Amritsar, Delhi, Yamunanagar and other parts of Haryana and Punjab. This system enables contractors to corner large revenue preventing the benefit sharing among right holders in its true essence. It is prescribed to strengthen BMCs and form User Groups/ registered societies at the village level who can harvest the produce sustainably, access markets and earn revenue for the group as a whole. The forest department can play a handholding role of linking the markets for the societies by establishing MoUs with private companies who utilize these medicinal plant parts as raw materials.

- **Promotion of Sustainable Livelihoods from Biological Resources:** Based on User groups/ SHGs registered in the tract, it is prescribed to promote sustainable livelihood of the fringe villages surrounding the biodiverse parts of the tract. It is noted that most often these fringe villages like Dodra, Kwar, Jakha, Tangnu Janglik, Rohal are comparatively socio-economically backward relative to other parts of the tract which are highly affluent.

The sustainable utilization of biological resources is also a key intervention package in the UN REDD Plus Action Plan for the Division which is annexed to the Volume II of this plan. It dwells light on how biodiversity of tract is vital and need to maintain its sustenance linking it with forest based livelihoods of local communities.

The JICA Forest Based Eco systems and Livelihood Improvement Project is a scheme which is ongoing in the tract and which can be tapped to enable medicinal plant linked livelihoods for the population. The Van Sampridi Jan Sampridi Yojana of the Himachal Pradesh Government was another scheme which was started with the objective to promote cluster groups based medicinal plant propagation and sale by providing capital support to Self Help Groups and Cluster Units formed under the scheme for raising medicinal plants in nursery and in forest areas. The program

is active in the Rohal and TagnuJanglik regions of the tract. However, the results of the program are yet to be documented.

The following are the major NTFPs that have potential in the tract to develop sustainable livelihoods:

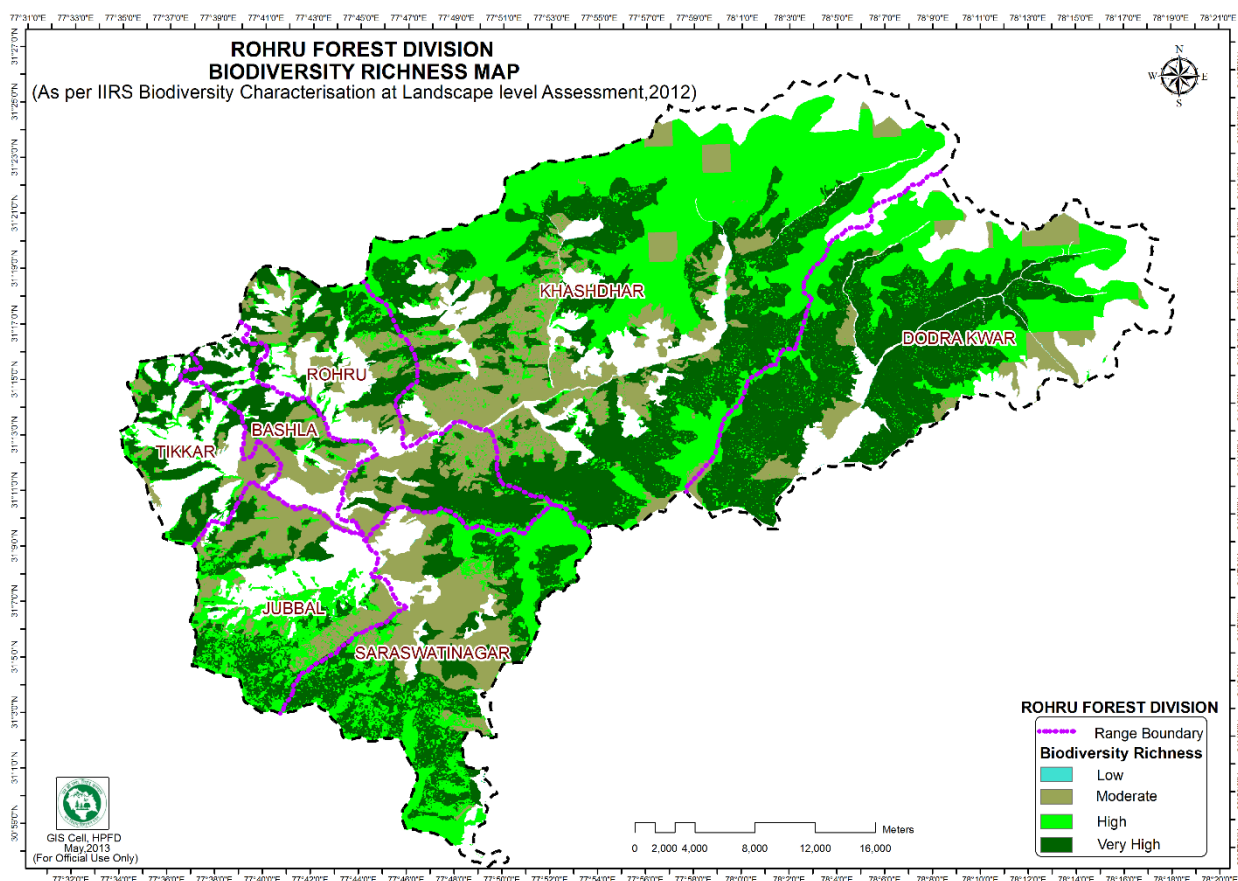
Sr.No.	Non Timber Forest Produce	Processed Product	Benefit	Habitat Range
1	Walnuts: Bark, Root, Fruit			Khashdhar, DodraKwar
2	Apricot: Fruit	Chuli Oil	Medicinal and healing	DodraKwar
3	<i>Berberis</i> spp. Kashmal Roots		Medicinal	DodraKwar
4	<i>Saussurea lappa</i> (Kuth)		Medicinal	Rohal, Tagnu Janglik, Giri, Deorighat
5	Honey		Medicinal	All ranges
6	<i>Podophyllum hexandrum</i> (Ban Kakru)		Medicinal	
7	<i>Picrorhiza kurroa</i> (Karu)		Medicinal	

Table 11.7: Detail of major NTFPs in the tract

- **Propagation Models for Medicinal Plants:** Under the JICA project, propagation models of different medicinal plants in the tract has been notified i.e. for *Aconitum heterophyllum*, *Picrorhiza kurroa*, *Swertia cordata*. There is a great need to notify such propagation models for other RET (Rare Endangered and Threatened) medicinal plants in the tract.
- **Training and Capacity Building of Local Population:** The Self Help Groups or clusters formed for the purpose of sustainable utilization of biological resources need to provide training on raising of medicinal plants in nurseries and the techniques for harvesting and propagation with key focus on sustainability. Technical institutions like HFRI and National Medicinal Plant Board can be roped in to provide skill development for such groups.
- **Permanent Preservation Plots for Long Term Ecological Monitoring:** It is strongly prescribed to lay permanent preservation plots in the tract especially in rich biodiverse zones of Larot, Thalathar, TangnuJanglik, Kalapani, Kharshali forests. These plots shall be identified, mapped,

demarcated and digitized. These plots shall be fenced with inter link chain fencing to prevent grazing and to keep them inviolate except for purpose of data collection. No cultural operations are allowed in these plots. The biodiversity will be studied by laying out 3m×3m and 1m×1m quadrats as explained in the methodology of Resource Assessment Survey. These preservation plots can help understand the changes in biodiversity especially with regard to climate change.

- **Rotational Closure of Biodiverse Areas:** There is a growing need to check on indiscriminate grazing in biodiverse areas. In this regard, all prescriptions given in Chapter of Protection (Overlapping) working circle with regard to controlling grazing needs to be followed. It is strongly prescribed to rotationally close those areas using inter link chain fencing only. It is prescribed to not use ordinary barbed wire fencing in these areas for closures as it is prone to being destroyed by grazers eventually resulting in wastage of public money.
- **Documentation of Indigenous Traditional Knowledge:** The local population is having deep knowledge of the medicinal and other uses of endemic plants. It is prescribed to document the traditional knowledge associated with the biological resource and compile a comprehensive People's Biodiversity Register (PBR).
- **Declaration of Biodiversity Heritage Sites:** It is prescribed to declare the forests leading up to Chanshal Pass including Larot Forest Block and Kwar Forest Block as a Biodiversity Heritage Site under the Biodiversity Act, 2002. Similarly, the forests of Summerkot Block and Todsa block known for the trail to Moral Danda peak is a treasure trove of biodiversity and can be declared as a Biodiversity Heritage Sites. The forests of Gawas Block and Diswani Block which are contiguous has also good potential of biodiversity and constitutes another possible potential BHS site. The potential above is illustrated using the biodiversity richness map given below:



Map 11.2: Biodiversity Richness Map of Tract

The declaration of the above sites as Biodiversity Heritage Sites is crucial for the protection and conservation of these biodiverse rich forests which are otherwise vulnerable to the constant pressures of development and anthropogenic requirements. It is much needed for an eco-centric model to thrive in the management of these forests rather than an anthropocentric model.

The major prescription for the tract with respect to biodiversity conservation and management is that there is a grave need to plug the vacuum of data and create baseline surveys and documentation to evaluate the biodiversity and extent of biological resources. Based on this foundational knowledge, it is prescribed to create a framework for sustainable utilization of biological resource, promote decentralized conservation, regulated access and benefit sharing for the right holding villagers resulting in livelihood development going hand in hand with conservation.

Chapter 12

Participatory and Joint Forest Management (Overlapping) Working Circle

12.1 Name of Working Circle: Participatory and Joint Forest Management (Overlapping) Working Circle

12.2 General Constitution of Working Circle

The working circle shall extend to the entire tract in overlapping fashion as the involvement of communities in forest management is essential in the modern day paradigm of sustainable development. The working circle will have prescriptions to involve communities in decision making, afforestation programmes and enhance their awareness, capacities and skill with respect to forest conservation, management and sustainable utilization of natural resources.

12.3 Objects of Management

The following are the objects of management in this working circle:

- To enhance people's participation in forest management and various works such as afforestation, fire protection, soil moisture conservation etc.
- To build capacity of local villagers and right holders with respect to forest protection and conservation
- To create a sense of ownership and responsibility for the natural resource and forest wealth among the people
- To promote good will between the forest department staff and the local population
- To enable gainful income and livelihood opportunities for the local population based on forest produce and sustainable utilization of biological resources
- To create institutions for people's participation in forest management and conservation and provide them powers with respect to utilization of funds and natural resources
- To manage forest in accordance with the needs and requirements of the local people that is to meet their needs of fodder, fuelwood and timber as outlined in the national forest policy
- To documenting and safeguarding the traditional indigenous knowledge of the residents of the tract

12.5 Current Status- Legal and Policy Overview

The Joint Forest Management (JFM) as a concept evolved in Arabari in West Bengal in which the then DFO of the area made an experimental pact with the local community. This involved a model of management in which 25% of the profit gained from forest management and utilization of timber and other resources to be shared with the community in return for the promise that they would not engage in illicit timber felling or grazing. This initiative was landmarked as it transformed the management from a colonialist exclusionary model to an inclusive participatory one based on ideals of decentralized democracy.

In the backdrop of success of the famous Arabari experiment, the Government of India identified Joint Forest Management (JFM) as a cornerstone of the National Forest Policy of 1988. Subsequently, the Joint Forest Management Guidelines were notified in 1990. The basic premise of JFM remains that the village adjoining the forest forms a Forest Protection Committee (FPC) and enter into JFM agreement with forest department. As per the agreement, the villagers receive NTFPs and share of revenue generated from forest while agreeing to forego illegal grazing, illicit felling and at the time safeguarding the forest from threats of fire and illegal activities. The concept of JFM is based on the underlying philosophy of rights and privileges being correlative to duties with the end goal being sustainable development.

The Participatory Forest Management (PFM) as a concept started in 1985 in the state of Himachal Pradesh through National Social Forestry (Umbrella) Project. The concept of PFM/ JFM in HP has been however developed through the Externally Aided Projects. The first such project was the IWDP Kandi Project funded by the World Bank. This project later transformed into the Mid Himalayan Water Shed Project and currently known as the Integrated Development Project (IDP). The JICA Forest Ecosystem Strengthening and Livelihood Improvement Project is another project which has seen extensive efforts in the tract.

12.5.1 Current status of PFM under JICA Project in the Tract: The JICA project in the tract extends to 4 forest ranges- Saraswati Nagar (Batch I and IV), Khashdhar (Batch II), DodraKwar (Batch II) and Jubbal (Batch III). There are a total of 22 Village Forest Development Societies formed under the Project for forest protection and afforestation. These VFDS have been registered under Societies Registration Act and have a broad memorandum of understanding detailing the objectives and duties of the organization and members. Every VFDS has an approved Micro Plan which details the various forestry and

community interventions that is to be executed. It is proposed that every VFDS working in the tract needs to have a micro plan which needs to be approved at the level of Deputy Conservator of Forests prior to working in the tract. Each of the VFDS has been allocated 10 Ha area for plantation in PFM mode and 10 Ha in Departmental Mode. A total of 500 Ha has been brought under plantation in the JICA project. Several of the areas are also brought under Assisted Natural Regeneration (ANR). The following table lists the detail of VFDS registered in the tract:

Sr.No.	Name of Range	Name of VFDS	Area of Operation	Previous Performance of VFDS
1	Saraswati Nagar (Batch I & IV)	Chetna VFDS Badiar-Bajhanu (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Undertook good efforts in plantation.
2	Saraswati Nagar (Batch I & IV)	VFDS Chajipur Valley (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance. Lack enthusiasm in participation.
3	Saraswati Nagar (Batch I & IV)	Jagriti VFDS Shallar – Nandpur (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance. Lack enthusiasm in participation
4	Saraswati Nagar (Batch I & IV)	Prerna VFDS Ruhil-Malog (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Members take great interest and is enthusiastic

				in participation.
5	Saraswati Nagar (Batch I & IV)	SansogDhakrantu (Batch-I)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance. Lack enthusiasm in participation
6	Saraswati Nagar (Batch I & IV)	JakhorPujarli (Batch-IV)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active interest in forest protection and Community Livelihood Development
7	Jubbal (Batch III)	Jai Jaga Mata VFDS Maltheshwari (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance. Lack enthusiasm in participation
8	Jubbal (Batch III)	Jaga Mata VFDS Kaina (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active participation in forest management and livelihood development
9	Jubbal (Batch III)	Jai Kali Mata VFDS Parali (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Probably the best VFDS in terms of CD&LI activities with

				mushroom cultivation
10	Jubbal (Batch III)	VFDS Giri Ganga (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Almost defunct
11	Khashdhar (Batch II)	VFDS Gaonsari (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active participation is noticed. Members are requesting for add on activity to enhance CD&LI component
12	Khashdhar (Batch II)	VFDS Rohal unit-I (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active participation is noticed. Members are requesting for add on activity to enhance CD&LI component
13	Khashdhar (Batch II)	VFDS Rohal unit-II (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active participation is noticed. Members are requesting for add on activity to enhance CD&LI component.

14	Khashdhar (Batch II)	VFDS Sindasli (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active participation is noticed. Members are requesting for add on activity to enhance CD&LI component
15	Khashdhar (Batch II)	Jai DevtaPawasi VFDS Dali (Batch- III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
16	Khashdhar (Batch II)	Jai DevtaGaudasi VFDS Dhakgaon (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active
17	Khashdhar (Batch II)	MaaDurga VFDS KhindariKhoptwari (Batch-III)	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance.
18	Dodrakwar (Batch III)	VFDS Jakha	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active group and members in CD& LI component.
19	Dodrakwar (Batch III)	VFDS BarasarJaskoon	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance.

20	Dodrakwar (Batch III)	Jai DevtaJakh VFDS Dodra	20 Ha (10 PFM mode) 10 (Departmental Mode)	Members are interested in production under CD&LI. SHGs are very good and active
21	Dodrakwar (Batch III)	Jai kewarjakh VFDS Danderwari	20 Ha (10 PFM mode) 10 (Departmental Mode)	Reasonably satisfactory performance
22	Dodrakwar (Batch III)	Rupin VFDS KEWAR	20 Ha (10 PFM mode) 10 (Departmental Mode)	Active members and good performance displayed in handloom production

Table 12.1: List of VFDS Registered in the the tract

Assisted Natural Regeneration (ANR)

Sr.No.	Name of Range	Name of VFDS	Area of Operation
1	Saraswati Nagar (Batch-I)	VFDS Chajipur	35 Ha (10 ha PFM mode) (25ha Departmental Mode)
2	Khashdhar Range (Batch-II)	VFDS Kharshali	15 Ha (10 ha PFM Mode) (5ha departmental mode)
		VFDS Dhakgaon	15 Ha (10 ha PFM Mode) (5ha departmental mode)
		VFDS Sindasli	15 Ha (10 ha PFM Mode) (5ha departmental mode)

		VFDS Rohal unit-I	10 Ha (5 ha PFM Mode) (5ha departmental mode)
		VFDS Gaonsari	15 Ha (10 ha PFM Mode) (5ha departmental mode)
3	Dodrakewar Range (Batch III)	VFDS Dodra	Total 75ha (65ha departmental mode)(10 ha PFM Mode)
		Rupin VFDS Kewar	50 ha departmental mode
		VFDS Dhandwari	50 ha departmental mode
		VFDS Jiskon	5 ha PFM Mode
4	Jubbal (Batch-III)	VFDS Jaga Mata Kaina	5 ha PFM mode
		VFDS Jai jaga Mata Maltheshwari	3 ha PFM mode
		VFDS Jai Kali Mata Parali	5 Ha PFM mode

Table 12.2: List of ANR executed by VFDS in the the tract

MUKHYA MANTRI VAN VISTAR YOJNA

Sr No	Name of Range	Name of VFDS/Name of the area	Area of Operation	Survival percentage as on 2025 March
1	Saraswati Nagar	UPF Shirol	5ha	60
		UPF Mungra	5ha	90
Total			10ha	
2	Dodrakwar Range	VFDS Jakha	5ha	80
		Jai DevtaJakh VFDS Dodra	5ha	75
		Rupin VFDS Kewar	5ha	80
Total			15ha	

Table 12.3: List of Plantation under MMVVY executed by VFDS in the the tract

Each VFDS in the project has 2 Self Help Groups formed within it. This part of the project is to develop Community Development and Livelihood Improvement. In this component, the members of the SHG are provided capital cost and training modules on the basis of an approved business plan. A total of 43 self help groups have been formed in the tract. Few of these groups have started production and in turn earning gainful income. The following table lists the Self Help Groups along with their Income Generating Activity (IGA):

Sr No	Range	VFDS Name	Name of Self Help Group	Income Generating Activity	Revenue Generated till (24-25)
1	Saraswati Nagar	Chetna VFDS Badiar-Bajhanu (Batch	SHG Hateshwari	vermicompost	59400
2			SHG Adarsh	Cutting and Tailoring	51428
3		VFDS Chajipur Valley (Batch-I)	SHG Angel	Vermicompost	55200
4			SHG Jai SabharsuDevta	Cutting Tailoring	37600
5		Jagriti VFDS Shallar – Nandpur (Batch-I)	SHG-NarsinghDevta	Vermicompost	48000
6			SHG-Ravingarh	Vermicompost	62400
7		Prerna VFDS Ruhil-Malog (Batch-I)	SHG Ekta	Cutting Tailoring	50705
8			SHG Samridhi	Vermicompost	109200
9		SansogDhakrantu (Batch-I)	SHG ThultaMahilaSamridhi	Vermicompost	Nil
10			SHG-SabharsuMaharaj	Pickle Making	7440
11		JakhoriPujarli (Batch-IV)	SHG -Jai maanagarkotijakhori	Pickle making	4000
12			SHG Adarsh	Badi making	27835
13	Jubbal	Jai Jaga Mata VFDS Maltheshwari (Batch-III)	SHG Khushboo	Cutting Tailoring	35627
14			SHG Ajivika	Vermicompost	nil
15		Jai jagamataKaina	SHG-Navjyoti	Bag Making	60100
16			SHG Navyuva	Cutting Tailoring	16000

17		Jai Kali Mata VFDS Parali (Batch-III)	SHG Shakti	Mushroom Cultivation	68810
18			SHG jai lankra veer Deem	Vermicompost	Nil
			Jai MaaGiriganga SHG Deem	Beekeeping	
19		VFDS Shilli	SHG Dhruv	Knitting	Nil
20					Nil
21	Khashdhar	VFDS Gaonsari	SHG Narayan	Vermicompost	Nil
22			SHG JICA Worrior	Apple Nursery	5000
23		VFDS Rohal unit-I	SHG Manjhwari	Vermicompost	Nil
24			SHG YuvaSanghthan	Vermicompost	Nil
25		VFDS Rohal unit-II	SHG Pawasi	Vermicompost	4000
26			SHG NARI SHAKTI Gaichwari	Medicinal plant	Nil
27		VFDS Sindasli	SHG Krishna	Vermicompost	9000
28			SHG Mansi	Knitting	62000
29		VFDS Dali	SHG Laxmibai	vermicompost	Nil
30			SHG Shiv Shakti	Beekeeping	Nil
31		VFDS DhakGaon	SHG – Chipwari Thar	Vermicompost	2000
32			SHG Astha	Apple nursery	Nil

33		VFDS Kharshali	SHG Nari Shakti	vermicompost	11500
34			SHG-Bayansar	vermicompost	5000
35	Dodrakewar	VFDS Jakha	SHG-Jakha	Traditional Crops	Nil
36			SHG -Dhara	Knitting	Nil
37		VFDS Barasar Jiskon	SHG-Ruppin	Chuli oil	10000
38			SHG-Jaga mata	Handloom	Nil
39		Jai Devta Jakh Dodra	SHG-Jai Banda kali	Handloom	Nil
40			SHG-Chanshal	Handloom	Nil
41		Jai Kewarjakh VFDS Danderwari	SHG-Jai Jaga mata	Handloom	Nil
42			SHG-Pittan	Knitting	Nil
43		Rupin VFDS Kewar	SHG-Ruppin	Handloom	Nil
44			SHG-Barasar	Grading and packaging	Nil

Table 12.4: List of SHGs and income generating activity in the the tract

The tract has just begun to see the light of Joint Forest Management through the JICA project. It is submitted that the tract has different socio-economic conditions that varies across it. It is seen that in few areas, the people are very affluent and have little interest in JFM activities. This is mostly seen in parts of Jubbal and Saraswati Nagar Ranges (Chhajpur block). Whereas, it is noticed that where people are relatively of a poorer socio-economic background, there is robust participation in forest management and conservation. This is

noticeable in DodraKwar Range, where people being largely poor depend on wages of afforestation for livelihood and income.

