# PART-II

# **FUTURE MANAGEMENT**

# DISCUSSED

# AND

# PRESCRIBED

# **CHAPTER-VIII**

**Basis of Proposals** 

# **CHAPTER-VIII**

# **Basis of Proposals**

# 8.1 Objects of Management

- 8.1.1 The objects of management are as under:-
  - To conserve, preserve and improve the vegetative cover for soil and water conservation and for maintaining its beneficial influence on the environment of the tract.
  - To treat these forests in accordance with the silvicultural requirements of the crop.
  - To take adequate measures for promoting regeneration.
  - To supplement natural regeneration with artificial regeneration wherever necessary.
  - To give special attention to the forests which are situated near habitations and are subjected to heavy biotic pressure.
  - To conserve, preserve and manage scientific management of wild life of the tract on scientific lines.
  - To obtain yield of timber and Non-Timber Forest Produce (NTFP) on sustained basis without disturbing the ecological balance of the tract.
  - To evolve the concept of joint forest management in true sense like the Joint Forest Management of West Bengal.
  - To improve the carrying capacity of the grazing lands of the tract.
  - To meet the bona-fide requirements of local inhabitant with respect to timber, fuel, fodder etc.

# 8.2 Method of Treatment

- 8.2.1 Keeping in view the above mentioned objectives of management the treatments proposed are as under:-
  - The forests which are situated on the top portion of the catchments should be protected and no felling of any type should be allowed.
  - The well-stocked Fir forest situated on commercial areas will be managed under Indian Selection System.
  - The natural regeneration of Fir shall be supplemented with artificial regeneration.
  - The well-stocked Deodar-Kail forests which are situated on commercial areas will be managed under Indian Selection System.
  - The natural regeneration will be supplemented by artificial regeneration in the pockets where there is problem of natural regeneration.
  - The Chir forest situated on commercial areas shall be managed under Indian Selection System. Special attention shall be given to the augmentation of natural regeneration with artificial regeneration and adopting modern soil and moisture conservation techniques, as Chir forests have degraded considerably especially, those which are situated adjoining to the habitations.
  - The broad leaved forests will be managed scientifically, keeping in view the importance of particular species like *Quercus leucotricophora*. The Banj Oak species

which cover most of the area of the Division shall be protected, improved and regenerated.

- The pasture lands which are an important constituents of this tract shall be managed on modern, silvi-pastoral techniques in order to increase the carrying capacity of these pastures. The introduction of grasses which have high production shall be introduced. This shall be done in a phased manner.
- The resin extraction shall be restricted only to those compartments which have the capacity for resin extraction. The poorly stocked Chir forest shall be exempted from resin extraction and special attention shall be given for their rehabilitation by augmentation of natural regeneration with artificial regeneration by way of establishment of effective closures in phased manner. All this should be done keeping in view the bona-fide requirements of people such as land for grazing of domestic cattle's, fuel wood, and fodder besides soil and moisture conservation measures.
- Efforts shall be made to conserve, preserve and propagate the Non-Timber Forest Produce (NTFP) which is an important constituent of the forests of the tract. The planting of those NTFP species which have economic value shall be done in closures which are located adjoining to habitations.
- The revival of village forest committees on the concept of Joint Forest Management by sharing profit of forest produce both short term and long term in order to improve socio-economic status of the people should be initiated.
- The forests which are situated near habitations have degraded considerably in the entire tract of the division and special focus on their rehabilitation shall be given in order to bring these forest back to normal.
- **8.3.** Constitution of Working Circle: In order to achieve the above discussed objects of management, the following working circles are constituted:
  - i. Deodar-Kail Selection working circle.
  - ii. Fir selection Working Circle.
  - iii. Chir Selection Working Circle
  - iv. Reboisement-cum-Rehabilitation Working Circle.
  - v. Resin Development Working Circle (overlapping)
  - vi. Broad leaved working circle.
  - vii. Ecological Conservation Working Circle.
  - viii. Eco-tourism Working Circle.
  - ix. Non-Timber Forest Produce Working Circle [NTFP] (Overlapping)
  - x. Plantation Working Circle (Overlapping)
  - xi. Forest Protection Working Circle (Overlapping)

#### 8.3.1. Deodar-Kail Selection Working Circle

All the compartments which are confined to Basantgarh Range with well stocked Deodar and Kail forest which are fit for working are allotted to this working circle. The crop shall be treated under Indian Selection system. The crop of Deodar and Kail is young to middle aged with few scattered matured and overmatured trees.

#### **1.3.2** Fir selection working circle:

Fir forests exist in Basantgarh Range of this Division. The compartments which are commercially suitable for exploitation are allotted to this working circle. The crop shall be treated under Indian Selection System. Since there is great problem of natural regeneration of Fir, so special attention shall be given to induce natural regeneration and supplementing it with artificial regeneration.

#### 1.3.3 Chir Working Circle

All the well stocked Chir forests which are mostly accessible with adequate regeneration / advance growth are allotted to this working circle. The Crop shall be treated under Indian Selection System.

#### 1.3.4 Reboisement-cum-Rehabilitation Working Circle

This working circle includes all the degraded forests of the Division. These forests are situated near the habitations and occur in every nook and corner of the Division. The degradation has resulted due to excessive biotic pressure in the form of uncontrolled grazing, excessive lopping for fodder and fuel and excessive resin tapping.

#### 1.3.5 Resin Development (Overlapping) Working Circle

Provisions of this circle shall apply to those areas where resin tapping is carried out. Basic objective of this circle would be to identity areas where resin tapping can be safely carried out and where it requires to be stopped. Future yields shall be worked out on the basis of availability of trees.

#### 1.3.6 Broad leaved working circle

All the broad leaved forests of the Division shall be managed under this working circle. The broad leaved forests are vital component to cater the requirement of fuel and fodder of the inhabitants living adjoining to forests. Their management, improvement and propagation on modern techniques shall be adopted. The natural regeneration shall be augmented with artificial regeneration.

#### 1.3.7 Ecological Conservation Working Circle

All the forest compartments which are not included in any Working Circles have been included in this circle. These forests are situated at higher altitudes of the catchments having steep and precipitous slopes. Complete protection should be provided to these forests. No felling and grazing shall be allowed. Artificial regeneration and soil conservation measures shall be adopted wherever necessary in order to bring these forests to a normal forest.

#### 1.3.8 Eco-tourism Working Circle

This Working Circle is constituted for the first time in the proposed plan of this Division. The main aim of constitution of this independent working circle is to develop the locations which have a tourism potential of both religious and aesthetic value without disturbing the Ecological Balance of the area.

#### **1.3.9** Non-Timber Forest Produce Working Circle

The main aim of constitution of independent working circle of Non-Timber Forest Produce is to raise plantation of Non-Timber Forest Produce yield species. The management of non-timber forest produce species on modern scientific techniques shall be adopted in this division which shall be beneficial for local inhabitants. Till date no such measures have been adopted in this division. No nursery of Non-Timber Forest Produce species exist in the Division. The non timber forest produce species can be planted in already established closures under various schemes.

#### 1.3.10 Plantation Working Circle (Overlapping)

The Plantation Working Circle (over lapping) has been constituted for the first time in Ranagar Forest Division keeping in view the degraded condition of forest areas which are situated near habitations. The main aim of creation of this working circle is to pay special attention for rehabilitation on these problematic areas keeping in view the bonafide requirement of the local peoples.

#### 1.3.11 Forest Protection Working Circle

This Working Circle is constituted for the first time in the proposed plan of this Division and shall be an overlapping Working Circle. The main object of constitution of this Working Circle is to protect the forest of this tract from illicit damages and smuggling of Timber and Resin. 1.4 The compartment wise allotment of working circles is given in appendix-I-A to 1-G the summary of area (in hectares) under various species in the different working circles is given below in Table No. 8.1.

Working Circle			Commercia	al		Un-Commercial				Grand
	D	К	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Total
Deodar Kail Selection Working Circle	1821	96	538	107	2562	306	0	581	887	3449
Fir Selection Working Circle	155	51	2154	0	2360	411	0	247	658	3018
Chir Selection Working Circle	0	0	0	4693	4693	147	215	354	716	5409
Reboisement Working Circle	62	0	13	3661	3736	402	656	841	1899	5635
Broad Leaved Working Circle	0	130	164	752	1046	4098	1118	1013	6229	7275
Ecological Conservation Working Circle	323	92	1229	1865	3509	2191	3958	257	6406	9915
Eco-Tourism Working Circle	568	0	230	1055	1853	267	14	424	698	2551
Total	2929	369	4328	12133	19759	7822	5961	3717	17493	37252

# Table No. 8.1

Area in Hectares

### 8.5 Block and Compartments

This plan does not involve any change in the compartment boundaries over the previous plan. The same is true of beats and blocks. Appendices 1a to 1c provides the estate area statement giving the list of compartments, range wise, along with their respective areas and allotments. The range wise break up of territorial blocks and beats along with their constituent compartments is provided under Appendix IX.

### 8.6 Period of Plan

The working plan shall remain in force for a period of 10 years from ending 2013.

# **CHAPTER-IX**

# Working Plan for Deodar-Kail Selection Working Circle

# CHAPTER-IX Working Plan for Deodar-Kail Selection Working Circle

# 9.1 General constitution of working circle

9.1.1 This working circle covers most valuable Deodar-Kail forest of the division. These forests are confined to the Basantgarh Range of this Division. This working circle constitutes9.26% area of the Division.All well stocked and easily approachable Deodar-Kail forest which are fit for harvesting are included in this working circle. The working circle is identical in constitution to the corresponding working circle of the plan under revision, except for compartment numbers 50 and 51 of Basantgarh Range which have been allotted to ecological tourism working circle. The compartment number 60 which was allotted to Deodar Kail Working Circle was missing in the area statement due to typographic mistake, although the area of this compartment was included in area of the working circle. The detail of compartments allotted to this working circle in plan under revision and proposed plan is given below table:

#### Table No. 9.1

	Plan under Revision		Proposed Plan	Proposed Plan Comptt No. Area in bottomore			
Range	Comptt No.	Area in Comptt No.		Area in			
		hectares		hectares			
	5b, 6, 7, 8, 9a, 9b, 10, 13,		5b, 6, 7, 8, 9a, 9b, 10, 13,				
	14a, 14b, 15, 16, 17a, 28,		14a, 14b, 15, 16, 17a, 28,				
Basantgarh	44a, 45, 46a, 46b, 46c,	4263	44a, 45, 46a, 46b, 46c,	3449			
	47, 48, 50a, 51, 52, 53,		47, 48, 52, 53, 58, 60,				
	58, 61, 62, 63, 64, 67,		61, 62, 63, 64, 67,				

### 9.2 General character of vegetation

9.2.1 Deodar is the predominant species and occurs almost as a pure crop, with few scattered Kail and Fir trees. Chir also occur at lower elevations while the broad leaved species occur in moist, depressions and nallas. The crop is represented by all age classes though the proportion of regeneration below 30 cms. is deficient. The detailed description of these forests has been given in Chapter-II of Part-I of this Plan.