12.6 Scope of JFM/PFM in the tract

There is a great scope for Joint Forest Management in the tract especially considering that people are becoming increasingly aware of the importance of forest protection and conservation in the tract. The following are the potential areas of engagement or scope which can be explored when it comes to Joint Forest Management:

12.6.1 Afforestation

The local people in the tract are interested and enthusiastic in afforestation activities. There is a need to capitalize on this interest and enthusiasm by raising sufficient plants in nursery which is currently falling short of the demand. The following prescriptions are advised with respect to afforestation in the JFM circle:

- **Site Selection:** The site of afforestation shall be approved by an officer not below rank of Range officer. The fire prone, Chil forests, Panwis and other such sites not recommended in the plantation overlapping working circle shall not be taken up.
- **Agreement with JFMC:** The Forest Department shall enter into a formal agreement with the JFMC virtually handing over the site to JFMC for planting, maintenance and fire protection. The agreement shall clearly define the roles, duties and responsibilities of both department and JFMC with the former playing a technical handholding role and the latter being the executing agency on the field level.
- **Species Selection:** The species to be selected in these plantations shall align with the fuel and fodder requirements of the local population.
- **Soil Moisture Conservation:** It is prescribed to have SMC works in correlation to plantation efforts to better enhance moisture retention and prevent drought related shocks for plants.

12.6.2 Soil and Water Conservation

The forests of the tract have an inseparable link with the water as an ecosystem services. This is undoubtedly the most important ecosystem service provided in the tract. The following prescriptions are made with regard to soil and water conservation in JFM circle

- **Mapping of Springshed/ Water Shed** at village level involving participation of people
- **Construction of Water Ponds** for recharge and moisture retention in consultation with local people.
- **Construction of Staggered Contour Trenches/ Contour Trenches** and other such structures in the catchment area to increase ground water recharge.
- **Rejuvenation** and recharge of Bauris which are traditional systems of geohydrology used by the local people for drinking and domestic purposes
- **Involvement of local people** in all soil moisture conservation activities

12.6.3 Forest Protection and Fire Protection

Forest fires are increasingly becoming the biggest threats to forests and plantations in the era of climate change especially with large dry periods observed during every year. The forest fire protection and firefighting effort requires joint efforts along with community. The following prescriptions are made in domain of fire protection with respect to JFM working circle:

- **Fire Prevention Activities:** It is essential to galvanize support of local people in removing the fuel load from plantations. This can be achieved using grass cutters and other machine which can collect and dispose of the fuel load reducing the vulnerability of plantations to forest fires.
- **Promotion of Pine Needle Handicraft/ Briquette Making** in Sawra range can be experimented in JFM Working Circle overlapping with Chil Working Circle
- **Support to Fire fighting** by galvanizing the public for fire fighting by use of branches, counter fire and other such methods. The Yuvak Mandals of the fire affected area can also be mobilized in such instances
- **Rewarding JFMCs** where zero fire incidents are reported in terms of providing incentive for fire prevention and protection

Apart from forest fires, it is recommended to enhance the role of JFMCs in forest protection to prevent and detect illegal felling, timber smuggling, lopping, grazing in closed areas and other such offences. The members of committee may

be actively involved in patrolling and may be devolved powers to register damage reports and make recommendation to Range Officer regarding compounding of damage in respect of offences committed in JFMC areas. The Deputy Conservator of Forests shall carry out the procedure for granting powers of forest officers as per the HP PFM Regulations, 2001.

12.6.4 Livelihood Improvement

The JICA FES&LI project provided great impetus to livelihood improvement and income generating activities among the communities in the tract. The focus is on twin ideals of enabling sustainable utilization of forest resources to promote gainful income generation and at the same time developing alternate livelihoods to reduce forest dependence that is harmful to forests in the long run. The following prescriptions are provided in this regard:

- **Identification of Forest Based Livelihood/ Alternate Livelihood:** The focus of LI programs in forest management is often to develop a goodwill for forest protection and conservation. In case of FBL, the philosophy is that a model of sustainable utilization of forest/ biological resources can provide a meaningful relationship for forest conservation and prevent the non forest land use of forests. Whereas, the alternate livelihood development seeks to promote an alternate livelihood in place of a forest based livelihood which creates a dependence which is adverse to health of forests or beyond the carrying capacity of the forest ecosystem.
 - The propagation of medicinal plants in forest land under Van Sampridi Jan Sampridi Yojana for sale of medicinal plant parts is an example of one such Forest Based Livelihood activity
 - The programs of cutting & tailoring, food processing are examples in which alternate livelihoods have been sought to be developed under the JICA project

In this context, it is prescribed to avoid choosing livelihoods which have a conflicting and contradictory relationship with forest in the tract. For example, apple cultivation is a significant threat in several ranges in the tract with regard to encroachment. Hence, apple nursery and such kind of activities need not be promoted considering the pressure of land use shall come in the tract.

In case the livelihood has potential of sustainable utilization of medicinal plants, then the same shall be promoted with a view to enhance gainful income in the tract. The business plan shall clearly reveal the

harvesting period and rotation periods to ensure sustainability. The local community managing the area under JFM shall be made aware of the importance of sustainability and non harvesting.

- **Market Access:** The main bottleneck in IGA development is to link the products of the trained group to the markets. In this context, there is a need to handhold and provide technical support to the groups engaged in production. The Himachal Pradesh government has existing brands like the 'HIMIRA' which can be utilized to deliver products and gain income. Apart from this, the entering into MoUs with private companies for the products should also be explored
- **Biodiversity Management Committees(BMCs):** There is a need to strengthen biodiversity management committees in the tract considering the enormous biological resources that exist in the tract. This can help enable collection of biological resources, processing/ sale as a centralized unit for the village breaking the monopoly of MFP contractors and providing sustainable access and benefit sharing for the villagers.
- **Eco Tourism and Livelihood:** There are numerous opportunities of livelihood related to eco tourism in the tract. This includes the possibility of nature guides, operation of homestays, camping sites. It is prescribed to train group of youth from Larot, TagnuJanglik, Sungri, Dumrehra, Jakha, Jiskoon, Pandar villages which are adjoining the popular trekking routes in the tract. They can be made part of the Eco Development Committees (EDC) registered for the area as a registered society so that they can manage the eco tourism sites in terms of regulating entry, guiding visitors, educating them about conservation, looking after the cleanliness in the area etc.

12.7 Selection of JFM Working Areas

Parts of the tract have different levels of interest and enthusiasm when it comes to forest management and conservation. The affluent areas in the tract i.e. Jubbal, Saraswati Nagar and parts of Rohru, Tikker Forest Range show little interest in participatory forest management. However, large parts of Khashdhar Forest Range, DodraKwar Forest Range show enthusiasm and inherent relationship with forest management. There is a need to select the apt areas while planning for Joint Forest Management.

It is suggested to conduct Participatory Rural Appraisal (PRA) in village to gauge the relationship of villagers with forests and to evaluate the dependence on forests. The following shall be the objectives of PRA exercise:

- Evaluate the dependence and its extent of the villagers on forests
- Build baseline information
- Define the interests and aspirations of the villagers with regard to forest management and conservation
- Identify the negative and positive links of interaction between villagers and forest department
- Document the existing land use practices and usage of forest resources
- Identify the bottlenecks of development and forest conservation

12.8 Organizational Framework for Participatory Forest Management

The organizational framework for PFM shall include the Village Forest Development Societies which currently exists. The VFDS is having an elected President and Deputy Range Officer as the Treasurer. It is recommended to have the Range Officer as the Ex Officio Secretary of the VFDS. The current system of VFDS having elected Executive Committee should continue and women representation of at least 50% should also be continued.

There is a need to identify VFDS which are actively participating in forest conservation, reward them and encourage them. On the other hand, VFDS which are having lukewarm response towards forest protection needs to be either revived or closed down in the event of no progress made so that resources.

In case of eco-tourism, it is recommended to constitute Eco Development Committees in individual ecotourism sites as registered societies having participation from both the local residents and the forest staff with Range Officer being the ex officio secretary. The EDC shall manage the day to day affairs of eco tourism and provide a platform of livelihood generation and participatory forest management for the local residents.

The Eco Development Committee will have an organizational structure similar to existing VFDS in which Range Officers shall be Ex Officio Secretary along with Elected Pradhan and Deputy Range officer will act as treasurer. The EDC shall choose its Executive Committee amongst itself and propose annual plans of operation which shall be tabled before the Supervision Committee at Division Level chaired by Deputy Conservator of Forests, Rohru. Thereafter, the annual plan of operation to utilize the revenue generated by EDC shall be put before the Governing Board of Shimla Forest Circle ECOSOC for approval. Once

the APO put forth by EDC is approved, then the activities so approved shall be undertaken within the eco tourism site. This model is proposed on the lines of community based eco tourism in which community facilitates eco tourism, gains revenue and also proposes activities on basis of revenue generated subject to regulation, legal and rule framework which exists in the state.

Apart from EDC and VFDS, there is a need to engage with Non Governmental and Civil Society Organizations. There are a number of NGOs and CSOs interested in environmental conservation and afforestation in the tract. The following list summarizes the name of NGO and CSOs in the tract:

Sr No.	Name of NGO/ Community/	Address	Contact No.
1	Panchayat Samiti Tikkar	tikkar Distt. Shimla HP	8892581424
2	NYM Bhakan	Bhakan	8580583856
3	Green Himalyan organisation	Chauhan Building Andhra Road VPO & The. Chirgon	
4	Vidya Bharti Education Samiti	Samoli Teh Rohru	9459225761
5	Sub Divisional Legal Services Committee	Rohru Tehh rohru Distt. Shimla	
6	National Stundents Union	GPG College Seema	8278804983
7	jan seva Sangh	Teeh rohru Distt.Shimla hP	
8	Ved Mata Gayatri jan Kalyan Samiti	Bhomper PO chillal Tehsil chirgaon Distt. Shimla hP	9805215594
9	Mahila Mandal Bijori	Bijori Tehsil Rohru Dist. Shimla HP	9882466429
10	Mahila Mandal Khilargi	Vill. Khilargi tehsil Rohru Distt.Shimla HP	
11	Nav Yuvak Mandal Khilargi	Vill. Khilargi tehsil Rohru Distt.Shimla HP	
12	DR. YSP Univeristy of Horticulture and Forestry Krishi vigyan kendra Shimla at Rohru	Rohru Distt. Shimla HP	

13	Chohara valley apple society sandasu	tehsil Chirgaon distt. Shimla hP	9857140007
14	Yuva Shakti Anusandhan Samiti	PO and The. Jubbal Distt, Shimla HP	9816652185
15	Tridev Aushdhiy Podh Utpadan Farmer Society Rohal	Chirgaon Distt. Shimla HP	7650005777
16	Sant Nirankari Mandal	Rohru Distt. Shimla HP	9418644151
17	Bhartiy Kissan Sangh	Jubbal Distt. Shimla HP	
18	Nav Yuvak Mandal Shallan	Shallan Tehsil Rohru Distt. Shimla hP	9816300994

Table 12.5: List of NGOs/ Community based organizations in the the tract

It is recommended to enter into MoUs with CSO, NGOs and JFMCs regarding afforestation and forest conservation in order to encourage them and formalize agreement with these organizations. The MoU shall clearly define the roles and responsibilities of forest department personnel and NGO/CSO members when it comes to undertaking plantation, maintaining plantation, forest protection, fire management etc.

The tract is having already established MahilaMandals, YuvakMandals, Self Help Groups. The participation of these groups can be galvanized for afforestation and other allied activities of forest conservation. The State Government has proposed in budget for the year 2025 the Rajiv Gandhi Van Samvardhan Scheme in which the participatory plantation model delving on the participation of these groups are forecasted. The list of Mahila Mandal/ Yuvak Mandal/ Self Help Groups which can be involved in participation and afforestation is given as follows:

Sr No.	Division	Range	Beat	Name of MM/NYM
1	ROHRU	BASHLA	ARHAL	UJWALA MAHILA MANDAL ARHAL
2	ROHRU	BASHLA	ARHAL	MAHILA MANDAL

3	ROHRU	BASHLA	BASHLA	NYA YUVAK MANDAL BASHLA
4	ROHRU	BASHLA	KEWLI	NYA YUVAK MANDAL KEWLI
5	ROHRU	BASHLA	KHADRALA	NYA YUVAK MANDAL KHADRALA
6	ROHRU	BASHLA	KHENGTERI	KRISHAK MAHILA MANDAL POLDI (KANDRORA)
7	ROHRU	BASHLA	MALKHOON	MAHILA MANDAL MALKHOON
8	ROHRU	BASHLA	SHAROG	MAHILA MANDAL BARARA
9	ROHRU	BASHLA	SHAROG	NYA YUVAK MANDAL SHAROG
10	ROHRU	JUBBAL	KHARAPATHER	MAHILA MANDAL JATARI
11	ROHRU	JUBBAL	KHARAPATHER	NYA YUVAK MANDAL PARALI
12	ROHRU	JUBBAL	MANDHOL	NYA YUVAK MANDAL MANDHOL
13	ROHRU	JUBBAL	SHALLAN	MAHILA MANDAL GANGANAGAR
14	ROHRU	JUBBAL	SNABA	GIRI NAV NIRMAN
15	ROHRU	KHARSHALI	KHARSHALI	NAR SINGH YUVAL MANDAL JADKOT
16	ROHRU	KHASHDHAR	BANOTI	MAHILA MANDAL KOILA
17	ROHRU	KHASHDHAR	CHIRGAON	MAHILA MANDAL ANDHRA
18	ROHRU	KHASHDHAR	CHIRGAON	NAV YUVAK MANDAL GYARI
19	ROHRU	KHASHDHAR	DALI	NAV YUVAK MANDAL DHAKGAON
20	ROHRU	KHASHDHAR	DIUDI	SUNNI NAG YUVAK MANDAL KHABAL
21	ROHRU	KHASHDHAR	DIUDI	NAV YUVAK MANDAL Shishtwari
22	ROHRU	KHASHDHAR	JAKHNOTI	MAHILA MANDAL DUNGIYANI
23	ROHRU	KHASHDHAR	JAKHNOTI	MAHILA MANDAL HAUNCHAL
24	ROHRU	KHASHDHAR	KHARSHALI	MAHILA MANDAL PATLI(UKHARSHALI)

25	ROHRU	KHASHDHAR	KHASHDHAR	MAHILA MANDAL KHASHDHAR
26	ROHRU	KHASHDHAR	LAROT	MAHILA MANDAL LAROT
27	ROHRU	KHASHDHAR	SINDSAL	MAHILA MANDAL KHABAL
28	ROHRU	KHASHDHAR	SINDSALI	NAV YUVAK MANDAL KHABAL
29	ROHRU	KHASHDHAR	TANGNU	MAHILA MANDAL VONVADI
30	ROHRU	KHASHDHAR	TANGNU	MAHILA MANDAL THAITWARI
31	ROHRU	KHASHDHAR	TELGA	MAHILA MANDAL SANDASU
32	ROHRU	KHASHDHAR	THALATHAR	MAHILA MANDAL MAYLA
33	ROHRU	SARASWATI NAGAR	DANSAR	JNYM DHANSAR
34	ROHRU	SARASWATI NAGAR	JHALTA	MAHILA MANDAL JHALTA
35	ROHRU	SARASWATI NAGAR	JHALTA	NYM JHALTA
36	ROHRU	SARASWATI NAGAR	KUDDU	NYM Nadhal
37	ROHRU	SARASWATI NAGAR	KUDDU	NYM BATTAR
38	ROHRU	SARASWATI NAGAR	KUDDU	NYM SARAJI
39	ROHRU	SARASWATI NAGAR	KUDDU	NYM SALNA
40	ROHRU	SARASWATI NAGAR	KWALTA	NAV YUVAK MANDAL KWALTA
41	ROHRU	SARASWATI NAGAR	MANDAL	NYM BHOLAR
42	ROHRU	SARASWATI NAGAR	MANDAL	RSC ROHTAN
43	ROHRU	SARASWATI NAGAR	MANDAL	NYM DHADI
44	ROHRU	SARASWATI NAGAR	RAWINGARH	SHG RAWINGARH
45	ROHRU	SARASWATI NAGAR	SHASHAN	MAHILA MANDAL SHASHAN
46	ROHRU	SARASWATI NAGAR	SHASHAN	MAHILA MANDAL SASKIR

47	ROHRU	SARASWATI NAGAR	SHASHAN	MAHILA MANDAL SOLANG
48	ROHRU	TIKKAR	KADIWAN	MAHILA MANDAL GALOON
49	ROHRU	TIKKAR	NAKSATLIY	MAHILA MANDAL KHRALA
50	ROHRU	TIKKAR	NAKSELTIIY	NAV YUVAK MANDAL KHALAI
51	ROHRU	TIKKAR	NAKSELTIIY	NAV YUVAK MANDAL REINUKOTI
52	ROHRU	TIKKAR	PHAROG	MAHILA MANDAL DHANOTI
53	ROHRU	TIKKAR	PHAROG	MAHILA MANDAL HANSTARI TEER
54	ROHRU	TIKKAR	PHAROG	SERI (BATARA)
55	ROHRU	TIKKAR	PHAROG	VIKAS DEVELOPMENT YUVAK MANDAL BATARA
56	ROHRU	TIKKAR	PHAROG	NAV YUVAK MANDAL DHANOTI
57	ROHRU	TIKKAR	PHAROG	NAVYUVAK PHAROG
58	ROHRU	TIKKAR	TIKKAR	MAHILA MANDAL KASHAIN
59	ROHRU	TIKKAR	TIKKAR	MAHILA MANDAL THANA
60	ROHRU	TIKKAR	TIKKAR	MAHILA MANDAL KHAMALIDHAR(DEORI GHATI)
61	ROHRU	TIKKAR	TIKKAR	MAHILA MANDAL DAROTI
62	ROHRU	TIKKAR	TIKKAR	NAV YUVAK MANDAL TIKKARI
63	ROHRU	TIKKAR	TIKKAR	NAV YUVAK MANDAL PHAROG MANDAL GUIANDLI
64	ROHRU	TIKKAR	TIKKAR	NAVYUVAK MANDAL THANA

Table 12.6: List of NYM/ MM involved for plantation in the the tract

Chapter-13

Wildlife Protection (Overlapping) Working Circle

13.1 Name of Working Circle: Wildlife Protection (Overlapping) Working Circle

13.2 General Constitution of the Working Circle:

The mandate behind the constitution of a wildlife protection working circle is to promote the conservation and protection of wildlife found in the tract. It is without question that the tract provides an ideal habitat for a variety of wildlife of various orders- mammalia, avifauna, reptilian, amphibians, Pisces and other faunal orders.

The tract is also lying adjoining to several protected areas in the state of Himachal Pradesh. The South West part of the tract borders the Talra Wildlife Sanctuary. The North Eastern Part borders the Rakcham Chitkul Wildlife Sanctuary, Govind Pashu Vihar National park of Uttarakhand and Northern part borders the Daranghati Wildlife Sanctuary. In this way the tract attains great significance of being a crucial wildlife and ecological corridor. It provides a continuity in habitat to the source population of these Protected Areas and has the potential to act as sink. The position of the tract attains significance as it can promote gene flow and enhance genetic diversity of species.

The tract is having rich array of diverse forest types and altitudinal transitions which enable the formation of mosaic and eco tone habitats which enhance the propagation of wildlife. The potential of the tract to promote wildlife thus cannot be understated. Considering these aspects, this working circle has been constituted in an overlapping fashion extending to the entire tract considering the distribution of wildlife across the entire tract.

13.3 Objectives of Management

The following are the special objectives of management:

- To promote in situ conservation of scheduled wildlife species under the Wildlife Protection Act, 1972 by safeguarding the viable habitats for their propagation
- To prevent and enforce the law against hunting and poaching of Scheduled Wildlife Species by enforcing the Wildlife Protection Act and

following a strict regime of regulated gun licensing

- To survey, document and record the faunal orders in the tract to better understand distribution, population status and trends with regard to wildlife especially the endangered and threatened species
- To safeguard the habitat of wildlife and improve the habitat quality of wildlife addressing the issues of habitat fragmentation, forest fires and poor hydrological regime
- To identify, declare and conserve key wildlife corridors through research and monitoring
- To create a system of monitoring of wildlife species adopting modern technologies of camera trapping, drone based monitoring and ANIDERS
- To mitigate human-wildlife conflict in the tract through multi pronged strategy
- To declare wherever possible conservation or community reserves under Wildlife Protection Act to interlink protected areas with forest landscapes

13.4 General Characteristics of Fauna:

10.4.1 Mammals in the tract

There is no clear record and documentation of mammals in the tract in the absence of any study conducted in the tract for faunal assessment. The following mammals are believed to be found in the tract based on anecdotal evidences and as reported by field staff during their patrolling:

Sr. No.	Common Name	Local Name	Zoological Name	Schedule
1	Leopard	Tendua	<i>Panthera pardus</i>	I
2	Goral	Goral	<i>Nemorhaedus goral</i>	I
3	Barking Deer	Kakkad	<i>Muntiacus</i> <i>Muntjak</i>	I

4	Rhesus Macaque	Bandar	<i>Macaca Mulatta</i>	Not in Schedule
5	Grey Langur	Langur	<i>Presbytis entellus</i>	II
6	Leopard cat	Tendua Billi	<i>Felis bengalensis</i>	I
7	Porcupine	Shail	<i>Hystrix indica</i>	I
8	Red Fox	Lomadi	<i>Vulpes vulpes</i>	I
9	Yellow Throated Marten	Sakralu	<i>Martes flavigula</i>	I
10	Indian Giant Flying Squirrel	Eenn	<i>Petaurista philippensis</i>	I
11	Indian Hare		<i>Lepus nigricollis</i>	I
12	Masked Palm Civet		<i>Paguma larvata</i>	I
13	Himalayan Black Bear	Bhalu	<i>Ursus thibetanus</i>	I
14	Himalayan Musk Deer	Kastura	<i>Moschus leucogaster</i>	I
15	Grey mongoose		<i>Urva edwardsii</i>	I
16	Sambar		<i>Rusa Unicolor</i>	I
17	Wild Boar		<i>Sus scrofa</i>	II

Table 13.1 List of the mammals believed to found in the tract

i) Ghoral (*Nemorhaedus gharal*): This antelope is found in rugged and grassy hillside covered with trees above 1200 m of elevation. It has goat like build with short teeth and short tail. Usually, it is blackish grey in colour. The ridge horns curved slightly backwards and are 10-12 cm in length. Poaching of this animal is significant due to its tasty meat value.

ii) Kakar (*Mutiacus munjtjak*): It is found in scrub forest upto 2000 m. It feeds on grass, leaves and fruits. Its call is like barking dog so sometimes it is called as barking deer. The un-branched antlers are small measuring 5-6 cm in

length. This animal pushed to interior of forests due to disturbance by human population near villages.

iii) Kastura (*Moschus moschiferus*): This is a small light grey deer found distributed in Khashdhar, Dodra Kwar Forest ranges more than 2500 m of elevation. It is listed as an endangered species under IUCN. It faces extensive threat due to poaching for kasturi (musk) a secretion from the scent gland or "pod" of the male musk deer are used in many traditional East Asian medicines to treat a variety of ailments relating to the heart, nerves and breathing.

iv) Bagh or Leopard (*Panthera pardus*): The Leopard is distributed in wider areas started from lower elevation to 2500 m of elevation. It makes its habitat in scrub areas and mostly lives near habitation areas in winters. It preys almost every animal including domestic ones. This is the apex predator in the tract at the peak of food chain. It is understood to be well distributed throughout the tract.

v) Kala Bhalu or Black Bear (*Ursus thibetanus*): It is distributed throughout the tract upto an elevation of 3500 m. It is also well distributed throughout the tract especially in areas dominated by Oak, Spruce-Fir Forests. In winters when upper regions are covered with snow, it migrates to the lower elevation in search of food and conflicts with local population. It lives solitary and nocturnal in habit and in day time, it stays under the trees or inside the caves. The focal point of black bear conflict in the region is with regard to it feeding on orchards in private areas adjoining forests. The Himalayan Black Bear also faces threats by poachers due to its skin and gall bladder which is having medicinal values.

vii) Indian wild boar, Jangli Suar (*Sus scrofa cristatus*): It is found distributed in all the forest division. The Wild Boar is seeing an upward shift towards higher elevations considering the changes in climate. The species also faces threat of poaching.

viii) The Indian hare (*Lepus nigricollis*): It is distributed in all areas of the division upto an elevation of 2500 m. It lives in bushes and scrubs. It is hunted for meat.

ix) Himalayan jackal (Golden Jackal) (*Canis aureus*): The golden jackal's coat varies in color from a pale creamy yellow in summer to a dark tawny beige in winter. It is smaller and has shorter legs, a shorter tail, a more elongated

torso, a less-prominent forehead, and a narrower and more pointed muzzle. The golden jackal is abundant in valleys and beside rivers and their tributaries, canals and lakes. It is being killed due to its skin.

The record of mammals provided needs to be verified on the basis of concrete data from camera trapping/ line transect surveys done for signs of mammals. There is a need to understand the distribution of the mammals in the tract better.

13.4.2 Important birds in the division:

Sr.No.	English name	Zoological name	Local Name
1.	Cheer pheasant	<i>Catreus wallichii</i> , Hardwicke	Cheer
2.	The white crested pheasant	<i>Lophura leucomelans</i> Latham	Kaleej/ kala murga
3.	Koklas, Medium tailed Himalayan Pheasant	<i>Pucrassia macrolopha</i> , Lesson	Kokla
4.	Impeyyan or Monal Pheasant	<i>Lophophorus impeyanus</i>	Monal
5.	Western Tragopan	<i>Tragopan melanocephalus</i>	Jejurana
6.	Button quail	<i>Turinix taki</i> , Blyth	,,
7.	Jungle bush quail	<i>Perdicula asiatica</i>	,,
8.	Chakor pertridge	<i>Alectoris graeca</i> , meisner	Chakor
9.	Black Breasted or rain quail	<i>Coturnix coromandelica</i> Gemelin	Chinak bater
10.	Snow partridge	<i>Lerwa lerwa</i> . Hodgson	Gunguria
11.	Black partridge	<i>Francolinus francolinus</i> . Linneaus	Kala Titar

12.	Himalayanor wood partridge	<i>Arborophila torqueola</i> Valenciennes	Peora
13.	Snow cock	<i>Tetraogallus tibetanus</i> G.R.Gray	Ram chakor
14.	Common green pigeon	<i>Treron phoenicopterus</i>	<i>Harial</i>
15.	Wedge tailed green pigeon	<i>Treron apticauda</i>	
16.	Blue rock pigeon	<i>Columba livia</i> . Gamelin	<i>Kabutar</i>
17.	Pintailed green	<i>Treron apicauda</i> . Blyth	<i>Malya</i>
18.	Snow pigeon	<i>Columba leuconota</i> . Vigor	<i>Safed Malya</i>
19.	Golden eagle	<i>Aquila chryaetos</i> , Hodgsoni	„
20.	Himalayan griffon vulture	<i>Gyps himalayensis</i> , Hume	Gidh
21.	Lammergeier or beards vulture	<i>Gypaetus barbatus</i> Linnaeus	Gidh
22.	Red Headed vulture	<i>Sarcogyps calvus</i>	„
23.	White Rumped vulture	<i>Gyps bengalensis</i>	„
24.	Egyptian vulture	<i>Neophron percnopterus</i>	„
25.	Himalayan wood owl	<i>Strixaluco nivicola</i> , Idnnaus	Uloo
26.	Scully's wood owl Horned owl	<i>Strixaluco biddhlphi</i>	„
27.	Himalayan batred owl	<i>Glaucidium cuculoides</i>	„
28.	While throated thrush	<i>Garrulax albogularis</i> .Gould	„
29.	Variegated thrush	<i>Garrulax varisgatum</i> , Vigors	„
30.	Sooty fly catcher	<i>Hemochslidon silbrica</i>	

31.	White browed blue fly catcher	<i>Muscicapula surperciliaris</i>	
32.	White bellied blue fly catcher	<i>Muscicapula pallipos</i>	
33.	Blue throated fly catcher	<i>Muscicapula Rebecoloides, Vigors</i>	
34.	Himalayan gold finch	<i>Carduelis carduellis</i> Linnaeus	Surja
35.	Himalayan tree finch	<i>Cardelis spinoides, Vigors</i>	Surja
36.	Himalayan pied wood pecker	<i>Cryobates himalayasis</i>	„
37.	Himalayan tree creeper	<i>Certhia himalayana</i>	„
38.	Himalayan barbet	<i>Mogalaima virens, Boddaert</i>	
39.	Black headed shrike	<i>Lanius nigriceps</i>	

Table 13.2 Important Birds in the tract

13.4.3 Reptiles of Rohru Forest Division

Sr.No.	English Name	Scientific Name
1	Common Indian Krait	Bungarus caeruleus
2	Common Wolf Snake	Lycodon capucinus
3	Checkered Keelback	Xenochrophis piscator
4	Himalayan Trinket	Orthriophis hodgsoni
5	Indian Rat Snake	Ptyas mucosa
6	Russel's Viper	Vipera russelli

7	Northern White Lipped Pit Viper	<i>Trimeresurus septentrionalis</i>
8	Himalayan Pit Viper	<i>Gloydius himalayanus</i>
9	Monitor Lizard	<i>Varanus griseus</i>

Table 13.3 Important reptiles in the tract

13.5 Endangered and Threatened/ Flagship Faunal Species in Division and Species Specific Conservation Plans

13.5.1 Musk Deer:

Without doubt, the musk deer is the most endangered and rare of all wildlife species which is believed to be found in the tract. It is believed to be found in Tangnu Janglik and Thalathar beats of Khashdhar forest range in the steep rocky portions beyond the tree line in these beats. Similarly, it is possible that the Rupin pass may also accommodate the Musk Deer in Pandar/ Manjeevan beats of Dodra Kwar Range.

The species is a niche habitat specialist which prefers alpine scrub lands in steep areas beyond the tree line in the Himalayas and the alpine meadows. Musk deer and other SSFR may be considered as ‘nibblers’ rather than browsers, as they selectively feed on the young leaves, buds, fruits and flowers of dicotyledonous plants. Musk deers have tendency to migrate from higher to lower altitudes during the day i.e. from 3000 to 2500m to use the forest during the day and the meadows/ alpine scrub lands during the night. The preferred forest type of this species being the dwarf rhododendron scrub, birch-rhododendron forests and the alpine scrub lands.

The main threat to this endangered species is from hunting for the musk pods which fetch a high price in the illegal wildlife market. The climate change is also a key factor which is affecting the suitable habitat of the species.

Conservation Measures for Musk Deer Protection

- **Patrolling and Anti Poaching Camps:** There is a great need to keep vigil from hunting of the species in the remote regions of Dodra Kwar and Khashdhar ranges. It is prescribed to form anti poaching squads and enforce strict regime of gun licensing in the villages surrounding musk deer habitats. There is a grave need to detect poachers and ensure they

are dealt with as per law. In order to achieve this, it is strongly prescribed to have a robust intelligence network at the ground level.

- **Coordination with Wildlife Crime Control Bureau (WCCB):** Considering musk pod business is an internationally organized crime network, there is a need to coordinate with WCCB for gathering intelligence, collating information and busting rackets of musk deer related crimes.
- **Mapping of Habitats:** It is prescribed to map the habitats of musk deer and clearly delineate them on the administrative map of the division. It is crucial to identify and protect these habitats.
- **Population Estimation and Distribution:** Considering it is an endangered species, there is an urgent requirement to assess the population of musk deer in the tract to understand the extent of threat and proximity to local extinction. The distribution and migration trends of the species also needs to be studied.

The ex situ conservation of the species may also be implemented on experimental basis although empirical evidence suggests the success of such conservation breeding and reintroduction programs for musk deers have previously not proved successful. Yet, considering the same has not been made in the tract, it is suggested that the reintroduction of musk deers may be experimented in suitable habitats of the tract where population has declined substantially.

13.5.2 Himalayan Black Bear

The Himalayan Black Bear is found across the tract in various diverse habitats. It is known for its preference to Oak forests and forests proximate to orchards in the tract. Being an omnivore and a frugivore, the bear's distribution makes in inevitably come in conflict with the resident population especially the orchardists. This has potential to lead to trapping, hunting of bears by horticulturists to protect their orchards.

The following prescriptions are made with respect to conserving the Himalayan Black Bear in the tract:

- **Population Estimation and Distribution:** The Zoological Survey of India is currently performing a study revealing the number of black bears in the tract. It is prescribed to take this as baseline data for bears and keep analyzing the trends in population status and distribution through camera trapping.

- **Habitat Enrichment:** The habitat mapping of black bears is prescribed through camera trapping. The mapped habitat may be enriched by planting fruit bearing trees like Ban Oak, Mohru Oak, Walnut etc.
- **Conflict Management:** The detailed discussion regarding this is left for another section in the chapter. However, it is underlined that human-bear conflict management and mitigation is essential for conservation and protection of species
- **Law Enforcement:** Bear biles are sought after in wildlife trade. There is a need to detect poaching network of Himalayan Black Bears and grab holders of those engaged in illegal wildlife trade and ensure they are given exemplary punishment under Wildlife Protection Act, 1972

13.5.3 Himalayan Ghoral

The Ghoral being a near threatened species which is prone to hunting for its meat needs to be conserved and protected in the tract. This bovid species which is in Schedule 1 of Wildlife Protection Act is a habitat specialist preferring steep grassy slopes whereby it can easily adapt to the habitat.

The following measures are prescribed to conserve Ghoral in the tract:

- **Habitat Mapping:** It is prescribed to identify and map Ghoral habitat in the tract through camera trapping and ocular identification of Ghorals through line transect survey. The steep grassland areas in recorded forest area can be taken as a reference for the same.
- **Population Status:** It is prescribed to undertake exercise of counting of Ghorals in tract and estimate the population. The methodology used in Great Himalayan National Park may be utilized for the same.
- **Avoid Plantations:** There is a need to avoid taking up plantations in identified and mapped Ghoral habitats as this will disturb the movement of wildlife
- **Conservation of Genetic Corridors:** It is noted that the possible habitats of the Himalayan Ghoral may overlap with linear infrastructure which is growing at a massive pace in the tract. In this context, it is required to keep in tact the corridor and habitat continuity of the species. It is prescribed to use over passes as corridors to connect fragmented Ghoral habitats.

13.5.4 Common Leopard

Considering it is the apex predator in the tract, the conservation of common leopard is essential to maintaining the ecological health and vitality of the forest landscape. The following prescriptions are made for the same:

- **Population Estimation:** The ZSI study on common leopards undertaken throughout the state would provide the baseline data of number of common leopards estimated in the tract along with their distribution and home range data. There is need to constantly monitor the baseline data and note the trends of population
- **Prey Base Development:** There is a need to safeguard the prey base in the tract to ensure sustenance of the apex predator. In this context, it is prescribed to safeguard habitat and prevent hunting of barking deers, ghorals and other such species which are preferred wild prey for leopards.
- **Conflict Management:** Managing human-leopard conflict is essential to ensure victory of conservation of leopards as it is necessary to prevent revenge mentality in people and avoid adverse impact on livestock and human life. However, leopard conflict is not severe in the tract in comparison to bear conflict.

13.5.5 Western Tragopan (Jujurana)

The state bird of Himachal Pradesh, the Western Tragopan is believed to be found in Kharshu forest type habitats. The forests of Banothi beat overlooking the Moral Danda peak is a highly possible habitat of the endangered bird. Similarly, the forests of Kwar beat in Dodra Kwar range is believed to be habitat of the Tragopan. Other possible habitats include the Thalathar and Tagnu beat in Khashdhar Forest Range and the forests of Jakha block. It is crucial to note that these patches of forests are pristine and relatively undisturbed in nature except for trekking in the path.

The main threat for the bird is from hunting for meat and habitat disturbance owing to increased diversion of forests and developmental pressures. The following prescriptions are provided to protect the pheasant species:

- **Population Status and Distribution:** The HP Wildlife Wing is planning a state wide census on Western Tragopan. The potential habitats of the Western Tragopan needs to be studied in detail in the tract to understand

the current numbers and trends of population. The historical habitats of the bird need to be identified from literature review and local extinction of the bird needs to be seen for.

- **Conservation Breeding and Reintroduction:** The HP Wildlife Wing is having a Conservation Breeding Project of the Western Tragopan in its Sarahan Pheasantry. The program has achieved success in breeding with a wide gene pool of Western Tragopan available as an ex situ stock for re introduction. It is prescribed that if based on the population assessment done above, local extinction or reduced numbers are reported in any potential habitat of the tract, then reintroduction of Western Tragopan can be made in these habitats for restocking of population and reclaiming dwindling habitats and populations.
- **Law Enforcement and Patrolling:** Currently, the detection of poaching and hunting in the tract is abysmal. There is a great need to enhance patrolling and anti poaching drives along with building capacity of staff in detection of wildlife crime, investigation techniques and collection of evidences for prosecution.

The Cheer Pheasant and Himalayan Monal are the other pheasant species found in the tract. The Monal is listed as Least Concern in the IUCN Data book whereas the Cheer Pheasant is a vulnerable species with succession grasslands being preferred habitat. The broad prescriptions for pheasant conservation with regard to population and distribution status, protection and anti poaching efforts shall apply equally to these species also.

13.5.6 Vulture Species

The Vultures are key species of the ecosystem in terms of their role in scavenging and cleaning up the eco system. They are vital to ensuring sustenance and vitality of a healthy food web. The Himalayan Griffon, Egyptian Vulture, Lammergier, Red Headed Vulture and the White Rumped Vulture are believed to inhabit the tract. It is crucial to note that Red Headed Vulture is a critically endangered species whereas the Himalayan Griffon, Lammergier are Near Threatened and the White Rumped, Egyptian Vultures are endangered. The threatened and endangered status of these vultures make their conservation paramount to wildlife conservation in the tract.

The following prescriptions are suggested for vulture conservation in the tract:

- **Habitat Mapping:** It is crucial to identify nesting colonies of Vultures in the tract and map them. The vultures prefer steep cliffs and crevices where they make their nesting colonies. The identification of these sites and their mapping is essential to monitor them for population status.
- **Population Status:** It is critical to understand the population trends and current status of every species of vulture in the tract. It is prescribed to conduct a detailed study of vulture population in the tract and estimate population of vulture species wise.
- **Vulture Restaurants:** The HP Wildlife Wing has already established a vulture restaurant in Kangra district which is yielding positive results for the conservation of vulture species in Pong Dam Wildlife Sanctuary. The vulture feeding stations can be established in appropriate locations in the tract based on the data received from population studies conducted. These feeding stations should be properly fenced and protected so that competing animals like dogs, jackals are not able to access the site. Wooden perching stations shall be provided within the station and beyond the fence for vultures. The feeding station shall allow people to bring in dead livestock which is not poisoned or drugged which are then laid out in open for vultures to scavenge upon
- **Enforcing Ban on Toxic Drugs:** The population of vultures began to dwindle after the widespread use of Diclofenac, Ketoprofen, Aceclofenac and Nimesulide. Thereafter, there has been a ban on the use of these drugs for livestock. However, this ban needs to be enforced in coordination with the Animal Husbandry Department. It is prescribed to conduct the lab testing of few carcasses of livestock to identify if the ban is being implemented fully at the ground level. In case of dead vulture noticed in the tract, sampling and analysis of blood is prescribed to detect any such poisonous drugs. Further, the results of new research and bans needs to be aligned with management at field level.

13.6 General Prescriptions for Wildlife Conservation

13.6.1 Baseline Data Collection

The major prescription for wildlife conservation in the tract is to plug the staggering vacuum of data on faunal population and distribution. Except the statewide study conducted by HP Wildlife Wing and ZSI to estimate Black bear and Leopard population, there is virtually no data available with the forest department regarding population of other species. There is an urgent need

which cannot be overstated to conduct wildlife monitoring and survey studies to give information on habitat occupancy, population status, habitat distribution and other such aspects without which wildlife management becomes an exercise of searching in the dark.

In order to achieve the objective of data collection, it is prescribed to carry out population, distribution and habitat mapping studies through research organizations and reputed scientists/ researchers considering the territorial staff of HPFD grossly lack in wildlife survey techniques and identification. However, the frontline staff shall be trained in installation of camera traps and data retrieving so that at least camera trap data can be compiled routinely by the division.

The collection of data also can verify the anecdotal records of species and ensure that the records of wildlife are documented and not just hearsay. This is especially true for endangered species like the Musk Deer, Western Tragopan, Snow Leopard which are believed to be present in the tract but the presence of which needs to be confirmed on the basis of empirical evidence.

13.6.2 Detection of Wildlife Crime

Currently, the division has an abysmal record of 0 wildlife crime cases registered. This shows the urgent need to step up patrolling and detection of wildlife crime and the need to develop a robust intelligence and information network on the ground. It is strongly prescribed to step up detection of wildlife crime and bring the perpetrators of offence to hands of law under Wildlife Protection Act, 1972.

13.6.3 Training and Capacity Building of Staff

Unfortunately, wildlife conservation has been much ignored in territorial forest divisions despite such divisions having massive habitats for scheduled and endangered wildlife species. The frontline staff are not aware of the Wildlife Protection Act, the extent of protection accorded to Scheduled Species and the various provisions of the act. The Wildlife Crime Investigation Manual, A Handbook for Wildlife Crime Investigation Officers released by WCCB in 2013 is an excellent resource available in public domain detailing the procedures to be adopted by frontline staff in detection, investigation, evidence collection and prosecution of wildlife offence cases. It is prescribed that a comprehensive training and refresher courses be conducted for the frontline staff detailing all aspects of wildlife crime with particular reference to the tract.

13.6.4 Habitat Enrichment

The need of habitat enrichment is not felt to be very pressing in the tract. However, the habitat mapping of species can provide actionable data based on which enrichment of habitat may be taken up. This includes the preservation of grass lands and silvipastoral landscapes wherever wildlife presence is existing. It is strongly prescribed not to embark on project to convert all grassland habitat to wooded landscapes as it will rob wildlife of their natural habitat.

The enrichment of habitats may be done with plantation of fruit bearing trees which is also the policy of the state government. Soil moisture conservation and enhancing permanency of water sources in forest is a key aspect of habitat enrichment. It is prescribed to identify and treat drainage lines to enhance the water resources available in forest areas.

13.6.5 Conservation and Augmentation of Wildlife Corridors

Habitat fragmentation is a major issue in the tract in the backdrop of linear infrastructure progressing at break neck speed. There is a need to resist approvals being accorded to forest diversions for roads which have superfluous character where there is no reasonable public benefit. In few diversion proposals brought under Forest Rights Act Section 3(2), it is being seen that there is already an existing road connecting the village or there is only a single beneficiary of the road. Such kind of diversion proposals fragmenting contiguous forests needs to be rejected considering the destruction of wildlife corridor as a cost which cannot be accepted for the meagre or no public benefit it proposes to achieve.

Apart from the safeguarding the current land use of contiguous wildlife habitats, there is also a need to create infrastructure for wildlife movement connecting fragmented habitats. This can be in the form of overpasses connecting disjointed landscapes which can enable gene flow of wildlife and enhance genetic diversity. It can also prevent road kill events safeguarding wildlife species.

Concrete efforts need to be made to identify and delineate wildlife corridors in the tract. The corridors may also be notified at government level for management purpose.