### 9.3 Area Statement

9.3.1 The species wise detail of compartments allotted to this working circle is given in Annexure II. the Range wise abstract of the area under different species in this working circle is given below in the table No. 9.2.

# Table No. 9.2

#### Range wise distribution of area (in hectares) allotted to Deodar-Kail Selection Working Circle of Ramnagar Forest Division

Range	Con	nmercia	l area i	n hectar	es	Non-C	Grand Total		
	Deodar	Kail	Fir	Chir	Sub- Total	B/L	Blank/ Scrub	Sub- Total	
Ramnagar North	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ramnagar South	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Basantgarh	1821	96	538	107	2562	306	581	887	3449
Total	1821	96 538 107 2562 306 581 887						3449	

# 9.4 Special Objectives of Management

- To create conducive conditions for advance growth by removing over-wood in a phased manner.
- To obtain sustained yield of timber.
- To supplement natural regeneration of Deodar and Kail with artificial regeneration.

### 9.5 Silvicultural System Adopted

9.5.1 Mr. Lovegrove prepared the first working plan of the area. The forests were in a fairly good condition but after being included in RamnagarJagir, the forests were subjected to heavy damage. Mr. S.D. Dhar prepared the working plan for the period from 1942-43 to 1956-57 in which the easily accessible and well stocked Deodar forests were allotted to Selection cum Improvement system. The same system was continued by Sh. Fotedar in his working plan for the period from 1957-58 to 1973-74. Later Sh. Jamwal in his plan for the period from 1974-75 to 1983-84 constituted the Deodar KailWorking circle and silviculture system. The Shelter-woodsystem was continued by Sh. S.P.Sharma (1984-85 to 1993-94) and Sh. B.L. Zadoo (1994-95 to 2003-04) in their working plans. The Deodar-Kail forests under the proposed plan shall be treated under the Indian Selection System. This system involves selective felling of silviculturally mature and over-matureavailable trees.

### 9.6 Exploitable Size

9.6.1 The exploitable size for Deodar and Kailis fixed at 70cms.dbh (ob) and for Fir and Spruce it is fixed at 80cms. dbh (ob).

#### 9.7 Rotation

9.7.1 In selection system the exploitable size is given preference. The average age at which Deodar and Kailattains exploitable diameter of 70cms.is 150 years. This is also inconformity with Government decision in which the exploitable diameter of Deodar and Kail has been fixed at 150 years throughout the state of Ramnagar & Kashmir. Fir/Spruce attains exploitable diameter of 80cms in 230 years in this tract.

#### 9.8 Felling Cycle

9.8.1 A felling cycle of 30 years is adopted based on considerations of silvicultural requirements of Deodar and Kail.

#### 9.9. Felling Series

9.9.1 There will be only one felling series for the working circle.

#### 9.10 Analysis and Evaluation of the Crop

9.10.1 The point sampling technique has been adopted for assessment of growing stock. The field data was collected from 36 sample points. Mean value of three variables viz. number of stems per hectare, volume of conifers 30 cm. dbh (ob) and basal area of conifers per hectare have been computed species wise and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 9.3.

The diameter class and species wise average number of trees per hectare are given in table no. 9.4.

The diameter class and species wise total number of trees in the commercial area (2562 hectare) of the working circle are given in table numbers 9.5.

The diameter class and species wise average volume of trees per hectare are given in table no. 9.6.

The diameter class and species wise total volume of coniferous trees in the commercial area (2562 hectare) of the working circle are given in table numbers 9.7.

The diameter class and species wise total number of treescalculated at lower confidence limit commercial area (2562 hectare) of the working circle are given in table numbers 9.8.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (2562 hectare) of the working circle are given in table numbers 9.9.

								Confidence limits			Lower limit
Working	Variable	Sample	Mean	Variance	Standard	Standard	Coefficient	(95	%)	Confidence	as
							of				
Circle	(per ha.)	Points			Deviation	Error	variation	(X <u>+</u> t :	x S.E.)	Interval	% of mean
				2				Lower	Upper		
		(n)	(X)	(S <sup>2</sup> )	(S)	(S.E.)	(%)	limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
								t=	1.96		
Deodar-	No. of										
Kail	Stems	36	235.72	9843.40	99.21	16.54	42.09	203.31	268.13	64.82	86%
Selection											
	Volume	36	350.77	17480.65	132.21	22.04	37.69	307.58	393.96	86.38	88%
											23/0
	Basal Area	36	39.71	216.17	14.70	2.45	37.03	34.91	44.51	9.61	88%

Results of Statistical analysis for Deodar-Kail Selection Working Circle

Column 7 : S.E. = S/ square root (n)

Column 8 : C.O.V (%) = (S/X) x 100

Column 9 : Lower limit = X - 1.96 x S.E.

Column 10 : Upper Limit =  $X + 1.96 \times S.E.$ 

Column 11 C.I. = Upper limit - Lower limit

		~	
Tree count per hecta	ure (Mean alue).		
Statement showing s	species and diameter(cm) class wise tree count per hectare for Deodar Kail Selection Wor	king C	lircle

Species		Diameter Class (Cm)											
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <				
Deodar	21.22	61.03	61.11	34.14	16.78	5.33	3.22	0.89	1.19	204.91			
Kail	0.00	0.86	1.72	1.36	0.14	0.00	0.00	0.00	0.00	4.08			
Fir	2.47	7.08	10.67	3.86	1.28	0.39	0.25	0.00	0.06	26.06			
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
B.L.	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00			
Total	23.69	68.97	74.50	39.36	18.20	5.72	3.47	0.89	1.25	236.05			

# Table No. 9.5

Total tree count over the entire commercial area of Deodar-Kail Selection Working Circle (Area = 1)												
Species				Diam	eter Class	s (Cm)				Grand Total		
	20-30	<u>20-30</u> <u>30-40</u> <u>40-50</u> <u>50-60</u> <u>60-70</u> <u>70-80</u> <u>80-90</u> <u>90-100</u> <u>100</u> <										
Deodar	54366	156359	156564	87467	42990	13655	8250	2280	3049	524979		
Kail	0	2203	4407	3484	359	0	0	0	0	10453		
Fir	6328	18139	27337	9889	3279	999	641	0	154	66766		
Chir	0	0	0	0	0	0	0	0	0	0		
B.L.	0	0	2562	0	0	0	0	0	0	2562		
Total	60694	176701	190869	100840	46628	14655	8890	2280	3203	604760		

Statement showing species and diameter(cm) class wise volume(m<sup>3</sup>) of Conifers in Deodar Kail Selection Working Circle Volume of Conifers per hectare (mean value)

			Diam	eter Class (C	m)							
Species	30-40	30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <										
Deodar	46.38	81.28	71.69	53.03	23.41	18.24	6.09	9.03				
Kail	0.65	2.70	3.09	0.46	0.00	0.00	0.00	0.00	6.90			
Fir	5.95	16.64	11.47	6.26	2.66	2.08	0.00	0.57	45.63			
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Total	52.98	100.62	86.25	59.75	26.07	20.32	6.09	9.60	361.68			

#### Table No. 9.7

Species			Diam	eter Class (C	m)				Grand Total			
	30-40	<u>30-40</u> <u>40-50</u> <u>50-60</u> <u>60-70</u> <u>70-80</u> <u>80-90</u> <u>90-100</u> <u>100 &lt;</u>										
Deodar	118826	208239	183670	135863	59976	46731	15603	23135	792042			
Kail	1665	6917	7917	1179	0	0	0	0	17678			
Fir	15244	42632	29386	16038	6815	5329	0	1460	116904			
Chir	0	0	0	0	0	0	0	0	0			
Total	135735	<u>135735</u> <u>257788</u> <u>220973</u> <u>153080</u> <u>66791</u> <u>52060</u> <u>15603</u> <u>24595</u>										

Total volume of conifers over the entire commercial area of Deodar-Kail Selection Working Circle (Area = 2562 hectares)

Distribution of stems and volume (m<sup>3</sup>) in Deodar Kail Selection working circle computed at lower confidence interval.

Total tree	e count of	commerci	al area (256	2 ha) at low	er interval fo	or Deodar-Ka	ail Selectio	n Working	; Circle	Lower l	imit 86%
					Diameter	Class (Cm)					Grand
Species	ies 10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <										Total
Deodar		46754	134469	134645	75221	36972	11744	7095	1961	2622	451482
Kail		0	1895	3790	2997	308	0	0	0	0	8990
Fir		5442	15600	23509	8505	2820	859	551	0	132	57419
Chir		0	0	0	0	0	0	0	0	0	0
B.L. 0 0 2203 0 0 0 0 0 0									2203		
Total	0.00 52197 151963 164147 86723 40100 12603 7646 1961 2754										

### Table No. 9.9

Lower limit 88%

Total volume of conifers over the entire commercial area (2562 ha)

Diameter Class (Cm)	
at lower interval for Deodar-Kail Selection Working Circle	

			D	iameter Cla	ss (Cm)					
Species	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total	
Deodar	104566	183251	161629	119559	52779	41123	13730	20359	696997	
Kail	1465	6087	6967	1037	0	0	0	0	15556	
Fir	13415	37516	25860	14114	5997	4689	0	1285	102876	
Chir	0	0	0	0	0	0	0	0	0	
Total	119447 226854 194456 134710 58776 45813 13730 21644									

# 9.11 Calculation of Yield

- 9.11.1 The yield will be calculated in terms of number of trees and volume, which in turn shall be controlled by area check by working out the size of the annual coupe. Modified Brandis diameter class method and Von Mantle's formula have been applied for calculation of the yield. The following presumptions have been made in this regard:
  - 1. Only commercial area and its growing stocks has been taken into account for the purpose of yield calculation.
  - 2. The growing stock over commercial area of this working circle is fixed within 10 cm diameter classes indicated by Symbols, I, II, III, IV, V & VI. Class I stands for trees above the exploitable diameter and the other successively below it, to the youngest.
  - 3. The number of trees in all those classes being considered for the purposes of yield calculation have been reduced to the lower limit of confidence interval.
  - 4. To attain exploitable diameter of 70 cm dbh. it takes 121 years for an average deodar tree, 112 years for an average kail tree and 221 years for an average fir tree.
  - 5. It takes 15, 13 and 25 years respectively for an average Deodar, Kail and Fir tree to pass from approach class (60-70 cm d.b.h. in the case of Deodar and Kail, 70-80 cm d.b.h. in the case of Fir) to exploitable classes.
  - In view of preponderance of mature and over mature growing stock and their vulnerability to rot, the yield finally arrived at shall be reduced by 15%.
     The following survival coefficient percent based on the All India volume tables in respects of Deodar, Kail and Fir have been used in yield calculation.