13.6.6 Declaration of Conservation/ Community Reserves

Currently, there is no conservation reserve declared in the tract despite immense wildlife potential in the tract. The scope for declaring a conservation reserve exists in biodiverse rich areas of the tract i.e., the forests of Larot Block upto the Chanshal Pass, Rupin Pass and adjoining forests, Chandernahan forests, Moral Danda peak and adjoining forests where there is a large contiguous patch of forests. A detailed biodiversity assessment and wildlife study is required to identify the possibility of these areas being declared a conservation reserve under wildlife protection act.

There are many forests in the tract which are believed to be sacred and belonging to the local deity called as Devta in the Himachali culture. The local community has a strong sense of fear and reverence for these forests where there is a total ban on lifting of any kind of forest produce. One can notice these areas in the Forest Ranges of Dodra Kwar and Khashdhar especially where large contiguous patches of forests are left undisturbed. Considering the huge support of community, it is prescribed to explore the possibility of declaring these forest areas as Community Reserves under Section 36C of the Wildlife Protection Act. A Community Reserve Management Committee be formed for each of such declared reserves under Section 36D to take steps for management and conservation of forest, wildlife and habitat.

Sr.No.	Range	Panchayat	Village	Name of Forest	Name of any temple/ shrine (if any)
1	Khashdhar	Kharshali	Khotwari	C.No.72a Kharshali	Naar Singh Devta Temple
2		Kharshali	Kharshali	C.No.72a Kharshali	Jai Maa Durga Kewala Temple Kharshali
3		Thana	Jhelwari	UF Jhalwari	Devta Khantu maharaj

4		Banoti	Manghara Shongi	UF Deoban	Devta Kailash Maharaj
5		Tangnu/Janglikh	Janglikh	Uf Janglikh-1	Jai Devta jakh maharaj
6		Andhra	Jabal	C.No.64Jabal	Devta Sh.Jabal Narayan
7		Larot	Larot	C.No.70D Kandi	Devta Bana Sheri Manahraj Mandir
1	Jubbal	Shilli	Snaba	DPF Giri 5c	Giri Ganga Mandir
2		Parali	Kharrapather	UF Ori	Kali Mata Mandir
3		Barthata	Mural	UPF Mural	Jakh Temple
		Jai Pidi Mata	Rampuri	UPF Rampuri	Narsingh Mandir
		Jai Pidi mata	Rampuri	DPF Rampuri	Temple
		Shilli	Kohlara	DPF Giri	Kali Mata Mandir
		Badhal	Badhal	UPF Badhal	Kali Mata Mandir

Table 13.4: List of some sacred places in the tract

The declaration of community and conservation reserves can give an added statutory protection to wildlife rich areas of the tract and compensate for the ignorance that these areas have so long faced in terms of wildlife management. It can also strengthen the public participation for the cause of wildlife conservation in the tract.

13.7 Human Wildlife Conflict Management

The main wildlife species that comes in conflict with humans in the tract is the Himalayan Black Bear. The reason for the conflict is with regard to location of orchards interspersed with habitats of black bear and the pull factor of fruits attracting the black bears. There are no clear boundaries or protection walls that separate these orchards and this promotes conflict. The following prescriptions are made to control human-bear conflict:

- **Mapping of Conflict Hotspots:** There is a need to map conflict hotspots in the tract through data on wildlife compensation, conflict incidents and correlate it with population distribution of black bear. The understanding of conflict spatially is essential to management for targeted and focused attention to these areas.
- **Automatic Alert System/ ANIDERS:** It is prescribed to use ANIDERS as automated system to detect animal intrusion into private orchards or human settlement areas using techniques of Geo Fencing and Alarms. The ANIDERS technology can be piloted in parts of Tikker/ Khashdhar Forest Range where the bear conflict is greater. Considering the scale of orchards and scattered nature of land parcels, it is difficult for the department to implement this technology in all conflict prone areas. However, the department can initiate this project and monitor its results during the plan period
- **Promoting Various Types of Deterrent:** It is prescribed that the government of HP promote subsidized solar fencing for orchards through panchayats/ horticulture department to prevent entry of bears wherever possible. Proper lighting is required to prevent intrusion during nights. Olfactory deterrents including bleach or ammonia can be used by residents
- **Promotion of Awareness:** There is a growing need to promote awareness regarding do's and don't's of human-bear conflict among residents through institution of Panchayat. Pamphlets and videos promoting awareness of bear conflict needs to be circulated to residents in conflict prone areas.
- **Predator Proofing of Livestock Sheds:** It is prescribed to take up such activities or ask panchayat to take up such activities to safeguard livestock from attacks by bears/ leopards
- **Compensation for Damages Caused by Wild Animals:** - The loss of cattle and human beings due to attack by wild animals are compensated

by the forest department to victims vide notification No. FTS-(F)-6-7/82 Shimla-2, LOOSE dated 9-4-1996 and Fts. (F) 6 7/82-II dated 28th August, 2001 but still there is no provision for compensation to the loss of cultivated field crops due to damage by wild animals in the State of Himachal Pradesh which need attention of the State Government in this regard. Therefore, necessary step may be taken up with Govt. in this regard by the Divisional Forest Officer. This will be very helpful in better understanding of problems of wildlife and ultimately help in mitigating the problem of human-wildlife conflict.

- **Detect Laying of Traps/ Snares:** The orchardists have the habit of laying traps/ snares around the orchards which brings the bear in conflict. There is a need to identify and keep vigil of such incidents and take appropriate legal action.
- **Keeping Water Tanks Closed:** One of the main reason for bear conflict is with regard to open water tanks which lead to bear or bear cub falling into it. This puts the bear in danger and of it being aggressive in nature. There is need to promote awareness with regard to same and prevent open water tanks which can be accessed by bears.

13.7.1 Wildlife Rescue Team

The HP Wildlife Wing is having a specialized rescue team of trained staff and veterinary doctor in Shimla. The tract is scattered in nature and is at least 3 hours from Shimla. Some parts of the tract are 6 hours away from the Rescue Centre. Hence, there is a need to train a division level RRT team to equip them with skill and equipment to handle a wildlife conflict situation. Often, this involves an animal trapped in a particular room, tank or trap or in worst cases livestock/ human kills. The RRT team at the division level shall consist of 1 Deputy Ranger and 3 Forest Guards reporting directly to the Deputy Conservator of Forest.

The team members shall be trained in restraining of wild animals in conflict situations, mob management, transportation of injured or rescued wild animals. The physical restraint of injured animals can be done by trained frontline staff. The chemical restraining of wild animals is a challenging task and it is difficult for frontline staff to execute it. However, any of the staff may be trained in the matter if feasible and otherwise the local veterinary doctor of animal husbandry shall be roped in for tranquilization of the animal.

The division is currently having a few monkey and leopard trap cage only. It is prescribed to procure bear trap and transportation cages for movement of animal to rescue facility or for wild release. The necessary protection gear and

equipment with regard to helmet, protection gloves, snake hooks, body protection suit, smart sticks shall be procured to strengthen the RRT.

A rescue center is not suggested for the tract considering the fact that the existing rescue center in Shimla can cater to the rescued wildlife in the tract. The rescued wildlife if required may be transported to the Rescue Center in Shimla for veterinary care. All efforts shall be made to release the rescued species into the wild after necessary veterinary treatment and evaluating the fitness.

Chapter - 14

Soil Conservation and Water Resource Management (Overlapping) Working Circle

14.1 Name of Working Circle: Soil Conservation and Water Resource Management (Overlapping) Working Circle

14.2 General Constitution of Working Circle

The entire tract has water sources and soil which renders that this working circle constituted for soil conservation and water resource management shall apply to entire tract in overlapping fashion. The tract has Pabbar river system which passes through its heart, there are several water falls, notified wetlands, springs and other water sources in the tract the management of which and the provision of water services is the main reason behind the constitution of this working circle. Large parts of the tract are also prone to erosion especially adjoining the river bank and in areas where road construction is progressing at rapid pace. In this backdrop, the constitution of this working circle attains importance especially with the objective of eco system services in terms of water and soil in mind.

The constitution of working circle also is crucial from the view point of climate change, increased forest fires, increased development activities especially in terms of road construction. With the rainfall and precipitation patterns being increasingly erratic and with increasing forest fires, the number and quantity of water sources have dwindled and there are increasing instances of drought. The increased excavation of hills for widening and construction of road also creates muck, debris and damages water sources while at the same time increasing chances of erosion. In this context, it is essential to have management tools for soil and water conservation as a pathway of sustainable development. In view of the challenges of 21st century, there is a great need to integrate soil and water conservation with development in order to ensure the sustenance and permanence of soil and water resources which are crucial for life and livelihood in the tract.

14.3 General Characteristics of the Vegetation: This working circle will be applied in almost all parts of forest division, so all types of vegetation will be met in the working circle. The types of forests in the division are already given in the chapter-2 of Part-I.

14.4 Felling Series, Cutting Sections and JFM areas: No felling series is constituted in this working circle as it is constituted for protection cum rehabilitation.

14.5 Blocks, Compartments and JFM area: No area is currently under JFM in the tract.

14.6 Special Objectives of Management: The special objectives of management are:

- i. To identify, delineate and map sources of water and drainage lines in the tract including rivers, streams, springs (including Bauries) and depict them on Compartment History Files, Beat Book and create digital inventory with GPS location of water sources
- ii. To identify, delineate and map water shed, catchment area, springshed in the tract
- iii. To prepare spring shed/ water shed management plan involving consultation with gram panchayat, VFDS, JFMC wherever these grass root level institutions exist
- iv. To implement water shed and spring shed management plans with a view to enhance water sources, reduce run off and capture water to increase moisture in the forest floor
- v. To identify forest areas which are affected by soil erosion and is highly vulnerable to landslides, landslips
- vi. To stabilize soil erosion and landslide prone areas based on priority and vulnerability through various techniques including vegetative, mechanical utilizing novel technology
- vii. To monitor river and stream flow pattern and periodically classify vulnerability of landscapes to soil erosion

14.7 Core Strategy of Soil Moisture Conservation

The core strategy of soil moisture conservation in the tract shall be to capture run off from snow and rain precipitation, enhance moisture, water provisioning services so that the hydrogeological services and water regime continues to be maintained in the tract. This involves use of different techniques for maintaining and enhancing the moisture regime in the forest floor and to

conserve soil and prevent its erosion. The following are the various techniques to mitigate soil erosion in the tract:

14.7.1 Rehabilitation Program

The sites which are prone to soil erosion, landslides, snow slides, river and stream bank areas and blank areas of natural forests will be rehabilitated with planting suitable species. The following areas of Rohru Forest Division required special attention.

Sr.No..	Name of the site
1.	Area around Andhra Khud, Kashdhar Range
2.	UF Jhakar
3.	DPF 41, Kuili
4.	Area around Pandar and Kavar Slip, Dodra Kavar Range
5.	Thana Slip of Mandal Beat, Saraswati Nagar Range
6.	Barthata / Sojla Slip of Karvi beat, Saraswati Range
7.	UF Sherhana, Saraswati Nagar Range
8.	DPF Giri I & II in Jubbal Range
9.	Ganga Nagar village of Jubbal Range
10.	Catchment area of Pandralu Nallah of Saraswati Range
11.	Forest Adjacent to NH 707 of Kuddu Block

Table 14.1 Area requires immediate attention of rehabilitation

14.7.2 Measures to Mitigate Gully Erosion

In small gully and nallah areas, brushwood check dams can be constructed across the gullies from the top to bottom approach to check soil erosion in gullies and establishment of vegetation. These can be made with pine needles packed with planting cutting of Celtis, Poplar, Salix, Shimalu, Alnus, Bamboo etc. The space behind the brushwood check dams must be filled with

soil to the spillway. If sprouting species (Salix, Poplar, etc.) are selected as posts and interlink materials (pine needles), brushwood check dams should be constructed when the soil in the gully is saturated or during the early rainy season. If non-sprouting species (Pine and Alnus as posts, bamboo strips as interlink materials) are used, brushwood check dams can be constructed during any season.

14.7.3 Stabilizing Landslide Risk Zones

There are numerous landslide vulnerable landscapes in the tract especially adjoining roads and adjacent to Hydro Electric Projects. In such areas, it is proposed to have following methods:

14.7.3.1 Construction of Retaining Wall: It is prescribed to identify such zones and provide retaining wall wherever it is feasible from engineering point of view to arrest landslide and prevent landslip

14.7.3.2 Geo Jute Textiles: It is prescribed to utilize geo jute textiles to stabilize slopes having steep gradient along with broadcasted grass sowing. Although costly, this technique has proven to be effective in hilly areas to protect the landslide vulnerable zones and prevent slides and slips.



Figure 14.1: Reference picture for Geo Jute textile and GI Mesh

14.7.3.3 GI Mesh with Cement Grouting

Although Geo Jute textiles are preferred for high erosive areas, where the soil depth is low and slide risk is high, GI Mesh with Cement Grouting is prescribed where Geo Jute is not feasible. This technique can help arrest soil erosion and landslips where slide risk is high although cost of this method is quite high.

14.7.3.4 Bioengineering Measures: Following Bioengineering measures are prescribed to stabilize the landslide prone areas in the tract:

- **Brush layering:** placing layers of live branches within soil to create living retaining structures
- **Wattle fencing:** embedding live stakes and weaving branches across slopes
- **Vegetated geogrids:** combining geotextiles with vegetation to reinforce soil
- **Propagation of Salix poles**

14.8 Drainage Line Treatment Techniques for Soil and Water Conservation

14.8.1 Utilization of Stony Check Dams

Stony check dams are constructed where degree of slope is high and gully and nallah are wide. The width of check dam at the base should be approximately equal to maximum height and successive courses are narrower so the section is roughly a trapezium. It is common to find upstream face of check dams vertical with all slopes on the downstream face but while there is sound engineering reason for this in case of large dams but it is not of any consequence in small gully control dams. In the centre of the dam portion sufficient waterway is allowed to discharge the maximum run off. The dry stone work should go up to 0.30 m to 0.60 m in the stable portion of the gully side to prevent end-cutting.



Figure 14.2 Stony Check Dam

14.8.2 Use of Gabion Structures

In places, where regular and continue chance of floods during rainy season, crate wire check dams are very useful in compare to stony check dams. When a dry stone check dam is held down with woven wire netting, the life and strength of the structure is enhanced many fold.

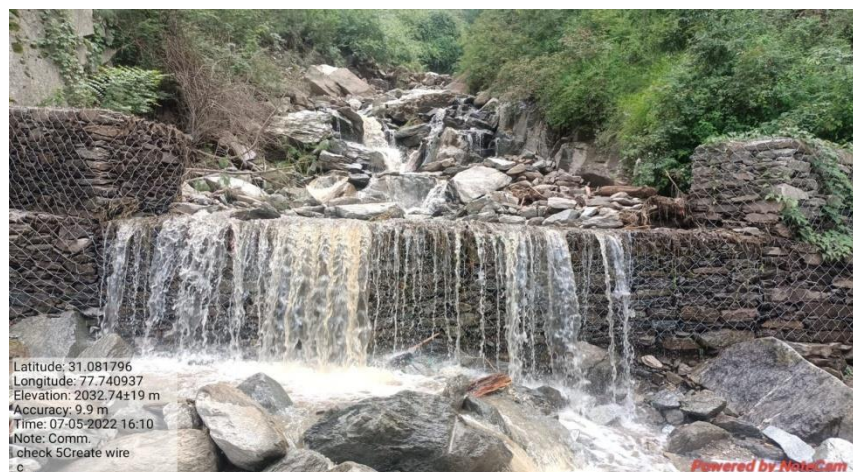


Figure 14.3: Gabion Structure

The Gabion Structures are essential in many nallahs in the tract which see drastic increase in flow in terms of quantity and velocity during the rainy season. It can be utilized to safeguard paths, forests, trees and even private areas adjoining forest areas. The Gabion Structures are also effective in areas adjacent to Pabbar river bank in which many villages are facing issue of landslide and erosion. It is prescribed to place gabion/ crate wire structures in all such streams, river banks and nallahs where there is risk of increased erosion and landslips.

One of the main reasons for the frequent occurrence of landslides in the hill areas is toe cutting by streams and rivers. In order to confine the flow and protect the bank, construction of spur walls/retards is desirable to deflect water of torrents from toe cutting of banks particularly at the curves. As a matter of fact R.C.C. block spur wall involves large scale work with heavy cost. Therefore, wire mesh boulder or stone spur walls is prescribed to be constructed along the embankments of Pabbar river on both sides especially in the Chirgaon and Badiyara areas where there is increasing threat of river bank erosion.

14.8.3 Diversion Drains and Toe Trenches

In some areas, diversion drains are made to intercept the storm water which could otherwise flow down from higher ground on to the arable land which it protects. Toe trenches are prescribed along agricultural/ horticultural land contours to increase capture of water and prevent erosion in these landscapes.

14.9 Soil Moisture Conservation and Water Recharge Treatment Techniques

14.9.1 Recharge Ponds/ Percolation Ponds

The recharge ponds are prescribed only for areas which are comparatively having lesser gradient or slope. These are rectangular shape water conservation structures made out of excavating soil and creating trough for collection and retention of water. It is prescribed to clear the channel and frequently desilt these recharge ponds so that they can function effectively.



Figure 14.4: Recharge Pond

14.9.2 Staggered Contour Trenches

Trenches refer to bio-engineering structures which are effective for recharge of water and conservation of soil especially in areas with higher degree of slope. Considering large parts of the tract are hilly in nature, SCTs are suggested as main measure of water retention and conservation. However, in forest areas where there is already good forest cover and dense canopy, there is

no need to undertake SCT measures as water and moisture retention is already occurring in the dense forests. SCTs shall be only utilized in areas with higher degree of slope which are largely open forests/ scrub forests where there is higher degree of rainfall leading to high run off and quick drainage.

In this context, SCTs can be utilized in such landscapes where there is a restriction on flow/ velocity of water, increase capture of run off and mitigate erosion of soil. SCTs are also suggested to be utilized in forest areas where the region is closed off for artificial regeneration/ assisted regeneration/ under plantation. In these areas, trenches can help to increase retention, enhance regeneration and spurt growth of plants/ saplings.

It is prescribed to undertake grass sowing and broadcasting along the berm of SCTs to enhance the life of SCTs. Desilting of SCTs are prescribed periodically to ensure the viability and life of SCTs so that they continue to remain functional.

14.9.3 Water Harvesting Structures

The Water Harvesting Structures are prescribed for the tract especially in areas where there is a heavy volume and velocity of water and where there is potential for wildlife habitat. RCC based Water Harvesting Structures covering large areas to collect large volume of water. It is prescribed to construct these WHS structure not adjacent to each other but sufficiently spaced in different forest habitat/ compartments based on hydrological regime, wildlife habitat and other such considerations.

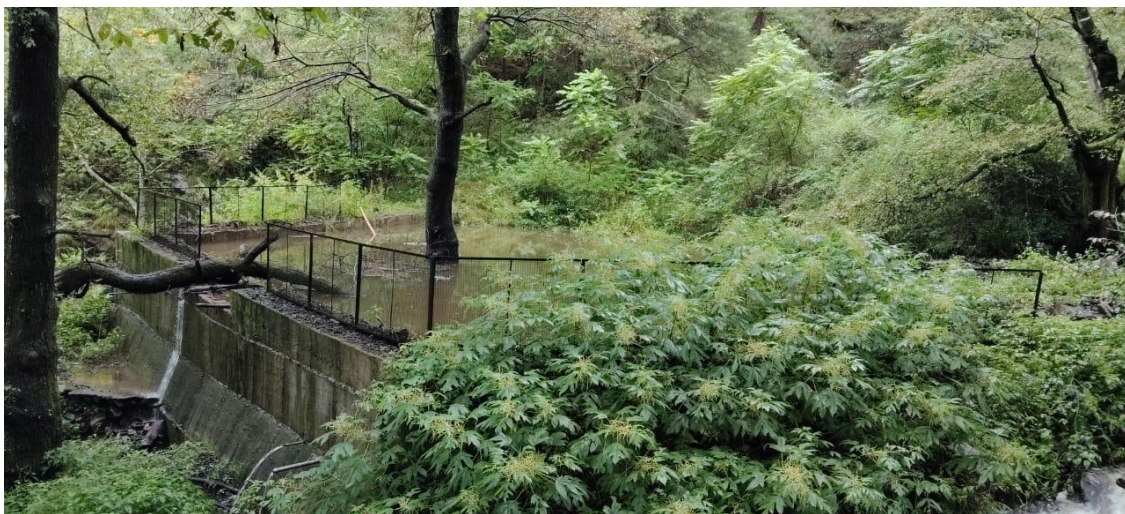


Figure 14.5: Water Harvesting Structure constructed as part of Jal Bhandaran Yojana

14.9.4 Vegetative Measures

Plantation of tree and shrub species to provide coverage and prevent erosion enabling capture of water and soil is another effective measure and technique to counter soil erosion. The vegetative measures in this regard include site specific plantation of tree species along with shrubs preferably undertaken under the model of Mukhya Mantri Van Vistar Yojana.

Composite technique of treating a site by utilizing both plantation and trenching is strongly prescribed for vulnerable and degraded sites which are at the risk of landslide/ soil erosion.

Slip area should be planted and well covered with quick establishing species of trees and shrubs e.g. *Agave cantula*, *Alnus nepalensis*, *Ipomoea*, *Populus ciliata*, *Salix*, *Vitex*, *Wetlandia*, etc. However, the spread of these species needs to be monitored as there is always threat of invasiveness associated with these species.

14.10 Soil Moisture Conservation Management Plan: Miscellaneous Prescriptions

The prescriptions on soil moisture conservation are guided largely by the Forest Eco system services study conducted in the tract in coordination with GIZ in which slope stability models across various range and water shed mapping was performed. Accordingly, priority interventions are listed out.