Diameter-Class d.b.h. (cm)	Survival percentage of species					
	Deodar	Kail	Fir			
30-40	30%	45%	20%			
40-50	60%	60%	40%			
50-60	80%	80%	50%			
60-70	90%	90%	60%			
70-80	95%	95%	85%			
80 & above	-	-	95%			

#### Table No. 9.10

Based on the assumption above, the number of total potentially available trees over the commercial area of this working circle, calculated at lower confidence limit of the mean value, after due deduction on account of mortality, is tabulated under table no.

Species and diameter-class wise potential availability of trees from the commercial area of Deodar-Kail Selection Working Circle

DEODAR							
Class	VI	V	IV	III	П	I	Total
Diameter-class	below 30	30-40	40-50	50-60	60-70	above 70	
Total No. of trees assessed at	54366	156359	156564	87467	42990	27234	524980
mean value							
Total No. of trees assessed at	46755	134469	134645	75222	36971	23421	451483
lower limit of confidence							
interval							
Age of entry in the class		57	71	90	110	135	
Years in class transition period		14	19	20	25		
Survival Coefficient of the class		0.30	0.60	0.80	0.90	0.95	
No. of potentially available trees		40341	80787	60177	33274	22250	236829
		41	62	89	120	149	

KAIL							
Class	VI	V	IV	Ш	Π	I	Total
Diameter-class	below 30	30-40	40-50	50-60	60-70	above 70	
Total No. of trees assessed at	0	2203	4407	3484	359	0	10453
mean value							
Total No. of trees assessed at	0	1895	3790	2997	308	0	8990
lower limit of confidence							
interval							
Age of entry in the class		42	55	72	91	115	
Years in class transition period		13	17	19	24		
Survival Coefficient of the class		0.45	0.60	0.80	0.90	0.95	
No. of potentially available trees		853	2274	2397	278	0	5801
		39	60	85	119	148	

FIR							
Class	VI	V	IV		-	I	Total
Diameter-class	30-40	40-50	50-60	60-70	70-80	above 80	
Total No. of trees assessed at	6328	18139	27337	9889	3279	1793	66765
mean value							
Total No. of trees assessed at	5442	15600	23509	8505	2820	1542	57418
lower limit of confidence							
interval							
Age of entry in the class	84	109	136	166	196	221	
Years in class transition period	25	27	30	30	25		
Survival Coefficient of the class	0.20	0.40	0.50	0.60	0.85	0.95	
No. of potentially available trees	1088	6240	11755	5103	2397	1465	28048

The stepwise calculation of yield in Deodar-Kail Selection Working Circle on the basis of modified Brandis Diameter Class Method is detailed in Table no.

	Yield Calculation for Deodar Kail Selection	n Working Circle		
		DFODAR	KAII	FIR
a)	Total number of trees in class I	22250	0	1465
b)	Total number of trees likely to pass on to class I in the first felling cycle from			
	Class II	33274	278	2397
	Class III	60177*(5/20)	2397*(6/19)	5103*(5/30)
	=	15044	757	851
C)	Total recruitment in class I from class II and III during first felling cycle	48318	1035	3248
d)	Annual recruitment from class II and III during the first felling cycle (c / 30)	1611	34	108
e)	Stock required to be kept as reserve i.e. half of the total recruitment in 'c' above	24159	517	1624
		21133	517	1021
f)	Surplus stock of class I ( a - e)	-1909	-517	-159
g)	Total possibility of yield in first felling cycle if all surplus stock in 'f' above is removed ( c + f)	46409	517	3089
h)	Annual yield (g/30)	1547	17	124
i)	Total possibility of yield if all surplus stock in 'f' above is removed in two felling cycles ( c + f/2)	47364	776	3168
j)	(refer note below) Annual yield ( i / 30)	1574	17	124
k)	Weighted average volume of trees above exploitable diameter as per Kully Volume Tables in cubic metres	6 11	5 66	0 20
	Kullu Volume Tables in cubic metres	0.11	5.00	9.30
I)	Total annual volume yield (m <sup>3</sup> )	9452	98	1149
m)	Deduct fifteen percent from 'l' above to account for mortality	8034	83	977
n)	Rounded off to lower multiple of hundred	8000	80	900
	TOTAL	8,980	m <sup>3</sup>	

# 9.12 Calculation of Yield Von Mantle's Formula

Annual Yield	2 x Growing Sto	ock (Calc Rotatic	<u>sulated at LCL)</u> on	Rounding Off	
Annual Yield for DEODA	AR =	<u>2x696997</u> 150	=	9293m <sup>3</sup>	9300 m <sup>3</sup>
Annual Yield for KAIL	=	<u>2x15556</u> 150	=	207m <sup>3</sup>	200 m <sup>3</sup>
Annual Yield for FIR	=	<u>2x102876</u> 225	=	914m <sup>3</sup>	900 m <sup>3</sup>
Total Yield (Deodar + Ka	ail + FIR)		=	10414 m <sup>3</sup>	10400 m <sup>3</sup>

After comparing the yield by both the methods the yield calculated by Brandis Diameter class method is less than the yield obtained by using Von Mantle's Method. From conservative point of view therefore the yield obtained by Brandis Diameter class Method is adopted and prescribed as under:

Total	=	8980 m <sup>3</sup>
Fir	=	900 m <sup>3</sup>
Kail	=	80 m <sup>3</sup>
Deodar	=	8000 m <sup>3</sup>

# 9.13 Size of Annual Coupe

The size of annual coupe is calculated by formula

Area of Annual Coupe =	Commercial area in Hectare
_	Felling Cycle

Commercial Area	Felling Cycle	Area of Annual Coupe
2562	30	85

### 9.14 Annual Cut Per Hectare

9.14.1 The annual cut per hectare is obtained by dividing annual yield of the working circle with the area of annual coupe.

Annual Cut per hectare = <u>Annual Yield</u>. Area of Annual Coupe

Annual Yield	Area of Annual Coupe	Annual cut per hectare m <sup>3</sup>
8980	85	105 m <sup>3</sup>

9.14.2 The per hectare percentage of Annual Yield with respect to growing stock (at lower confidence limit)

= <u>Annual Yield x</u> 100 Total Growing Stock

Annual Yield	Growing Stock	Percentage
8980	815429	1.1%

# 9.15 Realization of Yield

9.15.1 All fit trees above 30 cms. dbh (ob) marked for whatever purpose will count towards yield. Since the Deodar, Kail and Fir are not present uniformly, so it may not be possible to realize species wise yield. Thus, yield prescribed should be regulated in totality. However, a deviation of <u>+</u> 20% from the prescribed yield is permitted.

# 9.16 Sequence of Felling

9.16.1 In view of the ban on green fellings, the sequence of fellings has been left to the direction of the Divisional Forest Officer who shall exercise his judgement keeping in view the progress of regeneration.

# 9.17 Method of Executing Fellings

9.17.1 Removal of over-wood standing above the advance growth and regeneration, with a view to liberate it from shade and suppression, and very light opening lip of the crop where regeneration is inadequate, will constitute the general guide lines in the execution of fellings, The over-wood standing above the regeneration must be removed gradually. In order to avoid the invasion of the area by weeds, which come up abundantly in the gaps, the canopy needs to be manipulated with utmost care. Selection forests require elaborate management and great skill on the part of the executive staff to handle the crop. Accordingly the following marking rules are laid down for guidance of the marking officer.

# 9.18 Marking and Felling Rules

- 9.18.1 The marking officer, prior to conducting the marking, must acquaint himself thoroughly with the condition and composition of the crop in the compartment and its boundaries by traversing over the area of the compartment, at least once.
  - Marking should done by the DCF in-charge of the Division or well trained and experienced ACF. Marking should never be conducted by anybody below the rank of a well trained and experienced Range Officer, in which case the DFO/ACF should check at least 25% of these markings.
  - No marking, except the removal of dead, dying and diseased trees, shall be done in areas near and around cultivation and *behaks* with in a distance of 100 meters from their periphery.
  - No marking, except the removal of actually dead, dying and diseased trees, shall be done along nallah banks within a distance of at least 100 meters on either side.
  - No healthy trees below the exploitable size shall be marked.
  - No attempt shall be made to disturb the process of the succession by giving preference to
    one species over the others. The selection character of the crop shall be preferred over the
    area of this working circle and should be maintained by retaining some healthy trees of
    exploitable size which do not cause any suppression to the crop.
  - No marking should be conducted in areas lacking regeneration. No marking should be done on steep and precipitous slopes.
  - The over-mature trees should get preference over the relatively younger and healthier ones.
  - Improvement and hygienic marking in all age-classes shall be done.
  - Marking for improvement felling shall form an integral part of the major marking.

- All dead, dying, dry and diseased trees shall be marked together with malformed and unfit trees.
- All the trees of exploitable size (70 cm d.b.h. in case of Deodar and Kail and 80 cm d.b.h. in case of Fir) standing over adequate advance growth should be removed.
- Advance growth includes all the trees and poles up to exploitable size. Selection markings of light to very light intensity shall be done in areas having inadequate but established regeneration.
- In dense groups of trees, of and above exploitable size, the spacing between the stems to be retained will vary from 5 to 8 meters depending upon the status and amount of regeneration present. Selection felling of moderate intensity shall be carried out in such groups.
- In the mixed crop, ecologically most suitable species to the locally should be favored.
- The intensity of felling, over a particular compartment, will largely depend upon the degree of biotic interference to which it is subjected, the amount and status of regeneration, topography, slope and aspect
- Extreme care has to be exercised at the time of felling so *as* not to damage the crop below.
- Trees marked for felling should be lopped before execution of felling.

# 9.19 Supplementary Markings

9.19.1 As soon as the felling following major marking is over, supplementary marking of poles and trees damaged in felling, or those that have died, dried or fallen off subsequent to the major felling, should be done. Due caution is required to be taken to avoid large scale supplementary markings which prove dangerous to the ultimate requirement of the crop and the site. Preferably, these markings should be conducted by the DFO himself. Judicious discretion of the marking officer is, therefore, needed to ensure that provision of supplementary marking is not misused, and only such trees as are considered definitely unfit for retention, or are not likely to survive in the near future, are marked.

# 9.20 Cultural Operations

9.20.1 The areas where the felling coupe are near the habitations the debris is usually collected by villagers for fuel wood purpose leaving the forest floor almost clean however, some forests which are situated far away from habitations the controlled burning should be carried out during the safe season.

# 9.21 Regeneration Programme

9.21.1 Almost all the locality factors except the biotic factorsare favourable for regeneration of conifers, the forests located near human habitation experience adverse biotic interference which hamper the natural regeneration to a large extent. However the areas where pressure from both human beings and their cattles is less there is no problem of natural regeneration. Due to increase in population of domestic animals the excessive grazing is increasing and as a result the extent of area requiring artificial regeneration is increasing by every passing year. An area of 85 hectares is proposed for reforestation and rehabilitation which is equal to the area of annual coupe

# 9.22 Artificial Regeneration

9.22.1 In areas where regeneration has failed to come up on its own, artificial measures shall be initiated. Patch sowing of Deodar-Kail should be carried out where favourable soil-moisture condition exists. In blanks close to habitations planting is to be carried out after fencing the area.