It is strongly prescribed to have a spring shed/ watershed/ soil moisture conservation plan for the tract which comprehensively evaluates the water sources, records the springs, area of catchment/ water shed. The following table provides the list of springs in the tract:

Sr.No.	Range	Name of Forests	Name of Spring	GPS Location	Character of Spring (Perennial/ Seasonal/ Inactive)
1	Jubbal	UPF Muril	Muril Bawri	31.07945 77.683397	Perennial
2		UF Jachli	Jachli Bawari	31°06'44" 77°37'45"	Perennial

3		UPF Rampuri	Rampuri Spring		Perennial
4		UPF Shari	Shari		Perennial
5		15 d Matil	Naku Nala	31.137026 77.657227	Perennial
6		15 c Kaina	Kaina Gad	31.131963 77.684085	Perennial
7		15 d Matil	Dadha Nala	31.138099 77.658739	Perennial
8		18a Mandhol	Shela Pani	31°08'22" 77°42'20"	Perennial
9		UPF Badhal	Badhal		Perennial
1	Khashdhar	78a Dali	Savni	31°11'44"N 77°51'25"E	Perennial
2		77b dhak	savni	31.19737N 77.8770841E	Perennial
3		C.No.73A Telga	Sala Deuka ka Pani	31.223191N 77.89605E	Perennial
4		C.No.73b Telga	Pilga Ka Pani	31.123022N 77.545111E	Perennial
5		C.No.80b Diswani	Patal pani	31°11'13.83"N 77°50'46.46"E	Perennial
6		C.No.80b Diswani	Simber Bai	31°11'36.35"N 77°50'17.96E	Perennial
7		C.No.81a kayani	Chamshu Bai	31°11'00.61"N 77°49'50.29E	Perennial

8		UF Ghatdhar	Nallah ka Chhad	31°17'48"N 77°51'24"E	Seasonally
9		Uf Tangnu	Rol Chhalty	31°18'47.5784"N 77°59'52.4058E	All Season
10		Uf Tangnu	Chatwadi Bai	31°19'47.59184N 77°61'53.4058E	All Season
11		UF janglikh-2	Simber Bawadi	31°19'47"N 78°01'14"E	All Season
12		Uf Dayara	Chandenahan	31°23'27"N 78°06'10"E	All Season
13		Uf Mathla	Ghumi ki bau	31°17'07"N 77°48'18"E	Perennial
14		Uf Mathla	Mathla Bau	31°17'03"N 77°46'58"E	Perennial
15		Uf Ranol	Saru	31°17'48"N 77°50'07"E	Perennial
16		Uf Dumrera	Barti	31°18'26"N 77°46'58"E	Perennial
17		Uf Dumrera	Tangan Bai	31°19'21"N 77°46'32"E	Perennial
18		Uf todsa	Todsa Bai	31°15'48"N 77°49'28"E	Perennial
19					
20		UF Shagli	Shegalti Bai	31°16'24"N 77°50'18"E	Perennial

21		UF Todsa	Todsa Bai	31°16'01"N 77°49'25"E	Perennial
22		C.No.72a Kharshali	Roop Nallah	31°13'25"N 77°55'10"E	Perennial
23		C.No.71b Naluk	Kandola	31°12'47"N 77°55'13"E	Perennial
24		Uf larot	Boosdhar	31°14'25"N 77°57'50"E	Perennial
25		UF diudi	Water source Chingchwari	31°17'40.12"N 77°59'18.28"E	Perennial
26		Uf pekha	Water source pekha	31°16'18.47"N 77°59'16.74"E	Perennial
27		UF diudi	Water source Bhatwaeri	31.2893000N 77.9795000E	Perennial
1	Tikkar	C.No-22 pujarli	Spring of Devta Ruder MahaRaj Pujarli n-4	N-31°11'46" E-77°39'42"	Perennial
2	do....	C.No-22 pujarli	Koti Nalha	N-31°13'51" E-77°38'08"	Perennial
3	do.....	C.No 24b Khalai	Banbaw	N-31°12'2" E-77°39'31"	Perennial
4.	do.....	C.No-8 Narian	Spring of Devta Narian MahaRaj Narian	N-31°11'17" E-77°38'56"	Perennial
5	do.....	C.No-9 a Karchari	Local people of the area Karchari	N-31°10'19" E-77°39'15"	Perennial

6	do....	UF Harshal Tibba	Local people of the area Gujandli,Daroti	N-31*10'41" E-77*36'58"	Perennial
7	do....	C.No-6 a Sholdu	Local people of the area Saradhar	N-31*11'16" E-77*35'45"	Perennial
8	do....	C.No-6 c Kasheni	Local people of the area Kasheni,Tikkar	N-31*11'27" E-77*37'30"	Perennial
9	do....	C.No -3 Pharog	Local people of aea Pharog	N-31*13'16" E-77*36'28"	Perennial
10	do....	do.....	Mahsu Devta	N-31*13'02" E-77*36'32"	Perennial
11	do....	do.....	Bawadhar local people	N-31*13'10" E- 77*36'03"	Perennial
12	do....	do.....	Comman bau local people Pharog	N-31*12'55" E-77*35'37"	Perennial
13	do....	do.....	Bauti local people of Pharog	N-31*13'01" E-77*35'59"	Perennial
14	do....	do.....	Comman bau local people Pharog	N-31*12'52" E-77*36'20"	Perennial
15	do....	do.....	Kalari Baudi local people of Khalawan	N-31*21'33" E-77*36'57"	Perennial
16	do....	do.....	Pratap negi House Baudi	N-31*11'32" E-77*35'26"	Perennial
17	do....	do.....	Baudi Hanstari Teer	N-31*11'34" E-77*35'57"	Perennial
18	do....	do.....	Madnu Bawri	N-31*11'43"	Perennial

				E-77*36'38"	
19	do.....	do.....	Mashu Bawri	N-31*11'55" E-77*36'53"	Perennial
20	do.....	do.....	Hanstari Bawri Public	N-31*11'59" E-77*37'07"	Perennial
21	do.....	DPF Dhanoti	Dhanta Bauri dogri bamnu	N-31*11'45" E-77*37'08"	Perennial
22	do.....	do.....	Dhanta Bawri Shildu	N-31*12'01" E-77*37'22"	Perennial
23	do.....	do.....	Badret Bawri village Dhanoti	N-31*11'59" E-77*37'29"	Perennial
24	do.....	do.....	Badret Bawri seri baw	N-31*11'53" E-77*37'31"	Perennial
25	do.....	do.....	Shildu Bawri Carpenter	N-31*12'01" E-77*37'24"	Perennial
26	do.....	do.....	Chunri nala Bawri	N-31*12'03" E-77*37'32"	Perennial
27	do.....	C.No 27 a &ii Kuthari	Jarla Bawri local people of Jarla	N-31*14'49" E-77*36'16"	Perennial
28	do.....	C.No 27 a i &ii Kadiwan	Kadiwan bawri of vill.Kadiwan	N 31.238517" E 77.6064526"	Perennial
1	D/Kawar	C.No. 69 b	Pandar water fall	31*252634 78*110257	Peennial
		U.F. Kawar	Simla pani	31*12840 78*05676	Peennial
		U.F. Kawar	Shod gad	31*12195 78*055256	Peennial

Table 14.2 List of Springs in the Tract

WETLAND		Estimated area	GPS Location
1	Chander Nahan Lake	0.151	31.378849° 78.101236°
2	Bararasar Lake	14.59	31.230921° 78.211137°
3	Kanasar	21.64	31.259696° 78.254947°
4	Dhandras	3.58	
5	Dhandras	4.91	31.320283° 78.164249°
6	Sharangcha	9.41	31.322966° 78.181133°
7	Sharangcha	3.97	31.328852° 78.184937°
8	Rupin Uper water fall lake	7.68	31.344840° 78.141565°
Total		65.931	

Table 14.3 List of Wetland in the Tract

- Conduct identification and mapping of springshed/ water shed
- Rejuvenation and management of springs/ bauries and periodical monitoring of water flow and velocity
- Prevent dumping of muck/ debris in water sources and springs wherever recorded by proper scrutiny of FRA cases and enforcement of law as under Indian Forest Act
- Undertaking treatment of drainage lines based on priority and water volume/ velocity
- Involvement of community in participatory management of water resources to ensure its permanence and sustainability
- There are numerous streams/ nallahs in the tract which are required to be treated to conserve water regime and safeguard soil erosion. The following table summarizes the drainage line treatments to be prescribed:

Sr.No.	Range	Name of Forests through which stream is passing	Name of Stream	Whether the stream has been treated?
1	Khashdhar	Badalmund,C.No.78a Dali UF dali	Dalikhad	
2		Neemgad,UF Dogra	Neem Gad Nalha	
3		Uf Dali,80a Diswani	Shevdal Khad	
4		Shaldhar,Neemgad,Rikhan	Jivashal Khad	
5		UF telga	Roop Nalha	
6		UF Telga	Pishgad	Treated
7		C.No.80b Diswani	Shevdali Nalha	
8		C.No.80a Diswani	Mazar Gad	
9		C.No.81a Kayani	Bhieu Nalha	
10		C.No.74a Khashdhar	Thyati Gad	
11		Uf 50	Jivashal Khad	
12		UF Khashdhar	Peja Khad	
13		Uf 35 Baghi	Kurari Gad	
14		Uf Daulateer,UF35 Gyari	Bhilyani Khad	Treated
15		Uf Gaonsari	Chhua Nallah	
16		Uf jabal,UF Jhanjwani	Kop Khad	
17		Uf chuwagad,Uf Biuri	Shatul Khad	
18		Uf Rohal	Gattu Gad	
19		Uf Chuwagad,Uf Katargad	Katar Gad	
20		Uf Khabal,65a Khabal	Soundari Nallah	
21		Uf Kala Thach	Sindasli Nallah	
22		Uf Kala Thach	Petarli Nallah	

23		Uf Kala Thach	Jagatwani Nallah	
24		Uf kater Gad	Chuha Gad(Andhra River)	
25		UF Kater Gad	Rausi Nallah	
26		C.No60Dunna,C.No.58Pujarli,Uf pujarli	Dunna Nallah	
27		Uf Goskwari,Uf Kater Gad	Goskwari Nallah	
28		Uf Rokta	Rokta Khad	
29		Uf tangnu	Sundru Khad	
30		Uf Dayara ,Litham	Chandernahan Lake(Pabber River)	
31		Uf Devidhar	Shindi nallah	
32		UF Banoti.Udru	Kandra Gaad	Treated
33		Uf Banoti,udru	Kudi Gaad	Treated
34		Uf Shetyani	Shetyani Khad	
35		Uf Dumerera	Maida Gaad	
36		Uf Deoban	Kundi Gaad	
37		Uf mathla	Mathla Khad	
38		UF kolcha	Kolcha Nallah	
39		Uf Thali	Octa nallah	Treated
40		UF Thali	Chaicha Nallah	Treated
41		UF Thana	Thana Nallah	
42		Uf shagli	Todsa khad	Treated
43		Uf29 Devidhar	Devidhar Khad	

44		UF Shirolu	Khatlu Gad	
45		UF Shirolu	Kanchi Gad	
46		UF Nandla	Nandla Khad	
47		UF Jhalwari	Jhalwari Nallah	
48		UF Riot	Koti Gad	
49		UF Kutra	Kolcha Gad	
50		Uf Darigad	Dubhi Nallah	
51		Uf Darigad	Darigad nallah	
52		C.No.72a Kharshali	Roop Nallah	
53		C.no.70 1,11,111Mungal Janki	Gumnalti Gad	
54		UF Barshil	Jyoti Chad	
55		UF Pokhar	Dush Gad	
56		UF Pokhar	Sundaru Khad	
57		Uf Shardgad	Nallah	
58		C.No.67a Ambot	Ambot nallah	
59		C.No67bDiudi	Gartu Gad Diudi Nallah	
60		Uf Diudi	Bastani nallah	
61		Uf Tangnu	Tangnu Nallah	Treated
1	Jubbal	DPF Jachli	Jachli Nallah	No
2		UF Ori	Ori Nallah	No
3		UF Snaba	Geltu Khad	No
4		DPF Giri 5c	Giri Ganga Khad	Yes
5		Giri 3b, Giri Part -I	Bhagoli Nallah	No

6		Giri 2c, Giri 3a, UPF Sundli	Sundli Nallah	No
7		UPF Kyari	Guntu Nallah	No
8		UPF Shari	Shari Nallah	No
9		DPF Rampuri	Rampuri Nallah	No
10		13a Ganganagar	Baim Nallah	No
11		10 b Shallan	Siriya Nallah	Yes
12		13 b Ganganagar	Grindi Nallah	
13		18 a Mandhol, 18b Sari	Chirog Nallah	Yes
14		C.No. 18 B Sari	Jharag Nallah	No
15		C.No. 17 Brall	Badholi Nallah	No
16		DPF Badhal	Bannana Khad	No
17		UPF Badhal	Berli Nallah	No
18		Muril I	Muril Nallah	Yes
19		Muril II	Muril Nallah- 2	No
20		Muril III	Nallah- 3	No
21		UPF Kelvi	Kelvi Khad	No
22		UPF Badhal		No
23		UPF Deem	Deem Nallah	No
24		UF Jhalri	Jhalri Nallah	No
25		UF Jachli, UF Snaba	Baina Nallah	No
1.	Rohru	C .No. 82 a , C .No 83 c ii	Hingwala Nallah	Treated
2.	Rohru	C .No .82 a	Rangdoor Nallah	Treated
3.	Rohru	C .No. 82 b	Devali khad	Treated
4.	Rohru	UPF -53,	Pakhali Khad	Treated

5.	Rohru	C .No.82 a	Pakhal khad	No
6.	Rohru	UPF-54	Shaltru Nallah	No
7.	Rohru	C .No.82 a	Naltu Nallah	No
8.	Rohru	C .No. 82 a	Dunga Nallah	No
9.	Rohru	UPF-53	Gawas Nallah	No
10.	Rohru	C No.82 a, UPF -54	Shelapani Nallah	No
11.	Rohru	C.No.82 b	Stream Gawas baodi	No
12.	Rohru	C .No. 83 a ,	Mastot Nallah	treated
13.	Rohru	C .No .83 b(i)	Naser Nallah	Treated
14.	Rohru	C .No. 82 a	Hingwala Nallah	Treated
15.	Rohru	C .No. 83 b(iii)	Sanji Nallah	No
16.	Rohru	C.No.83 b(ii)	Jalodi Nallah	No
17.	Rohru	C.No.83 a, C.No.83 c (ii)	Baghi Nallah	No
18.	Rohru	C .No .83 b(iii)	Dabari Nallah	No
19.	Rohru	C .No .83 a	Strem Mastot Baodi	No
20.	Rohru	UPF - Munakdhar	Samoli Nallah	Yes
21.	Rohru	UPF - Baggi	Baggi Nallah	Yes
22.	Rohru	UPF - Munakhdhar	Sanji Nallah	No
23.	Rohru	UPF - chiuni	Chiuni Nallah	No
24.	Rohru	UPF - Chiuni	Bakhirna Nallah	Yes
25.	Rohru	C.No. 84 a parsa	Parsa Nallah	No
26.	Rohru	C. No. 84 c (i)	Sidroti Nallah	Yes
27.	Rohru	C. No. 84 c (i)	Pajigad Nallah	No
28.	Rohru	C. No. 84 c (ii)	Chupari Nallah	Yes

29.	Rohru	C. No. 85 a shakhal	Shamli khad	No
30.	Rohru	C. No. 85 a shakhal	Naltu Nallah	No
31.	Rohru	UPF - Diwari	Diwari Nallah	No
32.	Rohru	Shakli	Krai Nallah	No
33.	Rohru	Bhamnoli	Bhamnoli Nallah	Yes
34.	Rohru	Kui	Zarkot Nallah	No
35.	Rohru	UF Badi	Kanewarti Khad	Nil
36.	Rohru	UF Badi	Gahi Nal	Nil
37.	Rohru	C.No 50b	Jagothi Nala	2019-2020 Creat wire check dam &check wall
38.	Rohru	UF15 bhooth	Sah nail	Nil
39.	Rohru	UF16 Bhooth	Khiladgi nala	Nil
40.	Rohru	C.No49a Khanola	Mohnal	Nil
41.	Rohru	Banot Nala	Banot Nala	Nil
42.	Rohru	Basana ki Bai	Basana ki Bai	Nil
43.	Rohru	C.No47a	Seri Nala	Nil
44.	Rohru	UF Dungsa	Dungsa Nala Thirku Nala	Nil Nil
45.	Rohru	47d(ii)	Ambala Nala	Nil
46.	Rohru	48a(i)	Nallu	Nil
47.	Rohru	48a(ii)	Dibber Nalla	Nil
48.	Rohru	48b(iv)	Jallatu Nalla	Nil

49.	Rohru	C .No. 55 a	BhamburyNallah	2020-2021 Check wall
50.	Rohru	C .No .55 b	Rantari Nallah	No
51.	Rohru	UPF -Kundrala	Kundra Nallah	No
52.	Rohru	UPF -Majani	Majani Nallah	2019-2020 Check Dam
53.	Rohru	UPF Bijori	Bijori Nallah	2021-2022 brushwood
54.	Rohru	UPF-Jakhar	Didighar Nallah	No
55.	Rohru	UPF-Jakhar	Kutu khad	No
56.	Rohru	UPF -Bijori	Bijori Nallah	2020-2021 Check dam Check Wall
57.	Rohru	UPF Bhamnala	Bhamnala Nallah	Nil
58.	Rohru	UPF-19	Bhida Nalla	Nil
59.	Rohru	UPF 20	Bhida Nallah	Nil
60.	Rohru	C.No.53 a Kutara	Kutara Nallah	Nil
61.	Rohru	C.No.54 a	Buthara Nalla	WHS has been treated during the year 2021 - 2022
62.	Rohru	C.No.53 b(i)	GawnaNalla	Nil
63.	Rohru	UPF 22(a)	Dyarmoli Nalla	Nil
64.	Rohru	UPF Kenewra	Kenewra Nalla	Nil
65.	Rohru	C.No.46a(iii)	Kangari Nalla	Nil
66.	Rohru	C.No.45 b(i)	Bhaloon	Nil
67.	Rohru	C.No.45 (a)	Bajanjwal Nalla	Nil
68.	Rohru	C.No.45 b(ii)	Gari Nala	Nil

69.	Rohru	C.No.45 b(ii)	Bhooth Nalla	Nil
70.	Rohru	C.No.45 a(i)	Anui Nalla	Nil
71.	Rohru	C.No.46 a(ii)	Deor Nalla	Nil
72.	Rohru	C.No.45 b(i)	Bada Nalla	Nil
73.	Rohru	UPF Shari Thach	Bhashri Thach	Nil
74.	Rohru	C.No.44	Jaunli Khad	Nil
75.	Rohru	C.No.45 b(i)	Tikri Khad	Nil
76.	Rohru	UPF 43	Wali Nala	Nil
77.	Rohru	C.No.43 b	Thai Gard Nala	Nil
78.	Rohru	C.No.46 a(ii)	Char Nala	Nil
1.	Bashla	C.No.35b Karagad	Palkan Nallah	Not Treated
2.		C.No. 34 Sharog	Sharog Nallah	Water Harvesting Structure during Year 2020-21
3.		U.P.F. 12 Ferly	Ferly Nallah	Constructed Check Dam during Year 2023-24
4.		Tandali Panvi	Tandali Nallah/Dogra Khad	Constructed Create Wire During Year 2023-24
5.		U.P.F. 12 Ferly	Mehandali Nallah	C/O Check wall at Mehandali Khad during year 2022-23
6.		U.P.F. 12 Ferly	Saragori Nallah	C/O Dry Stone Check wall at Saragori

				Nallah during year 2022-23
7.		U.P.F. 12 Ferly	Bahali Nallah	C/O Dry Check Dam at Bahali Nallah during year 2022-23
8.		U.P.F. 12 Ferly	Khatli Nallah	C/O Check wall at Khatli Nallah during year 2022-23
9.		U.P.F. 12 Ferly	Shangla Pani Nallah	C/O Create wall at Shangla Pani Nallah during year 2022-23
10.		C.No.32 a	Ghursu Nallah	Constructed Check Dam during Year 2022-23
11.		C.No.33a & C.No.33b	Brasali Nallah	Not Treated
12.		C.No.32 a	Batari Nallah	C/O Check Dam in Batari Nallah during year 2022-23
13.		C.No.32a & b	Arhal Nallah	C/O Check wall at Arhal Nallah during year 2022-23
14.		UF- 9 Malkhoon	Dandigad Nallah	Not Treated
15.		C.No. 30d Malkhoon	Malkhoon Nallah	Not Treated

16.		C.No.30a Bhalara	Shanwali Nallah	Not Treated
17.		C.No.31a(i)	Baloun Nallah	Not Treated
18.		C.No.31a(vi)	Jhaltu Nallah	C/O Dry Check Dam in Jhaltu Nallah during year 2022-23
19.		C.No.31a(ii)	Dhai Nallah	Not Treated
20.		C.No.28b	Khoruwad Nallah (Bajeshal Nallah)	Constructed Dry Check Dam during Year 2022-23
21.		C.No.29a	Sukhdei Nallah(Khadrala Nallah)	Constructed Check Walls during Year 2022-23 and Year 2023-24
22.		C.No.29a	Pidhi Nallah	Not Treated
23.		C.No.29b Khangteri	Chauhnal Nallah	Not Treated
24.		C.No.29c Kakoi Basa	Sharigad Khad	C/O Check wall in Sharigad during year 2018-19
25.		C.No.29c Kakoi Basa	Kakoi Nallah	Not Treated
26.		C.No.29d Khangteri	Dogra Khad	Not Treated
27.		UPF-8 Bashuni	Bashuni Khad	Not Treated
28.		C.No.41(a) Kewli	Khadela Nallah	Not Treated
29.		C.No.41(b) Kewli	Panikhech Nallah	Not Treated
30.		C.No.41(c) Kewli	Kewli Khad	Not Treated