#### CedrusDeodara (Deodar):-

It occurs between 1800 meters to 2400 meters however it ascends to 3000 meters at paces and descends to 1200 meters sometimes.

Seed:-Seed is collected during October November

Seed weight:- 7000-8000 seeds per kilogram.

Germination percent:- 90 percent.

- a. **Direct Sowing:** Sowings are done just before snowfall by broad cast method or along contour lines, in broken area or continuous patches. Patch sowing is also done in areas where no weed growth occurs in patches usually at a spacing of 2m. x 2m. the seeds germinate in the following spring.
- b. **Nursery Technique:** Seeds are sown in the nursery by broad cast method or in lines 10cm. apartjust before snowfall and covered with thorns. The germination starts in spring and seedlings are properly watered during summer. During monsoon, they are pricked out in beds of 2m. x1m.size.
- c. <u>Planting Technique</u>: When the seedlings have attained an adequate size (30cms.approximately), they are transplanted in pits of size 45cm. x45cm. x 45cm. at a spacing of 2m.x 2m.inthe field. Planting operations are carried out just before or during the monsoon. The newly planted area is effectively protected against grazing.

Pinus wallichiana (Kail):

It occurs between 2000 to 3000 meters height but sometimes it also occurs at an elevation ranging from 1000 to 4000 meters. It is a strong light demander but grows well on cool aspects.

**Seed:** The seed ripens between September to November. Seeds can be stored after drying for 12 to 18 months.

Seed weight:- about 16000 seeds per kilogram.

Germination Percentage:- 90%

**<u>Nursery Technique</u>**: Seeds are sown in the nursery beds by broad cast method or in lines 10cm. apart just before snowfall and covered with thorns. The germination starts in spring and seedlings are properly watered during summer. During monsoon, they are pricked out in beds of 2m. x 1m.size.

**<u>Planting</u> Technique:** When the seedlings have attained an adequate size (30cms.approximately), they are transplanted in pits of size 45cm. x 45cm. x 45cm. at a spacing of 2m. x 2m.inthe field. Planting operations are carried out just before or during the monsoon. The newly planted area is effectively protected against grazing.

# 9.23 Control of Grazing

9.23.1 The intensity of affect of overgrazing is maximum in those forest areas which are situated near dense habitations. The unrestricted, uncontrolledand unregulated grazing has adversely effected the natural regeneration of the areas. It is prescribed that the areas which are subjected to heavy grazing should be closed for grazing in phased manners and taken-up for artificial regeneration.

# **CHAPTER-X**

# Working Plan Fir Selection Working Circle

#### CHAPTER-X

# Working Plan For Fir Selection Working Circle

# 10.1 General Constitution of Working Circle

10.1.1 The working circle comprises of all the wellstocked, commercially exploitable and accessible Fir forests of this Division. This working circle constitutes 8.10% area of the Division. All the compartments and sub-compartments allotted to this working circle were the part of previous Fir Selection Working Circle. Such forests are especially restricted to Basantgarh Range however, some patches of Fir/Spruce are available on the higher reaches of Ramnagar North Range as well.

### 10.2 General Character of Vegetation

- 10.2.1 The Fir forests occur mostly in pure form or mixed with Deodar, Kail and Spruce. The main associates of Fir in this Working Circle are Kail and Spruce, though the extent of distribution and percentage of Kail is low.
- 10.2.2 Towards the lower elevations of its natural zone it is associated with Deodar. The Broad Leaved associates of Fir in this working circle which occur in moist localities, steep slopes and depressions in linear strips along the banks of streams are *Acer species*, *Prunus* species, *Quercus semicerpifolia*, *Quercus dilatata* and *Juglans regia etc.* the main shrubs found in the Fir forests are *Viburnum nervosum*, *Rubus species*, *Skimmia laureola* and *Rhododendron campanulatum*.
- 10.2.3 The crop consists of mature and over mature trees in relatively larger proportions with inadequate amount of young regeneration. However, the compartment worked out in the past have a large number of young to middle aged crop.
- 10.2.4 The Alpine meadows which are visited by nomads and locals inhabitants during summer months are also present in this working circle.

### 10.3 Area Statement

10.3.1 The species wise detail of compartments allotted to this working circle is given in Annexure III. The Range wise abstract of the area under different species in this working circle is given below in the table No. 10.1.

Range	Commercial area				Un-Com Area in l	Grand Total			
	Deodar	Kail	Fir	Chir	Sub- Total	Broad/Lea ved	Blank/ Scrub	Sub- Total	
Ramnagar North	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ramnagar South	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Basantgarh	155	51	2155	0	2361	411	246	657	3018
Total	155	51	2155	0	2361	411	246	657	3018

# Range wise distribution of area (in hectares) allotted to Fir Working Circle of Ramnagar Forest Division

# 10.4. Special objectives of Management

- To create congenial condition for the establishment of regeneration and conservation of soil and moisture.
- To obtain timber on a sustained basis.
- To supplement natural regeneration by plantation of nursery raised plants.
- To protect these forests for their aesthetic value.

# 10.5. Silvicultural System Adopted

- 10.5.1 The forests which are allotted to this working circle exist on the uppermost area of catchment with a hilly terrain. These forests are mainly responsible for water and soil conservation. So keeping in view the condition, composition and environmental functions of these forests, they shall be managed under the Selection system. The main objectives behind the application of this system are:-
  - To distribute the regeneration evenly over the entire working circle.
  - Since Fir and Spruce are shade bearing species, so the presence of continuous shade will secure their regeneration. This system allows the removal of silviculturally available trees (above exploitable diameter).
- 10.5.2 The fellings are spread over the entire area and not so concentrated like in the uniform system. The removal of mature and over mature trees will be restricted in those pockets where regeneration has established. In areas deficient or lacking regeneration only improvement fellings will be carried out. In case large gaps already present no felling shall be carried out. Other species such as Spruce, Deodar and Kail falling within the compartments of this working circle will get the same treatment as Fir.

# 10.6 Exploitable Size

10.6.1 The exploitable diameter for Fir and Spruce is fixed at 80 cms. dbh (ob). Similarly, exploitable diameter for Deodar and Kail is fixed at 70 cms. dbh (ob). Keeping in view the overall deficiency of regeneration and higher proportion of mature and over mature trees in Fir, exploitable diameter has been raised from 70 cms. (technically exploitable size) to 80 cms. dbh (ob) in the plan under revision.

# 10.7 Rotation

10.7.1 The rotation has no significance in selection system. However, for the academic purpose the rotation of 230, 150 and 150 years has been adopted for Fir, Deodar & Kail respectively, corresponding to exploitable diameter of 80 cms. dbh (ob) for Fir and 70 cms. dbh (ob) for Deodar and Kail.

# 10.8 Felling Cycle

10.8.1 A felling cycle of 30 years is adopted which has been found to be convenient, based on our past experience.

# 10.9 Felling Series

10.9.1 There will be only one Felling Series spread over the entire working circle. The territorial Divisional Forest Officer will decide the order of fellings.

# 10.10 Analysis and Evaluation of the Crop

10.10.1 The point sampling technique has been adopted for assessment of growing stock. The field data was collected from 25 sample points. Mean value of three variables viz number of stems per hectare, volume of conifers 30 cms. dbh (ob) above and basal area of conifers per hectare have been computed species and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 10.2.

The diameter class and species wise average number of trees per hectare are given in Table No 10.3.

The diameter class and species wise total number of trees commercial area (2361 hectare) of the working circle are given in Table No. 10..4.

The diameter class and species wise average volume of trees per hectare are given in Table no. 10.5.

The diameter class and species wise total volume of coniferous trees commercial area (2361 hectare) of the working circle are given in Table No. 10.6.

The diameter class and species wise total number of trees calculated at lower confidence limit commercial area (2361 hectare) of the working circle are given in Table No. 10.7.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (2361 hectare) of the working circle are given in Table No. 10.8.

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								Confider	ice limits		Lower limit
Working	Variable	Sample	Mean	Variance	Standard	Standard	Coefficient	(95	5%)	Confidence	as
							of				
Circle	(per ha.)	Points			Deviation	Error	variation	(X <u>+</u> t :	x S.E.)	Interval	% of mean
								Lower	Upper		
		(n)	(X)	(S <sup>2</sup> )	(S)	(S.E.)	(%)	limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
								t= 2.06			
Fir	No. of										
Selection	Stems	25	123.08	9906.32	99.53	19.91	80.87	82.07	164.09	82.01	67%
Working											
Circle	Volume	25	249.00	27739.42	166.55	33.31	66.89	180.38	317.62	137.24	72%
	Basal Area	25	22.25	230.68	15.19	3.04	68.26	15.99	28.51	12.52	72%

Results of Statistical analysis for Fir Selection Working Circle

Column 7 : S.E. = S/ square root (n)

Column 8 : C.O.V (%) = (S/X) x 100

Column 9 : Lower limit = X - 1.96 x S.E.

Column 10 : Upper Limit = X + 1.96 x S.E.

Column 11 : C.I. = Upper limit - Lower limit

	Diameter Class (Cm)									Grand
Species	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total
Deodar	0.00	2.80	1.36	3.40	0.16	0.08	0.00	0.12	0.00	7.92
Kail	0.00	1.44	1.08	0.00	0.00	0.00	0.00	0.00	0.00	2.52
Fir	18.24	29.44	31.88	15.44	9.64	4.28	1.16	0.96	1.60	112.64
Chir	0	0	0	0	0	0	0	0	0	0.00
B.L.	0	0	0	0	0	0	0	0	0	0.00
Total	18.24	33.68	34.32	18.84	9.80	4.36	1.16	1.08	1.60	123.08

Statement showing species and diameter(cm) class wise tree count of Fir Selection Working Circle Tree count per hectare (Mean Value).

# Table No. 10.4

Total tree	Total tree count over the entire commercial area of Fir Selection Working Circle (Area = 2									61 hectares)
Species		Diameter Class (Cm)								Grand
	20-30         30-40         40-50         50-60         60-70         70-80         80-90         90-100         100 <								100 <	Total
Deodar	0	6611	3211	8027	378	189	0	283	0	18699
Kail	0	3400	2550	0	0	0	0	0	0	5950
Fir	43065	69508	75269	36454	22760	10105	2739	2267	3778	265943
Chir	0	0	0	0	0	0	0	0	0	0
B.L.	0	0	0	0	0	0	0	0	0	0
Total	43065	79518	81030	44481	23138	10294	2739	2550	3778	290592

Statement showing species and diameter(cm) class wise volume(m<sup>3</sup>) of Conifers in Fir Selection Working Circle

Volume of conifers per hectare (Mean Value).

		Diameter Class (Cm)								
Species	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total	
Deodar	2.13	1.81	7.14	0.50	0.35	0.00	0.82	0.00	12.75	
Kail	0.00	1.96	2.45	0.00	0.00	0.00	0.00	0.00	4.41	
Fir	24.73	49.73	45.86	47.24	29.32	9.63	9.02	16.30	231.83	
Chir									0.00	
Total	26.86	53.50	55.45	47.74	29.67	9.63	9.84	16.30	248.99	

### Table No. 10.6

Total volume of conifers over the entire commercial area of Fir Selection Working Circle(Area = 2361)								61 hectares)	
Species		Diameter Class (Cm)							
	30-40	<b>30-40 40-50 50-60 60-70 70-80 80-90 90-100 100</b> <							
Deodar	5029	4273	16858	1181	826	0	1936	0	30103
Kail	0	4628	5784	0	0	0	0	0	10412
Fir	58388	117413	108275	111534	69225	22736	21296	38484	547351
Chir	0	0 0 0 0 0 0 0 0							0
Total	63416	126314	130917	112714	70051	22736	23232	38484	587865

Total tree count of commercial area (2361 ha) at lower interval for Fir Selection Working Circle Lower line										er limit 67%
				Diar	neter Class	; (Cm)				Grand
Species	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total
Deodar	0	4429	2151	5378	253	127	0	190	0	12528
Kail	0	2278	1708	0	0	0	0	0	0	3986
Fir	28853	46570	50430	24424	15249	6770	1835	1519	2531	178182
Chir	0	0	0	0	0	0	0	0	0	0
B.L.	0	0	0	0	0	0	0	0	0	0
Total	28853	53277	54290	29802	15502	<b>6897</b>	1835	1708	2531	194697

Distribution of stems and volume (m<sup>3</sup>) in Deodar Fir working circle computed at lower confidence interval.

# Table No. 10.8

### Total volume of conifers over the entire commercial area (2361 ha)

at lower interval for Fir Selection Working Circle

at lower i	at lower interval for Fir Selection Working Circle Lowe									
Species		Diameter Class (Cm)								
	30-40	30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <								
Deodar	3621	3077	12137	850	595	0	1394	0	21674	
Kail	0	3332	4165	0	0	0	0	0	7497	
Fir	42039	84537	77958	80304	49842	16370	15333	27709	394092	
Chir	0	0 0 0 0 0 0 0 0								
Total	45660	90946	94261	81154	50437	16370	16727	27709	423263	

# 10.11 Calculation of Yield

- 10.11.1 The yield will be calculated in terms of number of trees and volume, which in turn shall be controlled by area check by working out the size of the annual coupe. Modified Brandis diameter class method and Von Mantle's formula have been applied for calculation of the yield. The following presumptions have been made in this regard:
  - 1. Only commercial area and its growing stocks has been taken into account for the purpose of yield calculation.
  - 2. The growing stock over commercial area of this working circle is fixed within 10 cm diameter classes indicated by Symbols, I, II, III, IV, V & VI. Class I stands for trees above the exploitable diameter and the other successively below it, to the youngest.
  - 3. The number of trees of in all those classes being considered for the purposes of yield calculation have been reduced to the lower limit of confidence interval.
  - 4. To attain exploitable diameter of 70 cm dbh. it takes 121 years for an average deodar tree, 112 years for an average kail tree and 221 years for an average fir tree.
  - 5. It takes 15, 13 and 25 years respectively for an average Deodar, Kail and Fir trees to pass from approach class (60-70 cm d.b.h. in the case of Deodar and Kail, 70-80 cm d.b.h. in the case of Fir) to exploitable classes.
  - 6. In view of preponderance of mature and over mature growing stock and their vulnerability to rot, the yield finally arrived at shall be reduced by 15%.

The following survival coefficient percent based on the All India volume tables in respects of Deodar, Kail and Fir have been used in yield calculation.

Diameter-Class d.b.h. (cm)	Survival percentage of species						
	Deodar	Kail	Fir				
30-40	30%	45%	20%				
40-50	60%	60%	40%				
50-60	80%	80%	50%				
60-70	90%	90%	60%				
70-80	95%	95%	85%				
80 & above	-	-	95%				

#### Table No. 10.9

Based on the assumption above, the number of total potentially available trees over the commercial area of this working circle, calculated at lower confidence limit of the mean value, after due deduction on account of mortality, is tabulated under table no.

Species and diameter-class wise potential availability of trees from the commercial area of Fir Selection Working <u>Circle</u>

DEGDIA							
Class	VI	V	IV	III	II	Ι	Total
<b>Diameter-class</b>	below 30	30-40	40-50	50-60	60-70	above 70	
Total No. of trees assessed at	0	6611	3211	8027	378	472	18699
mean value							
Total No. of trees assessed at	0	4429	2151	5378	253	316	12528
lower limit of confidence							
interval							
Age of entry in the class		57	71	90	110	135	
Years in class transition period		14	19	20	25		
Survival Coefficient of the class		0.30	0.60	0.80	0.90	0.95	
No. of potentially available trees		1329	1291	4302	228	300	7450

#### DEODAR

KAIL

Class	VI	V	IV	III	II	Ι	Total
Diameter-class	below 30	30-40	40-50	50-60	60-70	above 70	
Total No. of trees assessed at	0	3400	2550	0	0	0	5950
mean value							
Total No. of trees assessed at	0	2278	1709	0	0	0	3987
lower limit of confidence							
interval							
Age of entry in the class		42	55	72	91	115	
Years in class transition period		13	17	19	24		
Survival Coefficient of the class		0.45	0.60	0.80	0.90	0.95	
No. of potentially available trees		1025	1025	0	0	0	2050

FIR							
Class	VI	V	IV	III	II	Ι	Total
Diameter-class	30-40	40-50	50-60	60-70	70-80	above 80	
Total No. of trees assessed at	69508	75269	36454	22760	10105	8783	222879
mean value							
Total No. of trees assessed at	46570	50430	24424	15249	6770	5885	149329
lower limit of confidence							
interval							
Age of entry in the class	84	109	136	166	196	221	
Years in class transition period	25	27	30	30	25		
Survival Coefficient of the class	0.20	0.40	0.50	0.60	0.85	0.95	
No. of potentially available trees	9314	20172	12212	9150	5755	5590	62193

The stepwise calculation of yield in Fir Selection Working Circle on the basis of modified Brandis Diameter Class Method is detailed in Table no.

a)	Total number of trees in class I	JEODAR 300	KAIL 0	5590
b)	Total number of trees likely to pass on to			
		220	0	5755
	Class II Class III	220 //320*(5/20)	0*(6/19)	9150*(5/30)
	=	4320 (3/20) 1080	0 (0/13)	1525
c)	Total recruitment in class I from class II and III during first felling cycle	1308	0	7280
d)	Annual recruitment from class II and III during the first felling cycle (c / 30)	52	0	243
	Stock required to be kept as receive i.e.			
e)	half of the total recruitment in 'c' above	654	0	3640
			C C	
f)	Surplus stock of class I ( a - e)	-354	0	1950
g)	Total possibility of yield in first felling cycle if all surplus stock in 'f' above is removed ( c + f)	954	0	9230
			-	
h)	Annual yield (g/30)	32	0	308
i)	Total possibility of yield if all surplus stock			
	in 'f' above is removed in two felling $r_{1}(a) = r_{2}(a)$	054	0	0255
	cycles(c+1/2)	954	0	8255
j)	Annual yield (i / 30)	32	0	275
k)	Weighted average volume of trees above exploitable diameter as per Kullu Volume			
	Tables in cubic metres	6.11	5.66	9.30
I)	Total annual volume yield (m <sup>3</sup> )	194	0	2559
m)	Deduct fifteen percent from 'l' above to			
	account for mortality	165	0	2175
n)	Rounded off to lower multiple of hundred	100	0	2100
	TOTAL	2,200	m <sup>3</sup>	

Yield Calculation for Fir Selection Working Circle using Brandis Diameter-Class Method

120

# 10.12 The Yield Calculated By Von Mantle's Formula

=

Annual Yield

2 X Growing Stock Rotation

Species	Growing Stock at Lower Confidence Limit (Cubic meter)	Rotation (years)	Annual Yield (Cubic meter)	Rounding Off to nearest multiple of 100
Deodar	21674	150	289	300
Kail	7497	150	100	100
Fir	394092	225	3503	3500
Total Yield	423263		3892 m <sup>3</sup>	3900 m <sup>3</sup>

#### Table No.10.12

After comparing the yield by both the methods the yield calculated by Brandis method is more than the yield calculated by Von Mantle's Formula. Taking into consideration the conservative point of view therefore the yield calculated by Brandis Formula is adopted and prescribed as under:

Deodar	=	100 m <sup>3</sup>
Kail	=	0 m <sup>3</sup>
Fir	=	2100 m <sup>3</sup>
Total	=	2200 m <sup>3</sup>

# 10.13 Size of Annual Coupe

The size of annual coupe is calculated by formula

Area of Annual Coupe =

<u>Commercial area in Hectare</u>. Felling Cycle

Commercial Area	Felling Cycle	Area of Annual Coupe (in Hectare)
2361	30	79

# 10.14 Annual Cut Per Hectare

10.14.1 The annual cut per hectare is obtained by dividing annual yield of the working circle with the area of annual coupe.

```
Annual Cut per hectare = <u>Annual Yield</u>.
Area of Annual Coupe
```

Annual Yield	Area of Annual Coupe	Annual cut per hectare (in m <sup>3</sup> )
2200	79	28

The percentage of Annual Yield with respect to growing stock

#### = <u>Annual Yield × 100</u> Total Growing Stock

Annual Yield	Growing Stock	Percentage
2200	423263	0.51%

# 10.15 Realization of Yield

10.15.1 All fit trees above 30 cm dbh (ob) marked for whatever purpose will count towards yield. Since the Deodar, Kail and Fir are not present uniformly, so it may not be possible to realize species wise yield. Thus, yield prescribed should be regulated in totality. However, a deviation of <u>+</u> 20% from the prescribed yield is permitted.

# 10.16 Sequence of Felling

10.16.1 Due to ban on green fellings the sequence of felling has been left at the discretion of concerned Divisional Forest Officer who shall keep in view the progress of regeneration.

# 10.17 Method of Executing Fellings

10.17.1 Removal of over-wood standing above the advance growth and regeneration, with a view to liberate it from shade and suppression, and very light opening of the crop where regeneration is inadequate, will constitute the general guide-lines in the execution of fellings, The over-wood standing above the regeneration must be removed gradually. In order to avoid the invasion of the area by weeds, which come up profusely in the gaps, the canopy needs to be manipulated with utmost care. Selection forests require elaborate management and great skill on the part of the executive staff to handle the crop. Accordingly the following marking rules are laid down for guidance of the marking officer.

### 10.18 Marking and Felling Rules

- 10.18.1 The marking officer, prior to conducting the marking, must acquaint himself thoroughly with the condition and composition of the crop in the compartment and its boundaries by traversing over the area of the compartment, at least once.
  - Marking should done by the DCF in-charge of the Division or well trained and experienced ACF. Marking should never be conducted by anybody below the rank of a well trained and experienced Range Officer, in which case the DFO/ACF should check at least 25% of these markings.
  - No marking, except the removal of dead, dying and diseased trees, shall be done in areas near and
around cultivation and *behaks* with in a distance of 100 meters from their periphery.