31.		C.No.41(c) Kewli	Kuhal Khad	Not Treated
32.		C.No.28(a) Bajeshal	Gauni Nallah	Not Treated
33.		UPF- Pagas	Pagas Khad	Not Treated
34.		UPF-7 Pekhadhar	Pagas Khad	Not Treated
1	Tikkar	UF Field Bag	Bag Nalah	No
2	do...	UF Tangri	Tangri Nalha	No
3	do...	C.No -9 a Karchari	Taloti Nalha	No
4	do...	C.No -21 Friunkoti	Gadari Nalha	No
5	do...	UF Koti	Maddi Nalha	No
6	do...	C.No -21	Jakha Nalha	No
7	do...	C.No -22	Koti Nalha	No
8	do...	C.No 20 b (i)	Jagterly Nalha	No
9	do...	UF Harshal Tibba	Madden Puri Nalha	Yes
10	do...	C.No-6 b Tikkar	Hanstari Nalha	No
11	do...	UF Dharal	Dharal Nalha	No
12	do...	UF Seri Bada Khad	Seri Nalha	No
13	do...	C.No -5 b Dhanoti	Khalawan Khad	No
14	do...	C.No -5 a Dhanoti	Dhanoti Nalha	No
15	do...	UF Lambidhar	Lambidhar Nalha	No
16	do...	C.No -5 Hanstari	Khotu Nalha	No
17	do...	UF Sholdu	Sholdu Nalha	No
18	do...	UF Jarla	Jarla Nalha	No
19	do...	UF TutuPani	Tutupani Khad	No
20	do...	C.No 26 Kadiwan	Kadiwan Khad	No

21	do...	C.No -27 a (i)	Kuthari Nalha	No
22	do...	C.No-25 Khalgar	Ghasni Khad	No
1	D/Kawar	UPF Pishgad and DPF Pandar	-	1
2		UPF Umrichgad	-	2
3		U.F. Kawar (Chaidhar Nalah)	-	3
4		U.F. Kawar (Katol Nalah)	-	4
1.	S/Nagar	C No 3 (a) Jond , C No 1& 2 Jond	Machi gad	-
2.		C No 3 (b) ,4 , 5 (a) Jond &2(a), 3 (a) C No 1 Baghain	Balai Khad	-
3		C No 3 ,4 Baghain & C No 3 (b) , 2(b)	Kaiti Khad	-
4.		C No 3 , 2(a) & 1 ,2 (a) Baghain & 2(a) ,1 C No 1 Jond	Kelvi khad	-
5.		DPF C No 3 Jakhi	Sheel Khad	-
6.		DPF C No 3 Jakhi	Pishol Khad	-
7.		RF Battar	Ballu kyari Nallah	-
8.		UPF Mungra	Sanail Nalla	-
9.		C No 1 Shashan	Huran Khad	-
10		C No 9a Shashan	Bhajgaon	-
11.		C No 1 C No,CNo 2a , CNo 2b Chhajpur & UPF Saillar	Garti Gad	Yes
12.		UPF Shallar . UPF Sanoli	Shadu Nalla	Yes
13.		UPF Malol -i & UPF Malog -ii	Badiyar Nalla	Yes
14.		DPF Sharan	Sharan Nalla	Yes
15.		DPF Sainj	Sainj Nalla	Yes
16		DPF Jakhi C No 2	Sheel Khad	-

17.		DPF Dhansar	Narkul Khad	-
18.		DPF Chauri	Santi Khad	-
19.		UPF Chauri	Pawar Riwer	-
20.		UPF Sawra	Sawra Nalla	-
21.		UPF Sarot	Sarot Nalla	-
22.		UPF Shirolu	Bholar Nalla	-
23.		DPF Dullu	Bhakan Nalla	-
24.		DPF Kayala	Bhakhrot Nalla	Yes
25.		UPF Shirolu	Jarla Nalla	Yes
26.		C.No. 14 Chhajpur	Nalia Nalla	Yes
27.		C.No. 13 a&b	Rest House Nalla	Yes
28.		UF Dharmana	Anti Khad	No

Table 14.4: List of Drainage lines in the tract

It is prescribed to avoid duplication of works in the current plan period and to prioritize with targeting of those streams or nallahs where no treatment has been done thus far and in which there is increasing chance of soil loss and water run off with a view to increase perennial character of these streams.

Chapter- 15

INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE (Overlapping) WORKING CIRCLE

15.1 Name of Working Circle: Infrastructure development and maintenance (overlapping) working circle.

15.2 General Constitution of Working Circle

This working circle has been constituted with the sole objective of improving and developing the infrastructure of the department including forest offices, buildings, staff quarters, inspection huts, check posts, forest roads, vehicles, communication infrastructure, electronic devices and other such necessary miscellaneous infrastructure. Considering the infrastructure requirement exists for the entire tract, it is prescribed that this working circle shall extend to the entire tract.

15.3 Special Objects of Management

The following are the special objects of management of this working circle:

- **Development of Residential Infrastructure:** The main objective of the working circle is to construct and maintain residential quarters of forest staff recognizing that the concerned forest guard and deputy ranger needs to work from the HQ of their concerned beat or block for effective protection.
- **Building capacity of Protection Infrastructure:** To enhance the network and capacity of protection infrastructure including anti poaching huts, check posts, inspection huts and other such necessary infrastructure
- **Enhance Electronic Infrastructure:** To invest in, procure and maintain necessary electronic infrastructure for forest monitoring, data collection, compilation of data, communication, recording and to execute office work.
- **Mobility Infrastructure:** To procure or hire services of mobility which are essential for forest protection, fire protection, monitoring and effectiveness evaluation.

15.4 Miscellaneous Prescriptions for Infrastructure Development

15.4.1 Residential Infrastructure Development

With growing road network, there is a tendency among forest guards and deputy rangers to reside in Rohru town and commute to their beats or blocks for duty. This tendency is dangerous and increases vulnerability of forests to illicit felling, timber smuggling, encroachment and other such offences. In this regard, there is a great need to develop residential infrastructure in the tract especially in sensitive and remote beats where the presence of forest guards and deputy rangers is essential in the HQs.

Sr.No	Name of Range	Name of Building	Year of Construction	Current Status	G.P.S Location
1.	Bashla	Range office-cum-RO. Residence Bashla	1985-86	Good Condition	31.224520 77.693070
2.		F.R.H Bashla	1929	Good Condition	31.225220 77.684657
3.		F.R.H Khadralla		Good Condition	31.1544 77.3743
4.		Block Office-cum-B.O. Arhal Residence at Rohru		Good Condition	31.199739 77.747785
5.		Block Office-cum-B.O. Bashla Residence at Bashla	1909-10	Bad Condition Need to construct new	31.224374 77.692675
6.		Forest Guard Hut Bashla	1909-10	Bad Condition Need to construct new	31.224278 77.692877

7.		Forest Guard Hut Arhal	1997-98	Bad Condition Need to construct new	31.213405 77.698261
8.		Forest Guard Hut Khadralla		Bad Condition Need to construct new	31.1542 77.3743
9.		Range Rest Room Khadralla	1910-11	Bad Condition Need to construct new	31.1542 77.3743
10.		Gang Hut Sharog	1998-99	Good Condition	31.197653 77.706396
11.		Mali Hut at Bashla Nursery	2022-23	Good Condition	31.223098 77.687792
12.		Chowkidar Hut at FRH Bashla		Good Condition	31.225262 77.684289
1		Van Thana Tikkar	2009-10	Building is in very bad condition having cracks. Not safe so demolition is recommended	N- 31°7'33.5" E 77°43'27.8"
2		I/Hut Tikkar	n/a	Required for maintt.	N- 31°11'21" E 77°37'19"

3	Tikkar	Fgd/ Hut Pujarli No-4	n/a	Required for maintt. not suitable for stay	N- 31°11'52" E -77°39'20"
4		FRH Pujarli No-4	n/a	Good condition	N- 31°11'47" E- 77°39'31"
5		Fgd/Hut Sharontha	2022-23	Good condition	N- 31°10'20" E -77°38'59"
6		Fgd /Hut Tikkar	n/a	Bad condition required for maintt.	N- 31°7'32.5" E 77°43'28.8"
7		Old Forest Range Office	n/a	Bad condition required for maintt.	N- 31°7'34.5" E 77°43'27.8"
1.	Saraswati Nagar	B.O. Office cum residence Kuddu	1993-94	Need repair	31.079726 N 77. 807043 E
2.		Fgd hut Kuddu	1985-86	Very poor condition	31.081497 N 77.80193 E
3.		Fgd hut Shashan	1962-63	Need repair	30°59'15" N 77°98'55" E
4.		Fgd hut Pandranu	1962-63	Serviceable	31°00'33" N 77° 44'53" E
5.		B.O. residence Pandranu	1992-93	Serviceable	31°00'33' N 77° 49' 52" E
6.		Gang hut	1999-2000	Serviceable	31°00'33' N 77° 49' 54" E
7.		SOP hut Pandranu	1975-76	Serviceable	31°00'33' N 77° 49' 54" E
8.		Inspection hut Jhalta	1989-90	Poor Condition	31°5'36' N 77° 49' 32" E
9.		Fgd hut Jhalta	1962-63	Poor Condition	31°5'38' N 77° 49' 36" E

10.		Fgd hut Dhansar	1991-92	Need repair	31*05'23" N 77* 50'34" E
11.		Fgd hut Sawra	1985-86	Serviceable	31*07'18" N 77* 45'11" E
12		B.O. QtrSawra	1991-92	Serviceable	31*07'19" N 77* 45'10" E
13		ACF residence / Range office Sawra	1992-93	Serviceable	31*07'22" N 77* 44'58 " E
14.		Fgd hut Mandal / B.O. Qtr Mandal	1962-63	Poor Condition	31*1171885 N 77* 7831683 E
15.		Inspection hut Mandal	1989-90	Serviceable	31*1172995 N 77* 7829711 E
16.		Chhajpur Rest House	1876	Serviceable	
17.		Fgd Hut Chhjpur		Serviceable	
18.		B.O. Residence Chhajpur		Serviceable	
1	Khashdhar	Range Office Chirgaon(Khashdhar)	1998-99 (Socail Forestry Building)	Good	31.1357.31"N 77.5209.85"E
2		B.O.QuaterChirgaon		Good	31.1357.02"N 77.5209.10"E
3		Gang Hut Chirgaon		Good	31.1357.01"N 77.5208.78"E
4		FRH Chirgaon	2015-16	Bad Condition (Damaged in Disaster)	31.1356.78"N 77.5207.42"E
5		Log Hut Mandli	1961-62	Good	31.1316"N

					77.5030"E
6		Inspection Hut Todsa	1963-64	Bad Condititon	31*15'49"N 77*49'29"E
7		FRH Ranol	2017-18	Good	31*17'49"N 77*50'03"E
8		Guard Hut Todsa	--	Bad Conditation	31*15'49"N 77*49'29"E
9		Inspection Hut Diswani	1996-97	Not Good (Need repaire)	31.113878"N 77.501581"E
10		Guard Hut Dalli	---	Not Good(Need Repaire)	31*11'58.93"N 77*51'10.68" E
11		Forest Rest House Khashdhar	1932-33	Good	31*13'10"N 77*52'45"E
12		Range Quarter Cum Office	1919-20	Good Conditation	31*13'09"N 77*52'44"E
13		Guard Hut Khashdhar	1919-20	Bad Condiatation	31*13'9"N 77*52'43"E
14		Rest House Larot	1946-47	Good Condiation	31.13592"N 77.504337"E
15		Guard Hut Larot	2004-05	Good Condiation	31.135929"N 77.504339"E
16		Inspection Hut Diudi	--	Not Good (Need Repaire)	31*29'11.00" N 77*99'47.00" E

17		Guard Hut Diudi	--	Not Good (Need Repaire)	31*29'11.00" N 77*99'47.00" E
18		FRH Bousari	1996-97	Not Good (Need Repaire)	31.1534.28"N 77.5642.92"E
19		Guard Hut Sindasli	---	Bad Condiation	31*16'03.75" N 77*56'35.41" E
1	Rohru	Old Rest House	1905	Good Condition	N 31 ⁰ .11'59" E 77 ⁰ .44'58"
2		Clerks Quarter for two Clerks near DFO office Rohru	1931-32	Good Condition	N 31 ⁰ .12'09" E 77 ⁰ .45'06"
3		Forest Guard Hut Kui	1941-42	Need to be repair	N 31 ⁰ .14'48" E 77 ⁰ .40'58"
4		Forest Guard Hut Summerkot	2019-2020	Good Condition	N 31 ⁰ .27'969" E 77 ⁰ .69'709"
5		BO Quarter Summerkot	2023-2024	Good Condition	N 31 ⁰ .28'19"7 E 77 ⁰ .69'766"
6		Inspection Hut Dalgaon	1947-1948	Good Condition	N 31 ⁰ .15'37" E 77 ⁰ .43'49"
7		DFO. Residence Rohru	1962-1964	Good Condition	N 31 ⁰ .12'04" E 77 ⁰ .44'56"
8		ACF Residence Rohru	1963-64	Good Condition	N 31 ⁰ .12'05" E 77 ⁰ .44'56"

9		Clerks Quarter for Four Clerks Near Rohru Range	1965-66	Good Condition	N 31°11'59" E 77°44'52"
10		Peons Quarter for 4 Peon Near Range office	1962-63	Good Condition	N 31°11'59" E 77°44'48"
11		Peons Quarter for 4 Peon Near DFO office	1966-67	Good Condition	N 31°12'08" E 77°45'08"
12		Range Quarter cum officer Rohru	1988-89	Good Condition	N 31°11'58" E 77°44'51"
13		BO Quarter Rohru	1988-89	Good Condition	N 31°11'58" E 77°44'51"
14		Forest Guard Hut Machoti		Need to be repair	N 31.240089 E 77.701948
15		Gange Hut Machoti	1999-2000	Need to be repair	N 31.249170" E 77.705493
16		New FRH Rohru	2020-21	Good Condition	N 31°11'59" E 77°44'58"
17		Super indent Residence Rohru	1942-43	Good Condition	N 31°12'09" E 77°45'07"
18		Division Office Rohru	1942-43	Good Condition	N 31°12'09" E 77°45'07"
19		Court Room Rohru	2022-23	Good Condition	N 31°12'09" E 77°45'06"
20		Timber Store	2022-23	Good Condition	N 31°11'59" E 77°44'50"
21		Forest Guard Hut Rantari	Not available	Bad Condition	N 31°13'41"

					E 77°46'11"
22		Forest Guard Hut Kutara	Not available	Bad Condition	N 31°15'47" E 77°44'30"
23		Mali Hut Gawna	2010-2011	Need to be repair	N 31°14'14" E 77°44'49"
24		Out House With DFO Residence Rohru	1970-71	Good Condition	N 31°12'03" E 77°44'56"
25		Out House With FRH Rohru	1963-64	Good Condition	N 31°12'00" E 77°44'58"
26		Central Store Rohru	2019-2020	Good Condition	N 31°11'58" E 77°44'52"
1.	Jubbal	DFO Inspection Hut Sheel	1944-45, 46-47	Need Repair	
2.		Forest Guard Hut Sheel	1946-47	Need full construction (missing)	
3.		Inspection Hut Muril	1958-59	Maintained	
4.		Range quarter cum Office Jubbal	1932	Need urgent repair	
5.		Peon Quarter Jubbal	1962-63	Need Repair	
6.		Forest Guard Hut K/pather	1963-64	Need Repair	31.122950 77.626401
7.		Mali hut Snaba	1971-72	Good	
8.		Forest Guard Hut Badhal	1979-80	Need Repair	
9.		Log Cabin Kharrapather	1986-87	Missing	
10.		Type II Qtr Jubbal	1986-87	Need Repair	

11.		Inspection Hut (Additional room) Sheel	1987-88	Need Repair	
12.		Typr II Qtr 2 set Jubbal	1991-92	Need Repair	
13.		Forest Guard Hut Mandhol	1988-89	Need Repair	
14.		Type II Qtr 2 set Jubbal	1991-92	Need Repair	
15.		FRH Kharapather	1994-95	Need Repair	
16.		BO Qtr Sheel	1995-96	Good	

Table 15.1 List of Buildings and their status in the tract

The following residential infrastructure is proposed to be newly constructed in the tract for purpose of forest protection:

Sr.No.	Name of Staff Quarters	Forest Range	Forest Beat/ Block/ Range
1	Forest Guard Hut (New)	Rohru	Ghrema
			Machoti
			Kutara
			Gawas
		Tikkar	Kadiwan
			Farog
		Bashla	Khangteri
			Kewli
		Khashdhar	Tangnu
			Banoti
			Jhaknoti
			Thalatar
		Jubbal	Forest staff Residential Complex for Jubbal Block at Old Jubbal

			Shallan
		Saraswati Nagar	Ravingarh
			Kawalta
2	Deputy Range Officer Quarter (New)	Rohru	Gawas
		Tikkar	Tikkar
		Bashla	Khadrala
		Khashdhar	Khashdhar
		Saraswati Nagar	Mandal
		DodraKawar	Jakha
3	Range Officer Residence	Tikkar	Tikkar

Table 15.2 List of Proposed Buildings in the tract

The following are the residential infrastructure which is required to be maintained/ repaired during the period of this plan:

Sr No.	Name of Range	Name of Building
1	Bashla	Block Office-cum- B.O. Bashla Residence at Bashla
2		Forest Guard Hut Bashla
3		Forest Guard Hut Arhal
4		Forest Guard Hut Khadralla
5		Range Rest Room Khadralla
6	Tikkar	Van Thana Tikkar
7		Inspection Hut Tikkar
8		Forest Guard Hut Pujarli No-4

9		Forest Guard Hut Tikkar
10	S Nagar	B.O. Office cum residence Kuddu
11		Forest Guard Hut Kuddu
12		Forest Guard Hut Shashan
13		Inspection hut Jhalta
14		Forest Guard Hut Jhalta
15		Forest Guard Hut Dhansar
16		Forest Guard Hut Mandal / B.O. Qtr Mandal
17	Khashdhar	Inspection Hut Todsa
18		Guard Hut Todsa
19		Inspection Hut Diswani
20		Guard Hut Dalli
21		Guard Hut Khashdhar
22		Inspection Hut Diudi
23		Guard Hut Diudi
24		FRH Bousari
25		Guard Hut Sindasli
26	Rohru	Forest Guard Hut Kui
27		Forest Guard Hut Machoti
28		Gange Hut Machoti
29		Forest Guard Hut Rantari
30		Forest Guard Hut Kutara

31		Mali Hut Gawna
32	Jubbal	DFO Inspection Hut Sheel
33		Range quarter cum Office Jubbal
34		Peon Quarter Jubbal
35		Forest Guard Hut K/pather
36		Forest Guard Hut Badhal
37		Type II Qtr Jubbal
38		Inspection Hut (Additional room) Sheel
39		Typr II Qtr 2 set Jubbal
40		Forest Guard Hut Mandhol
41		Type II Qtr 2 set Jubbal
42		FRH Kharapather
43	DodraKawar	Inspection Hut Dodra

Table 15.3 List of Buildings prescribed for maintenance in the tract

15.4.2 Protection Infrastructure Development

The protection infrastructure of the division is limited except for check post at Pandranoo in Saraswati Nagar Range, a timber shed in Rohru Range Office Premises and a dilapidated Van Thana in Tikkar Forest Range. In this regard, the following protection infrastructure is prescribed in terms of new construction and maintenance:

Sr.No.	Protection Infrastructure Proposed (Check Post/ Anti Poaching Camp/ Timber Shed)	Location Proposed	Remarks

1	Timber Shed at Tikkar	Range office premises	Will protect timber from deterioration
2	Check post at Kharrapather	Near FRH Kharrapther	To deter and detect offence particularly related to timber and NTFP smuggling
3	Check Post at Tikkari	Bi-Junction to Janglikh/ Larot	
4	Check Post at Sungri	Main Road Rohru-Rampur-Khadrala	
5	Check Post at Kansakoti	Road bifurcation to Kutara/ Machoti	
6	Timber Shed at Jubbal	Jubbal Range Office Premises	
7	Timber Shed at Chirgaon	Range office Premises	

Table 15.4 List of Proposed infrastructure in view of protection in the tract

In addition to the above, it is proposed to maintain the existing protection infrastructure including inspection huts, gang huts and forest rest houses in the tract periodically as per the requirement. It is prescribed to have check posts fitted with CCTV and Vehicle Number Capturing System in order to maintain electronic record of vehicles passed.

15.4.3 Field Survey and Monitoring Infrastructure Development

It is prescribed to build field survey and monitoring infrastructure as it is essential to monitor field works, collect data and digitize the executed field works. The following instruments/ devices are suggested and strongly prescribed to be possessed in the field for executing forest protection and wildlife monitoring works:

1. **GPS Positioning Devices:** The GPS devices are part of everyday routine work of field level functionaries in which the location of forest, boundary pillars, mapping polygon of plantations, nurseries, diversion proposal.
2. **Camera Traps:** It is prescribed that every field forest guard shall have camera traps assigned to them for wildlife survey and monitoring. The GSM based camera traps are suggested for large areas where mobile network is available as it can also provide real time information on movement of hunters/ poachers.
3. **Fire Blowers:** It is an essential instrument of fire fighting especially in grasslands, panwis and pine forests with fuel load. Currently, 2 forest ranges in the division are having fire blowers. It is strongly prescribed to procure fire blowers for every fire vulnerable block in the division.
4. **Measurement Instruments:** The measurement of timber logs, standing trees and other such forest produce is essential. In this regard, measuring scales, weighing scales, measuring tape, calipers and other miscellaneous measuring instruments.
5. **Wildlife Rescue Kit:** The prescriptions in this regard are given in the wildlife working circle. In this context, a wildlife rescue kit containing essential items including trap cage, transportation cage, tranquilization equipment, veterinary medicines, snares, snake hook, multi purpose tools etc.
6. **Search Light and Torches** for conducting night raids and nakkas
7. **Wireless Communication Devices/ Walkie Talkies** for communication purpose
8. **Smart Sticks** for self protection and patrolling purpose
9. **Body Protection Gear** for use in human wildlife conflict and fire fighting scenarios

15.4.4 Office Infrastructure Development

The current status of electronic infrastructure is highly inadequate in the current situation and requires to be upgraded in both forest range and division offices. The following are the essential electronic office infrastructure which is required to be installed in the division and range office:

Sr.No.	Name of Office	Electronic Infrastructure Required (Computer/ Laptop/	Number

		Printer/ Scanner/ Any other electronic devices)	
1	Range Office Rohru	Computer	2 Nos.
		Printer/ Scanners	2 Nos.
		CCTV Cameras	3 Nos.
2	Range Office Jubbal	Computers	2 Nos.
		Printer/ Scanners	3 Nos.
		CC TV Cameras	3 Nos.
3	Range Office Saraswati Nagar	Computers	2 Nos.
		Printer/ Scanners	3 Nos.
		CCTV Cameras	3 Nos.
4	Range office Bashla	Computers	2 Nos.
		Printer/ Scanners	2 Nos.
		CCTV Cameras	3 Nos.
5	Range office Khashdhar	Computers	2 Nos.
		Printer/ Scanners	2 Nos.
		CCTV Cameras	3 Nos.
6	Range office Tikkar	Computers	2 Nos.
		Printer/ Scanners	2 Nos.
		CCTV Cameras	3 Nos.
7	Range office DodraKawar	Computer	2 Nos.
		Printer/ Scanners	2 Nos.