- No marking, except the removal of actually dead, dying diseased trees, shall be done along nallah banks within a distance of at least 100 meters on either side.
- No healthy trees below the exploitable size shall be marked.
- No attempt shall be made to disturb the process of the succession by giving preference to one species over the others. The selection character of the crop shall be preferred over the area of this working circle and should be maintained by retaining some healthy trees of exploitable size which do not cause any suppression to the crop.
- No marking should be conducted in areas lacking regeneration. No marking should be done on steep and precipitous slopes.
- The over-mature trees should get preference over the relatively younger and healthier ones.
- Improvement and hygienic marking in all age-classes shall be done.
- Marking for improvement felling shall form an integral part of the major marking.
- All dead, dying, dry and diseased trees shall be marked together with malformed and unfit trees.
- All the trees of exploitable size (70 cm d.b.h. in case of Deodar and Kail and 80 cm d.b.h. in case of Fir) standing over adequate advance growth should be removed.
- Advance growth includes all the trees and poles up to exploitable size. Selection markings of light to very light intensity shall be done in areas having inadequate but established regeneration.
- In dense groups of trees, of and above exploitable size, the spacing between the stems to be retained will vary from 5 to 8 meters depending upon the status and amount of regeneration present. Selection felling of moderate intensity shall be carried out in such groups.
- In the mixed crop, ecologically most suitable species to the locally should be favored.
- The intensity of felling, over a particular compartment, will largely depend upon the degree of biotic interference to which it is subjected, the amount and status of regeneration, topography, slope and aspect
- Extreme care has to be exercised at the time of felling so *as* not to damage the crop below.
- Trees marked for felling should be lopped before execution of felling.

#### **10.19 Supplementary Markings**

10.19.1 As soon as the felling following major marking is over, supplementary marking of poles and trees damaged in felling, or those that have died, dried or fallen off subsequent to the major felling, should be done. Due caution is required to be taken to avoid large scale supplementary markings which prove dangerous to the ultimate requirement of the crop and the site. Preferably, these markings should be conducted by the DFO himself. Past experience has shown that inn certain cases, the quantity of supplementary marking did exceed the original one. Judicious discretion of the marking officer is, therefore, needed to ensure that provision of supplementary marking is not misused, and only such trees as are considered definitely unfit for retention, or are not likely to survive in the near future, are marked.

#### 10.20 Cultural Operations

10.20.1 Since Fir forests are situated on higher elevations and are mostly away from inhabitations, so the collection of felling debris by local inhabitants for fuel wod purpose is negligible. So in order to maintain the hygiene of the forests the felling debris shall be disposed off during safe season at safer places as early as possible.

#### 10.21 Regeneration Programme

10.21.1 An area of 79 hectares which is equal to area of annual coupe is proposed to be taken up rehabilitation. The success or failure of any silvicultural system adopted and treatment given to crop depends upon the success or failure of natural regeneration. All the factors responsible for successful establishment of natural regeneration are favourable except one i.e. biotic interference. The biotic interference in the form of grazing is to such an extent that it does not allow the natural regeneration to come up and get established the extent of area deficient of natural regeneration (equal to the size of annual coupe, evenly distributed over the total area of the working circle), should be closed to grazing every year. All efforts should be made to induce natural regeneration and assist the establishment of natural regeneration. This involves removal of weeds, raking up of humus and closure of such areas for grazing. In case Forest do not regenerate naturally the artificial regeneration by way of sowing and planting of nursery raised seedlings should be resorted to.

#### 10.22 Artificial Regeneration (Nursery and Plantation Techniques)

#### Abies pindrow (Fir)

It is a slow growing species which require cool and moist climate. It occur at an altitude ranging from 2200 to 3300 meters, but sometimes extends to 2000 to 3300 meters

Seed:-Good seed year normally occur in 6-7 years. Seed ripen in the month of October-November.

Seed weight:- It weighs about 2500 seeds per Kilogram.

Germination Percent:- It normally ranges from 40 to 65. The germination starts after 4-5 months and completes in about one and a half months.

Nursery Technique:-Seeds are sown in nursery beds in November-December i.e. before snowfall and the germination starts in April. The seedlings remain in nursery for one and a half years.

Planting Technique:-The planting out is usually done during the month of March / April when the snow starts melting. It is done in pits of size 45cm x 45cm x 45cm at a spacing of 2m x 2m and cleaning is to be done twice a year.

#### 10.23 Control of Grazing

10.23.1 It is an admitted fact that unrestricted, uncontrolled and unregulated over grazing in Fir forest is main reason for the failure of the regeneration of Fir. These forests are grazed starting from the melting of snow in spring till the snow falls in winter, by large herds of cattle of both nomads as well as local inhabitants.

Under prevailing circumstances it is difficult to control and restrict the grazing in these forests. It is therefore, suggested that efforts should be made so that nomads and local people are actively involved in the protection of these forests.

# **CHAPTER-XI**

### Working Plan for Chir Selection Working Circle

#### **CHAPTER-XI**

#### Working Plan For Chir Selection Working Circle

#### 11.1 General Constitution of the Working Circle

11.1.1 All the Chir forests of the Division which are easy accessible and comparatively better stocked are allotted to this working circle. This working circle constitutes 15.52% area of the Division. This working circle is identical in constitution to the corresponding working circle of the plan under revision except compartment Numbers23a/R/N, 45/R/S and 57 R/S which have been allotted to ecotourism working circle. The detail of compartments allotted to this working circle in plan under revision and proposed plan is as under:-.

	Plan under Revision		Proposed Pl	an
Range	Comptt No.	Area in	Comptt No.	Area in
		Hectare		Hectare
Ramnagar North	1, 2, 3a, 8, 9b, 10a, 10b,	2124	1, 2, 3a, 8, 9b, 10a,	1974
	11, 12, 17a, 17b, 20,		10b, 11, 12, 17a, 17b,	
	22a, 23a		20, 22a	
Ramnagar South	28b, 33a, 41, 42, 44, 45,	3247	28b, 33a, 41, 42, 44,	2913
	46, 47, 48, 49, 50, 51,		46, 47, 48, 49, 50, 51,	
	52, 53, 54, 56, 57, 58		52, 53, 54, 56, 58	
Basantgarh	70, 71	522	70, 71	522
Total		5893		5409

#### Table No. 11.1

#### 11.2 General Character of Vegetation

- 11.2.1 The forest compartments allotted to this working circle consists of almost pure Chir forests. These forests are generally poorly stocked, malformed, mostly young to middle aged with low proportion of mature and over mature trees.
- 11.2.2 There is a remarkable difference in term of vigor of the Chir crop between the crop growing on deep soils and steep slopes. The trees have been affected badly due to frequent forest fires and heavy resin tapping. Though there is no problem of regeneration to come up but it is not able to get established due to heavy biotic pressure.
- 11.2.3 The prominent associates of the Chir towards its lower limits are:-Mallotus philippensis, Emblica officinalis, Acacia modesta, Euphorbia royleana, Sapindus mukorossi, Terminalia chebula, Terminalia belerica, Pistacia integerrima, Cassia fistula, Woodfordia floribunda, Dodonaea viscose, Carrisa spinarum, Adhatoda vasica, Zizyphus jujube, Punica granatum etc.
- 11.2.4 The prominent associates of the Chir towards its upper limits *are Rhododendron arbareum*, *Pierisovalifolia*, *Quercus leucotrichophora*, *Prunus species*, *Cratecus species etc*.

#### 11.3 Area Statement

11.3.1 The species wise detail of compartments allotted to this working circle is given in Annexure IV. The Range wise abstract of the area under different species in this working circle is given below in the Table No. 11.2.

#### Table No. 11.2

### Range wise distribution of area (in hectares) allotted to Chir Selection Working Circle of Ramnagar Forest Division

Range	Co	ommercia	l area in	Hectare		Un-C	ommercia	l Area	Grand
	Deodar	Kail	Fir Chir Sub- B/L				Blank/	Sub-	Total
					Total		Scrub	Total	
Ramnagar	Nil	Nil	Nil	1715	1715	96	163	259	1974
North									
Ramnagar	Nil	Nil	Nil	2603	2603	119	191	310	2913
South									
Basantgarh	Nil	Nil	Nil	375	375	147	0	147	522
Total	Nil	Nil	Nil	4693	4693	362	354	716	5409

#### 11.4 Special Objectives of Management

- i. To remove mature and overmature trees interfering with the establishment of advance growth.
- ii. To promote natural regeneration of Chir.
- iii. To supplement natural regeneration with artificial restocking by Patch Sowing and planting of poly bagged nursery raised plants of Chir in blanks.
- iv. To obtained yield of timber and resin on sustained basis.

#### 11.5 Silvicultural system adopted

11.5.1 During the past i.e. since 1959 the Chir forest of Ramnagar North and South Ranges were managed under Indian Shelterwood compartment system however, only a small fraction (3.2%) of the area i.e. 286 hectare out of a total of 8944 hectare under this working circle has been converted to uniform crop. In other words, actually no conversion to uniform crop has taken place. So, keeping in view the irregularity of the crop it is not feasible to continue with the Indian Shelterwood Compartment System but to adopt Indian Selection System.

#### 11.6 Exploitable Size

11.6.1 The exploitable size for Chir has been fixed 70 cm. dbh (ob)

#### 11.7 Rotation

11.7.1 Technically a rotation of 120 years is fixed for Chir in this working circle. The average exploitable diameter of Chir corresponding to rotation age for the site qualities prevalent in this area is 60cm.dbh (ob).

#### 11.8 Felling Cycle

11.8.1 A felling cycle of 30 years is adopted which has been found to be convenient based on past experience.

#### 11.9 Felling Series

11.9.1 There will beonly one felling series in the working circle

#### 11.10. Regeneration Period

11.10.1 As the area is prone to forest fire and heavy grazing, a regeneration period of 30 years is fixed in this working circle during this plan period.

#### 11.11 Analysis and Evaluation of the Crop

11.11.1 The point sampling technique has been adopted for assessment of growing stock. The field data was collected from 81 sample points. Mean value of three variables viz. number of stems per hectare, volume of conifers 30 cm. dbh (ob) above and basal area per hectare have been computed species wise and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 11.3.

The diameter class and species wise average number of trees per hectare are given in Table no. 11.4.

The diameter class and species wise total number of trees commercial area (4693 hectare) of the working circle are given in Table No. 11.5

The diameter class and species wise average volume of trees per hectare are given in Table No. 11.6.

The diameter class and species wise total volume of coniferous trees commercial area (4693 hectare) of the working circle are given in Table No. 11.7.

The diameter class and species wise total number of trees calculated at lower confidence limit commercial area (4693 hectare) of the working circle are given in Table NO. 11.8.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (4693 hectare) of the working circle are given in Table No. 11.9.

Results of Statistical analysis for Chir Selection Working Circle

Working	Variable	Sample	Mean	Variance	Standard	Standard	Coefficient	Confider (95	ice limits	Confidence	Lower limit
	Variable	oumpie	mean	Variance	btandard	otandara	of	(55	,,,,	Connachae	
Circle	(per ha.)	Points			Deviation	Error	variation	(X <u>+</u> t :	x S.E.)	Interval	% of mean
			0.0	(2)	(0)			Lower	Upper	(2.1)	
		(n)	(X)	(S <sup>2</sup> )	(S)	(S.E.)	(%)	limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
								t=	1.96		
Chir	No. of										
Selection	Stems	81	206.32	3715.60	60.96	6.77	29.54	193.05	219.59	26.55	94%
Working											
Circle	Volume	81	186.77	6459.00	80.37	8.93	43.03	169.27	204.27	35.00	91%
	Basal Area	81	26.44	58.81	7.67	0.85	29.00	24.77	28.11	3.34	94%
		3-		00.01							2

Column 7 : S.E. = S/ square root (n)

Column 8 : C.O.V (%) = (S/X) x 100

Column 9 : Lower limit =  $X - 1.96 \times S.E.$ 

Column 10 : Upper Limit = X + 1.96 x S.E.

Column 11: C.I. = Upper limit - Lower limit

	Diameter Class (Cm)											
Species	20-30	20-30         30-40         40-50         50-60         60-70         70-80         80-90         90-100         100 <										
Deodar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Chir	34.22	89.42	54.48	16.63	5.69	2.91	1.59	0.14	0.05	205.13		
B.L.	0.00	1.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19		
Total	34.22	90.61	54.48	16.63	5.69	2.91	1.59	0.14	0.05	206.32		

Statement showing species and diameter(cm) class wise tree count of Chir Selection Working Circle Tree count per hectare (Mean Value).

#### Table No. 11.5

Total tree	e count over	the entire co	ommercial a	rea of Chin	r Selection	Working	Circle		(Area = 46)	593 hectares)		
		Diameter Class (Cm)										
Species	20-30	20-30 30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <										
Deodar	0	0	0	0	0	0	0	0	0	0		
Kail	0	0 0 0 0 0 0 0 0 0 0										
Fir	0	0	0	0	0	0	0	0	0	0		
Chir	160594	419648	255675	78045	26703	13657	7462	657	235	962675		
B.L.	0	5585	0	0	0	0	0	0	0	5585		
Total	160594	425233	255675	78045	26703	13657	7462	657	235	968260		

volume of conners per nectare (wear value).												
		Diameter Class (Cm)										
Species	30-40	30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <										
Deodar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Chir	42.92	61.56	36.75	20.15	14.19	9.87	0.95	0.37	186.76			
Total	42.92	61.56	36.75	20.15	14.19	9.87	0.95	0.37	186.76			

Statement showing species and diameter(cm) class wise volume (m<sup>3</sup>) of Conifers in Chir Selection Working Circle Volume of conifers per hectare (Mean Value).

#### Table No. 11.7

Total volume of conifers over the entire commercial area of Chir Selection Working Circle(Area = $4693$											
		Diameter Class (Cm)									
Species	30-40	<b>30-40 40-50 50-60 60-70 70-80 80-90 90-100 100</b> <									
Deodar	0	0 0 0 0 0 0 0 0									
Kail	0	0	0	0	0	0	0	0	0		
Fir	0	0	0	0	0	0	0	0	0		
Chir	201424	201424 288901 172468 94564 66594 46320 4458 1736									
Total	201424	288901	172468	94564	66594	46320	4458	1736	876465		

Distribution of stems and volume (m<sup>3</sup>) in Chir working circle computed at lower confidence interval.

### Total tree count of commercial area (4693 ha) at lower interval for Chir Selection Working Circle

Lower limit 94%

										Grand		
				Diamete	er Class (Cr	n)				Total		
Species	20-30	20-30 30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <										
Deodar	0	0	0	0	0	0	0	0	0	0		
Kail	0	0	0	0	0	0	0	0	0	0		
Fir	0	0	0	0	0	0	0	0	0	0		
Chir	150959	394469	240334	73362	25101	12837	7014	618	221	904915		
B.L.	0	5250	0	0	0	0	0	0	0	5250		
Total	150959	399719	240334	73362	25101	12837	7014	618	221	910164		

#### Table No. 11.9

Total volume of conifers over the entire commercial area (4693 ha) at lower interval for Chir Selection Working Circle

at lower	at lower interval for Chir Selection Working Circle Lower									
			Di	ameter Cla	ass (Cm)				Grand	
Species	30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <									
Deodar	0	0	0	0	0	0	0	0	0	
Kail	0	0	0	0	0	0	0	0	0	
Fir	0	0	0	0	0	0	0	0	0	
Chir	183295	262900	156946	86053	60600	42151	4057	1580	797583	
Total	183295	262900	156946	86053	60600	42151	4057	1580	797583	

#### 11.12 Calculation of Yield

- 11.12.1 The yield will be calculated in terms of number of trees and volume, which in turn shall be controlled by area check by working out the size of the annual coupe. Modified Brandis diameter class method and Von Mantle's formula have been applied for calculation of the yield. The following presumptions have been made in this regard:
  - i. Only commercial area and its growing stocks has been taken into account for the purpose of yield calculation.
  - ii. The growing stock over commercial area of this working circle is fixed within 10 cm diameter classes indicated by Symbols, I, II, III, IV, V & VI. Class I stands for trees above the exploitable diameter and the other successively below it, to the youngest.
  - iii. The number of trees of in all those classes being considered for the purposes of yield calculation have been reduced to the lower limit of confidence interval.
  - iv. It takes about 24 years for an average tree of Chir to pass from approach class (60-70 cm d.b.h. in the case of Deodar and Kail, 70-80 cm d.b.h. in the case of Fir) to exploitable classes.
  - v. In view of preponderance of mature and over mature growing stock and their vulnerability to rot, the yield finally arrived at shall be reduced by 15%.
  - vi. The following survival coefficient percent based on the All India volume tables in respects of Chir has been used in yield calculation.
- 11.12.2 Based on the assumption above, the number of total potentially available trees over the commercial area of this working circle, calculated at lower confidence limit of the mean value, after due deduction on account of mortality, is tabulated under Table No. 11.10.

Table No.	11.10
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Diameter-Class d.b.h. (cm)	Survival percentage of species
	Chir
30-40	35%
40-50	60%
50-60	80%
60-70	90%
70-80	95%

Species and diameter-class wise potential availability of trees from the commercial area of Chir Working Circle

Crint							
Class	VI	v	IV	ш	П	I	Total
Diameter-class	below 30	30-40	40-50	50-60	60-70	above 70	
Total No. of trees							
assessed at	160594	419648	255675	78045	26703	22011	962676
mean value							
Total No. of trees	-						
assessed at	150958	394469	240335	73362	25101	20690	904915
lower limit of							
confidence interval							
Age of entry in the class		40	57	74	95	120	
Years in class transition							
period		17	17	21	25		
Survival Coefficient of	-						
the class		0.35	0.60	0.80	0.90	0.95	
No. of potentially							
available trees		138064	144201	58690	22591	19656	383201

#### CHIR

	Yield Calculation for Chir Working Circle		
	using Brandis Diameter-Class Method.	СНІР	KAII
a)	Total number of trees in class I	19656	0
b)	Total number of trees likely to pass on to class I in the first felling cycle from	22504	
	Class II Class II	22591 58600*(5/21)	0
	=	13974	0
c)	Total recruitment in class I from class II and III during first felling cycle	36565	0
d)	Annual recruitment from class II and III during the first felling cycle (c / 30)	1219	0
e)	Stock required to be kept as reserve i.e. half of the total recruitment in 'c' above	18282	0
f)	Surplus stock of class I ( a - e)	1374	0
g)	Total possibility of yield in first felling cycle if all surplus stock in 'f' above is removed ( c + f)	37938	0
h)	Annual yield (g/30)	1265	0
i)	Total possibility of yield if all surplus stock in 'f' above is removed in two felling cycles ( c + f/2)	37252	0
j)	Annual yield ( i / 30)	1242	0
k)	Weighted average volume of trees above exploitable diameter as per Kullu Volume		
	Tables in cubic metres	6.38	5.66
I)	Total annual volume yield ( m <sup>3</sup> )	7922	0
m)	Deduct fifteen percent from 'l' above to		
	account for mortality	6734	0
n)	Rounded off to lower multiple of hundred	7000	0
	TOTAL	7,000	m <sup>3</sup>

#### 11.13 Calculation of Yield Von Mantle's Formula

Annual Yield	=	2 X Growing Stock
		Rotation
Annual Yield for Chir	=	<u>2x797583</u>
		150
	=	10634 m <sup>3</sup>

11.13.1 After comparing the yield by both the methods the yield calculated by Brandis diameter class method is more conservative than the yield calculated by Von Mantles Formula and therefore the yield has been calculated but not prescribed.

#### 10.14. Size of Annual Coupe

11.14.1 The size of annual coupe is calculated by the formula

Area of Annual Coupe =

Commercial area in Hectare Felling Cycle

Commercial Area	Felling Cycle	Area of Annual Coupe( in Hectare)				
4693	30	156				

#### 11.15 Annual Cut Per hectare

11.15.1 The annual cut per hectare is obtained by dividing annual yield of the working circle with the area of annual coupe.

Annual Cut per hectare =

Annual Yield

Area of Annual Coupe

Annual Yield	Area of Annual Coupe	Annual cut per hectare m <sup>3</sup>
7000	156	45

The per hectare percentage of Annual Yield with respect to growing stock

= <u>Annual Yield X</u> 100 Total Growing Stock

Annual Yield	Growing Stock	Percentage		
7000	797583	0.87%		

#### 11.16. Realization of Yield

11.16.1 All fit trees above 30 cm dbh (ob) marked for whatever purpose will count towards yield. Since the Deodar, Kail and Fir are not present uniformly, so it may not be possible to realize species wise yield. Thus, yield prescribed should be regulated in totality. However, a deviation of <u>+</u> 20% from the prescribed yield is permitted.

#### 11.17. Method of Executing Felling

11.17.1 In this working circle the felling cycle has been fixed for 30 years and period of this plan is 10 years. So only one third of the total commercial area shall be available for working. Since due to ban on green felling no commercial exploitation has taken place during the currency of the Zadoo's Working Plan.