		CCTV Cameras	3 Nos.
8	Division office Rohru	Computers	5 Nos.
		Laptops	2 Nos.
		Printer/ Scanners	3 Nos.
		CCTV cameras	5 Nos.

Table 15.5 List of essential electronic infrastructure required for Division

15.4.5 Mobility Infrastructure Development

There is an urgent need of mobility in the tract given the forest ranges are distributed far and wide and the area is hilly and remote in nature. The road network in the tract has come up at breakneck speed and in order to utilize the same, mobility is much required for Field functionaries and Division Level. The externally aided JICA (FBL and FES) Project has been a great boon in this regard due to which 4 forest ranges have received mobility services in the past 5 years. However, there is a need to provide vehicle and mobility services to every range officer and to the divisional forest officer in order to enable efficient patrolling, protection, regulation of forest diversion and all such field level activities.

CHAPTER 16

GENERAL FINANCIAL FORECAST & FINANCIAL PLAN OF OPERATION

16.1 General: The costs and prices are influenced by market forces and depend on supply and demand. It further depends on the principles of management and pattern of exploitation adopted from time to time. Therefore, it is not possible to estimate with reasonable accuracy the expenditure and revenue during the period of this working plan. The estimates given below are based on the current prices of various items of forest produce and the cost involved in carrying out the prescriptions of the plan at current rates.

16.2 Past Revenue and Expenditure: The details of past revenue and expenditure have been given in the following table 16.1.

Year	Revenue (Rs.)	Expenditure	Deficit (Rs.)
2015-16	2837004	707000	
2016-17	5356568	9782600	4426032
2017-18	2940242	13599952	10659710
2018-19	1939241	9998250	8059009
2019-20	909993	91435545	90525552
2020-21	206564	113051392	112844828
2021-22	6209549	24544617	18335068
2022-23	10643846	134914063	124270217
2023-24	6054073	13549291	7495218
Gr. Total	38919241	411582710	374485630

Table 16.1: Detail of Past Revenue and Expenditure in Last 10 years

Table 16.1: Past revenue & expenditure from 2014-15 to 2023-24 in Rohru Forest Division

The revenue amounting to **Rs. 255206652 /-** has been recovered and deposited in account of HOD, HP Forest Dept. from HPSFDC on account of royalty of timber of salvage trees during last 10 years under the revenue head '101-01 Timber & other Forest Produce removed from forest by Govt.

16.2: Projected Revenue details for 2025-26 (excluding Working circles prescriptions):

Sr No	Source of revenue	Projected revenue for the 2026-27
1	101-Sale of timber & other Forest produce	
2	01-Timber & other Forest Produce removed from forest by Govt.	275000
3	02-Timber and other forest produce removed form forest by consumer purchaser by HPSFC	0
4	03-Drift & waif wood.	25000
5	04 Other Forest produce removed from forest by govt. Contractors	0
6	05-Sale of timber and other forest produce removed from forest other than HPSFC	0
7	06-Minor Forest Produce including medicinal plants.	100000
8	07-Grazing and Grass	5000
9	08. Receipt from penalties and Damage bills	500000
10	09. Receipt from sale of trees to right holders .	500000
11	10.Compensation under section 68 of Indian Forest Act	1000000
12	11.Receipt from Export permit fee	5000
13	12. Receipt from their departments to corporation Foreststation	0
14	13. Receipt from forests not management by Govt.	0
15	14. Receipt from penalties and Damage bills etc from HPSFC .	20000
16	15. Receipt from Distribution of Seedlings	0
18	102-Receipts from social and Farm Forestries	

19	01 - Receipt from Registration fees	30000
20	02- Receipt from forest societies	0
22	other forest produce	
23	800-Other receipt	
24	04-Receipt from rent of building	110000
25	05.Registration fee MFP	0
26	10-Miscellaneous(Seized timber).	200000
27	18-Miscellaneous receipt.	500000
29	801-Interest or other earnings fro Grantee on unspent balance	
30	02 interest accrued on Non SNA Bank account	200000
32	01. Interest or state share of centrally sponsored scheme	0
33	800 Other receipt	
34	02. Entry fee fro Zoos/park	0
35	801- Interest or other earning from grant on unspent balance	
36	01. Interest or other earnings from grant on unspent balance	0
38	Total Projected -Revenue	76,65,000

Table 16.2: Projected Revenue for the next financial year

The approximate amount of timber royalty from Salvage trees is estimated at **Rs. 250000** This will be generated as revenue under revenue head '101-01-Timber & other Forest Produce removed from forest by Govt. and shall be deposited in the account of HOD, HP Forest Department.

16.3: In this Working Plan there is harvesting prescription for Deodar/Kail, Fir Spruce & Chil working circles.

Working circle	Revenue (Rs.)	Expenditure (Rs.)	PROFIT (Rs.)
Deodar Kail	1270797		
Fir Spruce	1220032		
Chil	2298		
Total	2493122		

Table 16.3: Annual Revenue & Expenditure anticipated for FY 2025-26 for Working Circles

Expenditure details include – Material & Supply (Barbed wire fencing, Paint), Manpower (Wages as per scheduled rates of Rs. **400** per day), Vehicle for works, SMC measures, Research & Miscellaneous.

Revenue details: Basis prescribed yield and auction thereof by HP Forest Corporation (Deodar: Assuming Rs. 34718 market rate per cubic m for timber and 60% conversion excluding fuelwood, Kail Assuming Rs. 24358 market rate per cubic m for timber and 60% conversion excluding fuelwood; Fir/Spruce: Assuming Rs. 12352 market rate per cubic m for timber and 60% conversion excluding fuelwood).

16.4 Other Future Expenditure:

Average expenditure basis APO projected for 2025-26

Item	Qty	Rate (in Rs.)	Estimated expenditure projected for 2025-26(Rs.)
Plantation and regeneration			
Plantation and regeneration	60 HA	52000	31,20,000
Maintenance of plantation	414 HA		18,79,100
Cost for maintenance of Nurseries	498560 PLANTS		47,03,050
Protection Working Circle			
Cost for implementing the protection plan			
Roads and Bridges	15 Kmts		15,00,000
Intensive protection measures including patrolling, staff mobilizing etc.			5,00,000
Maintenance of Boundary Pillars (large)	500 Nos	5700/- per B/P	28,50,000
Soil & Water Conservation & other Engineering measures	25 Nos	1/s	25,00,000
Wildlife & Biodiversity Conservation WC			
Establishment of anti-wildlife depredation unit & patrolling vehicle			5,00,000

Construction & maintenance of Road		L/S	2,00,000
Eco tourism activities		L/S	30,0000
Scientific Studies, Monitoring			
Patrolling, monitoring etc.	4x2		5,00,000
Training of staff including exposure visit			
JICA			
Total estimated expenditure:		2 crore	

Table 16.4: Average expenditure basis APO projected for 2025-26

Table 16.5 Salary Expenditure:

Sr. No.	Name and Designation	Pay Band		Pay in Pay band	Rate of increment	Amount of increment	Amount Pay	DA	CA	HR A	Capital Allowance	Other Allowance	G.Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14
2406-Forest and Wild life Non Plan Scheme													
1	DFO (Sanctioned post-1)	56100-177500	74000	888000	0	0	888000	488400	2400	0	0	0	1378800
2	ACF (Sanctioned post-2)			0		0	0	0.0					
3	Supdt. (Sanctioned post-1)	43000-136000	67000	804000	0	0	804000	337680	2400	7200	0	0	1151280
4	Sr. Asstt. (Sanctioned post-3)	38100-120400	47400	237000	1400	7000	244000	99540.0	1000	0	0	500	345040.0
5	Forest Ranger (Sanctioned post-8) (present 3)	43000-136000	184000	1467000	3400	4600	1471600	616140.0	5200	8400	0	3500	2104840.0
6	Deputy Ranger (Sanctioned post-25)	38100-120400	654000	7848000	19000	100000	7948000	3296160.0	32640	67200	0	10560	11354560.0
7	Forest Guard (Sanctioned post-75)	21300-67800	2187700	26252400	45400	214100	26466500	11026008.0	166560	211200	0	125240	37995508.0
8	Jr. Asstt/Clerk	20200-64000	164200	1970400	2000	10000	1980400	827568.0	12000	0	0	0	2819968.0

	(Sanctioned post-6)												
9	Driver (Sanctioned post-1)		449 00	5388 00	1300	7800	5466 00	22629 6.0	240 0	0	0	1560 0	790896.0
10	Mali (Sanctioned post-7)	18000- 56900	101 200	1214 400	1600	7500	1221 900	51004 8.0	960 0	132 00	0	9120	1763868.0
11	Muleman /Syce (Sanctioned post-1)	18000- 56900	242 00	2904 00	700	2100	2925 00	12196 8.0	240 0	0	0	2280	419148.0
12	Sweeper (Sanctioned post-2)	18000- 56900	519 00	6228 00	0	0	6228 00	26157 6.0	240 0	0	0	3480	890256.0
13	Peon (Sanctioned post-13)	18000- 56900	110 900	1330 800	3100	17000	1347 800	55893 6.0	960 0	0	0	9120	1925456.0
14	Chowkidar (Sanctioned post-6)	18000- 56900	149 200	1790 400	3500	19000	1809 400	75196 8.0	144 00	300 0	0	1848 0	2597248.0
15	Dak Runner (sanctioned post-1)	vacant											
16	Naib/Tehsildar/Kanungo (sanctioned post-1)	vacant											
17	Patwari (Sanctioned post-1)	vacant											
18	Forest worker (Sanctioned post-38)	18000- 56900	479 700	5756 400	13900	71300	5827 700	24176 88.0	528 00	468 00	0	3792 0	8382908.0
19	MPW (Sanctioned Post-2)	18000- 56900	129 000	1548 000	3600	3600	1551 600	65016 0.0	144 00	900 0	0	1368 0	2238840.0
20	Total 115												76158616.0

Table 16.6 Medical, Uniform and Liveries: - The expenditure on medical, uniform and liveries can best be worked out on the basis of last three years experiences as tabulated below: -

Item					Total (Rs.)	Average (Rs.)
	2021-22	2022-23	2023-24	2024-25		
Salary	743376267	92944517	86963819	84913218	1008197821	336065940
Medical	1056300	1235000	945980	1670500	4907780	1635926
Livery	0	200000	82500	817500	110000	366666

16.7: Cost of the Preparation of the Working Plan: The actual expenditure incurred on the preparation of this Working Plan during 2022-23 to 2024-25 is given in table 16.7.1

Table 16.7.1: Showing the cost of preparation of the working plan Details

Expenditure incurred during financial year in Rs.				
	2022-23	2023-24	2024-25	Total
Other expenditure (Field data collection from sample points, plantation survey, boundary survey, socioeconomic survey, encroachment survey for the forest areas of 2000 ha and travel cost of forest staff)	958168	0	0	958168
ONGOING: Miscellaneous expenses for printing, stationary, binding, pending liability of vehicle used for final ground-trothing in silviculture areas for Working Plan	236474	0	0	236474
Total	1194642	0	0	1194642

16.8 Possible Funding Agencies: Normally the forestry activities are funded through various schemes under District, State & Central sector. In the state, the district & state sector schemes include:

Table 16.8 showing the funding sources

S. No	Funding Agency	Schemes involved	Nature of works
1.	Ministry of Forest & Environment,	Campa (NPV, CA) Schemes	Miscellaneous (Plantation, Soil Conservation work, Wild life conservation, Raising of nursery, Lantana Eradication,

	Government of India		infrastructure work in Forest area, development of degraded forest area, Biodiversity etc.)
2	Ministry of Forest & Environment, Government of India	CSS Scheme	a) Forest Fire Control and Management Scheme. b) Human conflict with elephant project.
3	Government of Himachal Pradesh	Samudayik Van Samvardhan Yojana	Community based forestry works (Plantation, Soil Conservation work, lantana eradication etc.) in forest area.
4	Government of Himachal Pradesh	Ek Buta Beti ke name Scheme	Distribution of 5 plants with Kit to each newly born girl-child
5	Forest Department, Himachal Pradesh.	Forestry developmental work	Buildings, Roads, Silvicultural operations, marking, etc.
6.	HP Tourism Department	Nayi Rahein Nayi Manzilein	Sirmaur Van Vihar creation
7.	HP Pollution Control Board	National Clean Air Programme	Yamuna Van Vihar, Yamuna Riverfront (ongoing)
8.	JICA	Project for Improvement of HP Forest Ecosystem Management & Livelihoods	Afforestation, community development and livelihood initiatives.
9.	Government of Himachal Pradesh	Mukhya Mantri Van Vistar Yojna	Afforestation

16.10 Prioritization of works: All the works prescribed in this plan are important for effective forest management. Hence, funds should be made available to carry out all the prescriptions prescribed for the sustainable management of the forest. However, scarcity of financial allocation is often felt while working plan prescriptions are followed in the division. Therefore, priority of works has been fixed to guide DFO while preparing annual budget

& sending his demand. It is also suggested that DFO should carry out top priority works with the available budget:

16.10 Table showing the priority of works

Priority	Nature of works to be carried out
I	Consolidation and demarcation of Forests including construction and maintenance of Boundary Pillars
II	Encroachment Eviction and Rehabilitation of Encroachment evicted Forest Lands
III	Forest Protection i.e. protection from forest fire, illicit felling, Mining and illegal road development etc
IV	Silviculture operations, Afforestation and ANR
V	Wildlife and Bio Diversity Conservation
VI	Construction and Maintenance of buildings & other infrastructure (Nursery etc.) in the Division
VII	Soil & Water Conservation works
VIII	Community based schemes,
IX	Strengthening the knowledge of field staff by imparting training & exposure visits
X	Misc. Eco Tourism Works

Chapter-17

SCIENCE AND RESEARCH

17.1 Preservation Plots

The need of preservation plots are to study the variation in forest types and their progression towards climax stage in the long term. It is also helpful to understand the effect of climate change in the tract and the variation brought about in the vegetation owing to climate change. In order to have a broad understanding of the progression of various forest types and how they fare in the future, it is proposed to have undisturbed preservation plots of 0.5 Ha area in the following forests:

Sr.No.	Name of Forest	Geo Coordinates of Centre of Plot
1	DPF 15 b Badrol	31.137918° 77.684868°
2	DPF NaltiThach	31.198322° 77.966965°
3	RF Batar	31.092496° 77.787795°
4	DPF Amrich Gad	31.285848° 78.162818°

Table 17.1: Preservation Plots Prescribed in the Tract

17.2 Sample Plot

The sample plots utilized for data collection in the run up to the preparation of this plan is prescribed to be utilized for periodical collection of data. The detailed list of sample points mentioning the geo coordinates along with the forest name and forest blocks are mentioned in the Volume 2 of the plan. It is prescribed to collect data from these plots periodically.

17.3 Regeneration Plot

There is a great need to lay regeneration plots in the tract and collect data on seedlings, saplings and established regeneration. The regeneration plots are already incorporated in the sample plot which is listed in the Volume 2 of the plan.

17.4 NTFP Plot

The tract is home to a wide variety of NTFPs which are high volume traded species which need to be monitored. It is recommended to lay 3x3 meter plot in

NTFP rich areas and experiment the safe harvesting limit by harvesting 100%, 75%, 50% and 25% of marketable parts within the plot and subsequently recording the regeneration of NTFPs to work out the optimum utilization of NTFPs. The plots shall be visited every year.

17.5 List of References

The list of research articles/ findings used for the preparation of the plan is detailed below:

- Antinori, C. and Bray, D.B. (2005). "Community forest enterprises as entrepreneurial firms: economic and institutional perspectives from Mexico," *World Development* 33 (9), pp. 1529-1543.
- Barrow, E. and Murphree, M. (2001). "Community conservation: from concept to practice," pp. 24-37, in Hulme, D. and Murphree, M. (eds.) *African Wildlife & Livelihoods: the promise & performance of community conservation*. James Currey, Oxford.
- Chambers, R. (1983). *Rural Development: putting the last first*. Longman Scientific & Technical, Harlow.
- Champion, H.G. & Seth, S.K. (1968). *Forest Types of India*, FRI, 1968.
- Chapela, I.H. (2000). "Global bodies won't save the environment: it needs grassroots efforts ...," *Nature*, 403, 13 January, p. 129.
- Chhatre, A., 2003. 'The mirage of permanent boundaries: Politics of forest reservation in the western Himalayas', *Conservation and Society*, vol. 1, no 1: 137-163.
- IIFM (2014). National sets of Criteria and Indicators for sustainable management of natural forests in India, IIFM, Bhopal India: *Ministry of Environment, Forest & Climate Change, GOI, New Delhi*.
- Manoj K., M.P. Singh, H. Singh, P.M. Dhakate and N.H. Ravindernathan (2020). Forest Working Plan for the sustainable management of forest and Biodiversity in India. *Journal of Sustainable Forestry* NWPC (2014). National Working Plan Code-2014 (for sustainable management of forests and biodiversity). *Ministry of Environment, Forest & Climate Change, GOI, New Delhi*.

- Mohan, G. (2001). "Beyond participation: strategies for deeper empowerment," pp. 153-167, in Cooke, B. and Kothari, U. (eds.) Participation: the new tyranny? Zed Books, London and New York.
- National Centers for Environmental Information NOAA/NESDIS E/NE SSMC3, 4th Floor 1315 East-West Highway Silver Spring, MD 20910-3282
- O'Riordan and Stoll-Kleemann, 2002; Barrow and Murphree, 2001, p. 28; Mohan, 2001; Antinori and Bray, 2005; Chapela 2000, p. 129.
- Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Biodiversity Synthesis World
- Yao, R.; Hock, B.; Harrison, D.; Hall, P.; Baillie, B.; Evanson, T. (2017). Analysis of Setback Options and Harvesting Implications for Forestry in The Marlborough Sounds; Scion: Torrance, CA, USA: 52.
- Preliminary Working Plan Report of Rohru Forest Division
- Working Plan of Rohru and Jubbal Forest Division by Ajay Srivastava I.F.S
- Working Plan for Paonta Sahib Forest Division by Aishwarya Raj I.F.S
- Principles and Practices of Silviculture by L.S.Khanna

It is to be noted that there is a huge vacuum of data in the tract when it comes to studying biodiversity, wildlife and water shed data which is the need of the hour. In order to address the gaps, it is strongly prescribed to conduct periodical research and surveys in the tract so that at least a solid baseline data can be developed aiding in the data driven management of the tract.

Chapter-18

MISCELLANEOUS REGULATIONS

This chapter shall deal with miscellaneous regulations in the tract dealing with the removal and utilization of various forest produce including timber and the use of forest land in terms of natural resource management considering the needs of right holders and development works.

18.1 Petty Felling

Felling of petty nature include felling for bonafide utilization and dry/ uprooted trees. All removals of such nature will be entered in control forms and will be accounted for against yield.

- a. Trees which are dry/ uprooted in nature shall be distributed to right holders of concerned forest as per the Timber Distribution Rules notified by HP government and amended from time to time.
- b. Trees which are dangerous to life and property and deemed so by concerned Sub Divisional Magistrate shall be removed. The forest corporation shall be involved for removal of such trees wherever feasible.
- c. Trees required for departmental use and for supply to other departments at market rate as per the rules and guidelines notified by HP Government from time to time. In this context, only dry and salvage trees are to be utilized.
- d. Green trees required for research and allied purpose. It shall count towards yield.
- e. Trees which are coming in alignment of development works for land diverted under Forest Rights Act Section 3(2) and Forest Conservation Act, 1980.

18.2 Deviation:

All operations including plantation and felling not covered by the provisions of this plan shall constitute a deviation for which approval shall be sought from PCCF or competent authority. All deviations, which permanently alter the basis of management laid down in a working plan, will require prior sanction of the PCCF. All deviations, which do not permanently alter the basis of management and with the necessity of which he agrees, may be approved and sanctioned by the APCCF, Working Plan on behalf of the PCCF. Where there is difference of opinion between APCCF Working Plan and the territorial Conservator of Forests, the former will refer them to the PCCF for instructions. The PCCF, as the case may be, will counter sign the deviation statement. Minor deviations can be sanctioned at the level of CCF or PCCF as the case may be, but the PCCF before sanctioning the major deviations of following nature, will necessarily take prior approval of the Ministry of Environment and Forests:

- (i) Change in Silvicultural system
- (ii) Clear felling of natural forest
- (iii) Formation of new felling series; and
- (iv) Large scale felling due to natural calamities

18.3 Grazing and Lopping for Fodder

Fodder grass is a major natural resource in the tract and a vital one for livestock reares and migratory grazers. Over the years, the number of livestock has declined locally but increased in terms of migratory grazers. There are pockets in the tract like Tagnu, Janglik, Deorighat, Dodra, Kwar, Chhajpur where there is significant grazing pressure in terms of local diurnal grazing and migratory grazing. There is a notable tendency for migratory grazers to inhabit new areas against the permit and to have greater number of cattle as against the fixed number in the permit. It is strongly prescribed to limit the number of migratory grazers within the limits of carrying capacity and to safeguard biodiversity which are endemic and threatened in nature by applying principles of rotational grazing, fixing route of grazers and enforcing the rules in this regard. It is certain that unchecked and arbitrary grazing will lead to the destruction of forests and endemic biodiversity. On the other hand, grass collection needs to be encouraged from fire prone forests and Panwis to relieve fuel load and mitigate forest fires.

18.4 Forest Roads and Paths

The list of forest roads and paths in the tract along with their condition and prescription are given in the Appendix-X(b) in Volume-II of this working Plan.

It is prescribed to upgrade the forest roads from kachha to pucca after completing due formalities under the Forest Conservation Act. This will greatly help fire fighting, transportation of salvage timber and seedlings in the tract.

18.5 Forest Rights Act

The Forest Rights Act, 2006 is a landmark legislation that has completely altered the dynamics of forest management in the country empowering traditional forest dwellers and scheduled tribes. However, there is a lack of clarity when it comes to its interpretation and implementation in the tract. The following are the matters that are discussed and deliberated in this regard:

- **Eligibility of OTFDs:** As per the principal legislation, the OTFDs need to occupy the land for 75 years prior to 2005 to be considered to be eligible to be categorized under OTFDs. Elder statement is one of the admissible evidences in this regard. However, it is not clear as to how an elder can ascertain the occupancy of a resident from 1930 when the statement is recorded in 2025. Further, there are numerous application for

regularization of encroachment in which encroachers have mentioned the year from which they occupied the forest lands. In such cases, it is strongly prescribed to utilize the application forms and counter claims in order to evaluate the correctness of eligibility. In addition, satellite image can be used as a supplement to evaluate the period of occupation.

It is also noted that the forest rights of all villages in the tract were settled through proceedings of various District Level Committees in which no individual claim was put forth by any resident of any village. This indicates that all gram sabhas in the tract invited claims, publicized invitation yet did not receive any claim. As a consequence of which, the quasi judicial process of settling claims under Forest Rights Act has been completed by statutorily empowered DLC for every village in the tract. This fact is also to be taken into consideration when Gram Sabhas re invite claims.

It is strongly prescribed that forest officials record their observations/ objections for every case of individual forest rights whether in the forest rights committee meeting, Gram Sabha scrutiny, SDLC meeting or DLC meeting. It is also necessary to undertake or refer sociological or historical literature survey for the tract to understand the migration patterns of residents in the tract and as to whether the occupations in forest land preceded 1930 and for 3 generations as mandated in the act.

- **Diversion of Forest Land under Section 3(2):** There are large number of developmental works which are ongoing in the tract. After the commencement of forest rights act, a large number of developmental works are being accorded clearance under Section 3(2) of the Forest Rights Act at the level of DFO and if not at the level of DLC. This has greatly decentralized diversion of forest for non forest purpose and more than 400 such cases of forest diversion involving more than 200 Ha of forest land has been diverted so far. In such a context, there is a great need to regulate and keep a check on forest diversions to avoid excessive, unnecessary, arbitrary and marginal benefit diversions. The following checks are suggested in this regard:
 - **Existence of Roads prior to sanction:** It is prescribed to check existing roads and linear infrastructure adjacent to proposed case of diversion to avoid sanctioning of superfluous infrastructure where there is no real incremental benefit
 - **Presence of Encroachment:** It is prescribed to avoid sanctioning diversion wherever forest encroachments exists as such diversions

will aid encroachers and give power for further encroachment among orchardists

- **Proposal in Continuation:** It is noted that there are diversion proposals for roads in which the proposed road is taken as a link from previously sanctioned road or in continuation. Considering this is against the spirit of the act and points to piecemeal diversion, it is prescribed to avoid sanction of such cases except wherever the total area of diversion remains less than 1 Ha. Further clarification may be sought in this regard.
- **Roads made in Violation:** It is strongly prescribed to avoid sanctioning roads which are already constructed in violation of forest conservation act and without securing any approval for diversion under FCA or FRA. This creates a tendency for law breakers to take matters into their own hands and rewards law breakers.
- **Marginal Benefit:** It is observed that there are numerous cases where a single or few orchardists are the only beneficiaries of proposed diversion roads. In such cases, considering the absence of public benefit and benefit of singular person, it is prescribed to avoid sanctioning roads.

It is prescribed that during the joint inspection of the diversion proposal, concerned range officer along with Deputy Ranger and Forest Guard shall incorporate their specific comments on the above mentioned matters before forwarding the file to DCF for sanction. The points discussed above may also be brought to the notice of higher authority.

18.6 Settlement Operation

The tract has seen 124 newly notified DPFs over the past period of the plan. However, almost all of these DPFs are yet to be demarcated on ground and boundary pillars to be affixed. Even the mutation of these DPFs is yet to be completed in concerned revenue record. It is prescribed to immediately take effort to secure mutation of notified DPFs in revenue records, demarcate and secure boundaries of these forests at the earliest.

There are still numerous Undemarcated Forests in the tract. These forests are yet to be surveyed and settled. The pendency of this settlement has caused a great lack of clarity when it comes to encroachments on UF land. In this context, it is strongly prescribed to complete the process of inquiry into rights and settlement of rights under Indian Forest Act, 1927 and as per the Himachal Pradesh Forest Settlement Rules issued and amended from time to time.

The applicability of 1952 notification also deserves deliberation and mention here. The notification of 1952 blanket categorized all government

owned waste land in the tract as Protected Forests under Section 29 of the Indian Forest Act, 1927. However, after the issuance of notification, many DPFs have been notified after completion of process of rights inquiry and settlement as per the Indian Forest Act, 1927. It is understood that once a DPF is notified, there is no further need for government owned wasteland adjacent to it where rights inquiry and settlement has completed to be still interpreted as forest land. This should be classified as non forest land as it creates an unnecessary impediment to development works on non forest land and brings applicability of Forest Conservation Act, 1980. It is prescribed that clarity in this matter be obtained from concerned authority in order to ensure that the benefits of settlement and demarcation of boundaries free up non forest government land for development.

It is prescribed that the notification is to be seen as an interim measure prior to settlement and final notification of DPFs. However, due to lack of clarity, the current practice is to seek forest clearance for all government lands irrespective of whether the process of inquiry and settlement of rights is completed. This is counter productive and renders the settlement process futile again burdening forest department with clearance cases and pulling back the pace of development. It is submitted that wherever inquiry and settlement is completed and final notification is issued, the lands outside such notified boundaries should be made free from applicability of 1952 notification.

In this context, it is essential that the government clarify that 1952 notification shall cease to apply for all lands where settlement has been completed and DPFs stand notified. Additionally, the Forest Settlement officer shall clearly identify and list out those lands where settlement process is completed and falling outside notified forest land boundaries which can be treated as non forest land for undertaking development activities. The notification of DPFs/ RFs shall clearly list out these non forest lands after settlement. In case of existing DPFs also, it is required to be clarified as to what all Khasra and land parcels stand settled with respect to concerned DPF so that they are free of forest land status.

The above prescriptions of settlement are essential to rectify the ambiguities and clearly spell out the forest land and differentiate the non-forest land. Unless this ambiguity is settled, the management of forest land and the enforcement of forest laws over forest land remains a major challenge for the custodians and managers of forest land in the tract.

18.7 Working with HP State Forest Corporation

The tract has an established forest corporation division headquartered at Saraswati Nagar. This division of HPSFDC manages salvage timber extraction, transportation and sale of salvage timber, resin tapping along with its transportation and further sale. The HP state government gains fixed royalty on timber and resin volume as fixed by the Pricing Committee constituted at government level chaired by the Honourable Forest Corporation.

The detail of timber extraction and royalty deposits have been detailed in Part 1 of this plan comprehensively. The major prescription with regard to working with HPSFDC is to define clearly the terms and conditions based on which the timber extraction is to be done. It is noticed that there is a substantial ambiguity with regard to matter of illicit felling in handed over salvage lots as to which organization the financial and administrative responsibility lies. In this context, it is strongly prescribed that an agreement be signed between the HPSFDC and HP Forest Department clearly laying down terms and conditions for handing over of lots, payment of royalties, penalties and working of the lots.

It is prescribed to not undertake silvicultural extraction of salvage timber in proposed biodiversity heritage sites and biodiversity rich forests considering it harms the understory and the threatened endemic taxa therein.

Chapter-19

Monitoring, Assessment and Reporting

This chapter shall spell out the method of monitoring, assessment and reporting with respect to the entire prescriptions in the tract. It shall detail the forms, journals and reporting formats which can aid data collection, aggregation, data analysis and enable data driven management to improve forest health and vitality.

19.1 Control and Records

The control forms required for control of deviations from prescriptions for the working circles is provided in this chapter. The same is required to be prepared and submitted annually to Conservator of Forests with copy to Working Plan officer for scrutiny and obtaining sanction of deviations.

19.1.1 Silviculture Felling Control Form

Working Circle- Periodic Block		Felling Series - cutting section		Localities prescribed localities suggested (with areas)				Coupe control form	
								Coupe No.	Page
Range wise	Area	Species	Diameter/ class	Trees marked	Unit factor	Volume marked	Trees retained	% trees retained	remarks
1	2	3	4	5	6	7	8	9	10

19.1.2 Silvicultural Control Form

For control of all other silvicultural operations such as cleaning, subsidiary silvicultural operation such as pruning, weeding, burning etc.

Working Circle- Periodic Block		Felling Series - cutting section	Localities prescribed localities suggested				Coupe control form		
							Coupe No.		Page
			As Carried Out				Excess (+) or deficit (-)		
Prescript ion in breif	A.P. para	Year due	Year	Block /Com pt.	Area	Volume	Area	Volume	Remark s and Sanctio n
1	2	3	4	5	6	7	8	9	10

19.1.3 Compartment History

The Compartment History file shall include all aspects of the compartment including the extent of areas, boundary pillar locations, diverted area, forest type, forest cover, plantation area, encroached area, evicted area and all other details enabling continuity in the management of the forest

compartment. It shall be periodically updated and furnished to DFO and any deviation to prescription shall be duly recorded.

19.1.4 Maintenance of Records

A detailed record shall be maintained for every forestry activity in order to enable continuity in management and to facilitate data driven decision making particularly with the objective of optimum utilization of budget. The following are the records that are prescribed to be maintained:

19.2 Record Room of Collector Court and Court of Authorized Officer

The record room of collector court shall physically keep all case files pertaining to encroachment cases tried under HP Public Premises Act. The court shall also maintain a detailed register detailing the date of institution of case, date of verdict and keep tab on progress of pending eviction order implementation. It is prescribed to digitize all case files pertaining to cases which have been tried for eviction under HP Public Premises (Eviction and Rent Recovery) Act, 1971.

19.3 Boundary Pillar Register

Every Range officer shall maintain an updated boundary pillar register clearly detailing the location of all boundary pillar along with the updated status of the condition of the boundary pillar. The same needs to be checked by the concerned beat guard every month.

19.4 Plantation Journal

The plantation journal shall record all activities done as advance work and plantation work including fencing, digging of pits, filling of pits, planting, transportation of plants and all other items of work which are executed. The plantation journal shall also have space for inspection notes of RO/ACF/DFO/CCF who conduct inspections as per the MFI targets allotted to them. The detail of expenditure incurred, species planted and survival percentage shall be clearly written down in the plantation journal. The digital map/ KML of the plantation shall be clearly pasted in the journal.

19.5 Nursery Journal

Every nursery shall have a nursery journal which shall be maintained separately by the in charge forest guard. The journal shall display the nursery name, fund sources, yearly fund distributed, expenditure incurred for raising and maintenance of plants along with clear display of annual work schedule. It shall duly record the date of sowing of seeds for raising, germination of seedlings, number of plants in various age groups, total plants raised, total plants supplied for plantation departmentally, number of plants supplied to public institution, weeding and hand watering days, health status of plants.

The in charge forest guard, deputy ranger and Range officer shall record their observations regarding raising of plants, growth status of plants and casualty data, reason for casualty or low growth accordingly.

19.6 Deviation Statement

To exercise control over progress of various operations at the end of each financial year, the prescriptions of the working plan will be compared with the actual operation done in the field on felling, silvicultural operations and miscellaneous works and any excess or short fall shall be recorded giving reasons for deviation and sanction of the competent authority shall be obtained as per the details given in the Miscellaneous Regulations.

19.7 Beat Manual/ Beat Book

Every forest guard shall maintain a beat book clearly detailing all aspects of his/ her forest beat including extent of area, number of forests, forest compartment data from CH file, boundary pillar locations, evicted area, plantation area, wildlife present in the beat, villages in the beat, fire vulnerable areas, streams and water sources data etc.

19.8 Register and Records

The following register and records are prescribed to be maintained at division office/ range office:

1. Register detailing detected encroachment cases including name of forest, area involved, current status of the case and date of eviction wherever implemented
2. Budget control register detailing the budget allotment and expenditure year wise
3. Register detailing lots handed over and royalty realized from forest corporation
4. Register of Saw Mill along with date of registration, name and address of licensee, expiry of registration
5. Register of Imported Timber Depot with date of registration, name and address of licensee, expiry of registration
6. Register of Minor Forest Produce Contractors along with date of registration, name and address of licensee, expiry of registration
7. Register of Store Articles
8. Register of Timber Distribution range wise and year wise along with detail of applicant
9. Register of Seized Timber along with FIR details, date of offence, forest range
10. Register of Offences
11. Register of Forest Diversions under FRA
12. Register of Forest Diversions under FCA

13. Register of List of Forests along with notification number and date
14. Register of Boundary Pillars
15. Register of Cases under Section 52A of the Indian Forest Act
16. Building Register: Year of construction, Name of Building, Name of Forest, Current Status, Expenditure Incurred
17. Register of wildlife compensation

The Annual Office Inspection shall be carried out by DFO for Range offices and the inspection of DFO office shall be done by concerned CF/CCF.

Chapter-20

SUMMARY OF PRESCRIPTIONS

Working Circle	Heading	Prescriptions	Para No (of Part II)
Deodar Kail	Silvicultural System and Regeneration	Indian Irregular Shelterwood System with assisted natural regeneration	2.7
	Rotation and Regeneration Period	120 years and 30 years respectively	2.6.3
	Exploitable Dia	40 cm	2.6.4
	Felling Cycle	30 years	2.6.6
	Division into Periodic Blocks	Fixed three periodic block: PBI, PBIV and PB-Unallotted	2.6.7
	Prescribed Annual Yield	25100 m ³ for PBI, 114200 m ³ and 1290 m ³ for PBU	2.6.8
	Broad Prescriptions for Periodic Blocks	PBI-The main object of PBI is to establish regeneration after carrying out seeding felling. PBU- Only dead, dried, diseased and uprooted trees will be marked and felled as salvage removal against right holder requirements for timber distribution or as salvage lot towards forest corporation PBIV-All class I and class II trees except for those near boundaries of private cultivation, adjacent to riverine or stream areas, mother trees standing over regenerated young crop or in steep terrain vulnerable to soil erosion shall be marked and removed against yield. The mother trees standing above regenerated crop and where regeneration is deficient is to be retained.	2.6.10

	Regeneration Assessment	Regeneration plots shall be laid and data be collected through these plots every year to evaluate regeneration in each compartment	2.6.12
Fir Spruce	Silvicultural System and Regeneration	Indian Irregular Shelterwood System was applied in these forests	3.6.2
	Rotation and Regeneration Period	Fixed at 150 years	3.6.3
	Exploitable Dia	60 cm	3.6.4
	Felling Cycle	10 years	3.6.6
	Division into Periodic Blocks	There should be 5 periodic blocks corresponding to regeneration period. But only PB I has been allotted this working circle which is allotted in groups/patches considering regeneration and advance growth and rest all forest is not allotted for working and treated as PB –unallotted	3.6.7
	Prescribed Annual Yield	PBI- 121900 m³	3.6.8
	Broad Prescriptions for Periodic Blocks	PBI- In selection mother trees, vigorous, healthy and tall trees are retained in preference to over mature trees. Natural regeneration required cleaning and thinning. PBU- Improvement felling will be carried out in entire un-allotted PB. Over mature, dried, diseased and wolf trees will be removed from the area	3.6.10
	Regeneration Assessment	Natural regeneration is the best way of obtaining growing stock through seedling origin.	3.6.12

Chil	Silvicultural System and Regeneration	Indian Irregular Shelterwood system with a view to enable regeneration by conserving mother trees and at the same time providing sustained yield	4.6.2
	Rotation and Regeneration Period	Fixed at 100 years	4.6.3
	Exploitable Dia	50 cm	4.6.4
	Felling Cycle	25 years	4.6.6
	Division into Periodic Blocks	Working circle is divided into three Periodic blocks PBI, PBIV and PB unallotted	4.6.7
	Prescribed Annual Yield	PBI- 1500 m ³ and PBIV- 3500 m ³	4.6.8
	Broad Prescriptions for Periodic Blocks	PBI- The main object of this Periodic Block is to establish regeneration after carrying out seeding felling. All dead, diseased and dried trees will be marked. PBU- Only dead, dried, diseased and uprooted trees will be marked and felled as salvage removal against right holder requirements for timber distribution or as salvage lot towards forest corporation PBIV- All dead, diseased and dried trees will be marked. All class I and class IIB trees except for those near boundaries of private cultivation, adjacent to riverine or stream areas, mother trees standing over regenerated young crop or in steep terrain vulnerable to soil erosion shall be marked and removed against yield	4.6.10
	Regeneration Assessment	Closure and ANR in PBI areas, Weeding and Tending and Annual Survey of	4.6.12

		regeneration is prescribed in the working circle	
High Altitude Broad Leaved	Silvicultural System and Regeneration	Protection and improvement system will be followed in this working circle with emphasis to protect and conserve high altitude broad leaved eco system for enabling the various eco system services that the high altitude broad leaved forests provide	5.6.2
	Rotation and Regeneration Period	Not applicable	5.6.3
	Exploitable Dia	Not applicable	5.6.4
	Felling Cycle	Not applicable	5.6.6
	Division into Periodic Blocks	No periodic block is prescribed	5.6.7
	Prescribed Annual Yield	Yield obtained after salvage felling will be recorded.	5.6.8
	Broad Prescriptions for Periodic Blocks	Not applicable	5.6.10
	Regeneration Assessment	The natural regeneration appears to be deficient in this working circle with endangered and threatened species facing local extinction. ANR for selected forests, Fencing and Closure, Seed collection, Ex Situ Conservation, Artificial regeneration and collection of regeneration data is prescribed for this working circle	5.6.12
Forest Protection (Overlapping)	Exhaustive prescriptions for preventing and dealing with forest encroachment including construction of boundary pillars, digitization of evicted lands, SoP for challaning of cases before Collector Court etc. is given. Protection prescriptions to mitigate offences of illicit felling, mining, hunting, debris dumping, lopping is detailed using novel technology in		Chapter 6

	combination with traditional patrolling. Detailed prescriptions also include prosecution procedure.	
Grassland Conservation (Overlapping)	The summary of prescription is to conserve grassland ecosystem recognizing its unique eco system and to avoid its alteration in any manner.	Chapter 7
Plantation (Overlapping)	The notable prescription is to avoid plantation in unsuitable areas including natural grassland ecosystem, fire vulnerable areas, low soil depth and refractory slopes. Plantation is strongly prescribed in evicted lands, to enrich canopy density in RFA based on site specific characteristics and requirements. The rationalization of Nurseries is prescribed by promoting Deodar nursery in Shashan and by utilizing Bashla modern nursery for Broad Leaved plants. Emphasis is also given for community and social forestry.	Chapter 8
Evicted Area Rehabilitation (Overlapping)	The major prescription is to digitize evicted lands, bring them under ANR and plantation immediately to prevent re-encroachment and restore the encroached landscapes to its original form.	Chapter 9
Eco Tourism (Overlapping)	The detailed list of proposed eco tourism sites in the tract are given. The summary prescription here includes providing an organizational structure in form of EDCs for undertaking eco tourism activities, levying of permit fees for hiking/camping, environmental preservation fees, carrying capacity considerations, local livelihood generation with a view to promote sustainable community based eco tourism in the tract.	Chapter 10
Biodiversity Conservation (Overlapping)	The chapter lists out the major biodiversity in terms of flora in the tract. The major prescriptions include the documentation of biodiversity, preparation of PBRs, sustainable livelihood from sustainable utilization of NTFPs, strengthening the institution of BMCs, long term ecological monitoring through permanent preservation plots, rotation closure and declaration of potential biodiversity heritage sites.	Chapter-11
Participatory and Joint Forest	The prescriptions include formation of VFDS, JFMCs and their involvement in domains of	Chapter 12

Management (Overlapping)	afforestation, soil and water conservation, forest protection and fire protection, development of community livelihoods to offset forest dependence.	
Wildlife Protection (Overlapping)	The broad prescriptions include the species specific conservation plans, anti poaching efforts, detection and cognizance of wildlife crime, conservation and augmentation of habitats, habitat management, exploring the declaration of conservation/ community reserves and human-wildlife conflict management in the tract.	Chapter 13
Soil Conservation and Water Resource Management (Overlapping)	The broad prescription is to effect drainage line treatment, enhance water retention through water retention structures and rejuvenate springshed and water shed in the tract.	Chapter 14
Infrastructure Development And Maintenance (Overlapping)	This working circle has been constituted with the sole objective of improving and developing the infrastructure of the department including forest offices, buildings, staff quarters, inspection huts, check posts, forest roads, vehicles, communication infrastructure, electronic devices and other such necessary miscellaneous infrastructure. Considering the infrastructure requirement exists for the entire tract, it is prescribed that this working circle shall extend to the entire tract.	Chapter 15

Signature of Officers

Sh. N Ravisankar IFS,
Deputy Conservator of Forests,
Rohru Forest Division

Sh. Anupam Kashyap IAS,
Deputy Commissioner,
Shimla District

Sh. K Thirumal IFS,
Chief Conservator of Forests,
Shimla Forest Circle

Sh. Upasna Patial IFS,
Addl Pr. CCF (Working Plan)
HP Forest Department

Sh. Sanjay Sood IFS,
Principal Chief Conservator of Forests (Head of Forest Force),
Himachal Pradesh Forest Department