#### 11.18. Marking and Felling Rules

- 11.18.1 The marking officer, prior to conducting the marking, must acquaint himself thoroughly with the condition and composition of the crop in the compartment and its boundaries by traversing over the area of the compartment, at least once.
  - Marking should done by the DCF in-charge of the Division or well trained and experienced ACF. Marking should never be conducted by anybody below the rank of a well trained and experienced Range Officer, in which case the DFO/ACF should check at least 25% of these markings.
  - No marking, except the removal of dead, dying and diseased trees, shall be done in areas near and around cultivation and *behaks* with in a distance of 100 meters from their periphery.
  - No marking, except the removal of actually dead, dying diseased trees, shall be done along nallah banks within a distance of at least 100 meters on either side.
  - No healthy trees below the exploitable size shall be marked.
  - No attempt shall be made to disturb the process of the succession by giving preference to one species over the others. The selection character of the crop shall be preferred over the area of this working circle and should be maintained by retaining some healthy trees of exploitable size which do not cause any suppression to the crop.
  - No marking should be conducted in areas lacking regeneration. No marking should be done on steep and precipitous slopes.
  - The over-mature trees should get preference over the relatively younger and healthier ones.
  - Improvement and hygienic marking in all age-classes shall be done.
  - Marking for improvement felling shall form an integral part of the major marking.
  - All dead, dying, dry and diseased trees shall be marked together with malformed and unfit trees.
  - All the trees of exploitable size (70 cm d.b.h. in case of Deodar and Kail and 80 cm d.b.h. in case of Fir) standing over adequate advance growth should be removed.
  - Advance growth includes all the trees and poles up to exploitable size. Selection markings of light to very light intensity shall be done in areas having inadequate but established regeneration.
  - In dense groups of trees, of and above exploitable size, the spacing between the stems to be retained will vary from 5 to 8 meters depending upon the status and amount of regeneration present. Selection felling of moderate intensity shall be carried out in such groups.
  - In the mixed crop, ecologically most suitable species to the locally should be favored.
  - The intensity of felling, over a particular compartment, will largely depend upon the degree of biotic interference to which it is subjected, the amount and status of regeneration, topography, slope and aspect
  - Extreme care has to be exercised at the time of felling so *as* not to damage the crop below.
  - Trees marked for felling should be lopped before execution of felling.

#### 11.19 Supplementary Markings

11.19.1 As soon as the felling following major marking is over, supplementary marking of poles and trees damaged in felling, or those that have died, dried or fallen off subsequent to the major felling, should be done. Due caution is required to be taken to avoid large scale supplementary markings which prove dangerous to the ultimate requirement of the crop and the site. Preferably, these markings should be conducted by the DFO himself. Past experience has shown that in certain cases, the quantity of supplementary marking did exceed the original one. Judicious discretion of the marking officer is, therefore, needed to ensure that provision of supplementary marking is not misused, and only such trees as are considered definitely unfit for retention, or are not likely to survive in the near future, are marked.

#### 11.20 Subsidiary Silvicultural Operations

- 11.20.1 The subsidiary silvicultural operations are most important and an integral part of management of Chir pine forests. The subsidiary silvicultural operations include.
  - a. Disposal of Debris.
  - b. Protection against fire.
  - a. <u>Disposal of Debris:</u> Chir pine forests are situated on lower elevations and since the human population density is more, Mostly the felling refuse is taken off by local inhabitants for their domestic use as fuel wood. However, in some pockets where the habitations are far away, the felling debris should be off at safer places during the safe period of year.
  - b. **Protection against Fire:** The Chir forests are prone to forest fires though Chir is a fire hardly species but the young regeneration is effected badly due to forest fires. There are various factors responsible for forests fires such as, hot and dry weather combustible pine needle, oozing out resin and human beings. The forest fire has harmful effects on forest soil, flora as well as fauna of the forests. Though measures adopted are insufficient for preventing forest fires however, following measures are recommended for control of forests fires.
    - Fire Lines.
    - Control Burning.
  - i. <u>Fire Lines:</u> Usually 10 meters wide temporary fire lines are created annually before the onset of summer by cutting bushes grass etc. It is recommended that the traditional foot paths such as bridle path, foot paths constructed by department or other paths used by villagers be developed as permanent fire lines by cutting bushes and grasses 2 mts. on either side of the paths and periodically removal of pine needle etc. from the path during the peak fire season. This can be done by engaging local labour.
  - ii. Control Burning:
  - 1. It should generally be done during the period starting from December to February (Earlier on hotter aspects).
  - 2. The worked out areas should not be control burned until they are thoroughly cleared of slash / debris and felling refuse.
  - 3. Areas, where the fellings have been conducted and where the regeneration has already established, should be control burnt at an interval of every two years.
  - 4. The operations of control burning should be started from the top portion of an area, and extended downwards along the slope. Control burning proceeding upwards along the slope is injurious to the crop.
  - 5. In the forests under resin tapping an area up to 1.5 meter radius around each tree under taping is cleared of chips and other inflammable material before control burning.

#### 11.21. Artificial Regeneration (Nursery and Plantation Technique)

11.21.1 In areas where regeneration has failed to come up on its own, artificial measures shall be initiated. Patch sowing of Chir should be carried out where favourable soil-moisture condition exists. In blanks close to habitations planting is to be carried out after fencing the area. An area of 156 hectares is proposed for reforestation and rehabilitation annually which is equal to area of annual coupe.

#### Nursery and Plantation Technique of Pinus roxburghii (Chir):

**Occurrence:** The Chir grows at an altitude ranging from 500 meters to 2300 meters height. It is light demander species. It is frost and drought hardy and fire resistant species.

The seed should be collected during March and April.

Seed weight:-Approximately 10,000 seeds per kg. seed can be stored in sealed tins upto 4 years Germination percentage:- more than 70%.

**<u>Nursery Technique</u>**: Dibbling or broad cast sowing of seed is done in shaded nursery beds during March and April. The nursery soil is mixed with soil collected around large pine trees in the adjoining forests. The nursery isproperly watered during summer and seedlings are pricked out during June and July.

**<u>Planting Technique</u>**: The naked rooted seedlings when they attain a height of 10-15 cm are transplanted with or without ball of earth at 2m x2m spaces in pits of size 45cm x 45cm x 45cm during monsoon. Young seedlings are damaged by porcupines.

#### 11.22 Control of Grazing

11.22.1 The unrestricted, uncontrolled, unregulated and heavy grazing is responsible for failure of natural regeneration of Chir. Large herds of nomads as well as locals graze in these forests round the year resulting in trampling of young seedlings. The areas which are prone to heavy grazing are prescribed to be effectively closed and artificial regeneration measures such as planting patch sowing of Chir etc need to be taken up so that the forest can be regenerated.

# **CHAPTER-XII**

### Working Plan for Rehabilitation Cum Reboisement Working Circle

#### Working Plan for Reboisement Working Circle

#### 12.1 General constitution of the Working Circle

12.1.1 The Working Circle Consists all those compartment of the Division which are poorly stocked but potentially productive usually these areas are confined to forest fringes where the biotic pressure is maximum. The excessive exploitation of crop to cater the daily requirements of timber, fuel and fodder and the encroachment upon the forest land to grow more food grains with an excessive grazing pressure is common. It has been noticed that excessive and uncontrolled grazing does not allow the natural regeneration to come-up and in some areas excessive lopping of trees have rendered the crop seedless. In most of the compartments the problem of soil erosion has increased manifold which has resulted in the depletion and degradation of the natural forests. Almost all the compartments allotted to this Working Circle in the plan under revision have been allotted to this working circle of proposed plan except compartment numbers 6/R-N and 34b/R-S which have now been allotted to this working circle in the plan under revision and proposed plan are given in the tables below.

I	Plan under Revision		Proposed Plan				
Range	Comptt No.	Area in	Comptt No.	Area in			
		Hectare		Hectare			
Ramnagar	3c, 4a, 4b, 4c, 6, 7,	1907	3c, 4a, 4b, 4c, 7, 9a, 13,	1827			
North	9a, 13, 14a, 21, 27a,		14a, 21, 27a, 27c, 29a,				
	27c, 29a, 30a, 30b,		30a, 30b, 31a				
	31a						
Ramnagar	32a, 32b, 34a, 34b,	1744	32a, 32b, 34a, 37, 40b,	1311			
South	37, 40b, 43, 60, 61		43, 60, 61				
Basantgarh	2, 3, 4a, 44b, 49a,	2497	2, 3, 4a, 44b, 49a, 49b,	2497			
-	49b, 50b, 65, 66, 68a,		50b, 65, 66, 68a, 68b,				
	68b, 69c, 72b, 73, 74,		69c, 72b, 73, 74, 75				
	75						

Table No. 12.1

#### 12.2 General Character of Vegetation

12.2.1 The Reboisement working circle mostly falls in Chir pine forest with some compartments in Deodar-Kail zone. Also the crop is usually scattered, under stocked with a density less than 0.4. The regeneration status is very poor and in some compartments it is almost absent. The main crop has been replaced by bushes by excessive lopping and browsing. At many places there is no tree cover and only shrubs like *zizyphus jujube*, *Carissa spinarun*, *Berberis species*, *Rubus species*, *Nerium indicum*, *xanthoxulum alatum*, *Santha* (Dodonea viscose) etc exist.

#### 12.3 Area Statement

12.3.1 The detailed statement of species wise area of compartments/Sub-Compartment allotted to this working circle is given in Appendix-V. However, range wise abstract of the distribution of the species wise area is provided in the below Table No.12.2.

## Table No. 12.2.Range wise distribution of area (in hectares) allotted to Reboisement Working Circle of<br/>Ramnagar Forest Division

Range		Com	nercial	area		Un-C	Un-Commercial Area in ha.				
	Deodar	Kail	Fir	Chir	Sub- Total	B/L	Blank/ Scrub	Sub- Total			
Ramnagar North	Nil	Nil	Nil	1317	1317	128	180/202	510	1827		
Ramnagar South	Nil	Nil	Nil	327	327	118	412/454	984	1311		
Basantgarh	62	Nil	13	2016	2091	157	249/0	406	2497		
Total	62	Nil	13	3660	3735	403	1497	1900	5635		

#### 12.4 Object of the Management

- 1. To rehabilitate and improve the existing forest crop which has been degraded over the years by adopting strict forest protection and improvement measures.
- 2. To create a multiple product zone so that these forests act as buffer to the well stocked core forests.
- 3. To ensure Soil and Water Conservation by adopting soil and moisture conservation technique.
- 4. To involve local inhabitants in protection afforestation as well as and development of these forests.

#### 12.5 Analysis and Evaluation of the Crop

12.5.1 The point sampling technique has been adopted for assessment of growing stock. The field data was collected from 73 sample points. Mean value of three variables viz number of stems per hectare, volume of conifers 30 cms. dbh (ob) above and basal area of conifers per hectare have been computed species wise and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 12.3.

The diameter class and species wise average number of trees per hectare are given in Table No. 12.4.

The diameter class and species wise total number of trees commercial area (3455 hectare) of the working circle are given in Table No. 12.5.

The diameter class and species wise average volume of trees per hectare are given in Table No. 12.6.

The diameter class and species wise total volume of coniferous trees commercial area (3455 hectare) of the working circle are given in Table No. 12.7.

The diameter class and species wise total number of trees calculated at lower confidence limit commercial area (3455 hectare) of the working circle are given in Table No. 12.8.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (3455 hectare) of the working circle are given in Table No. 12.9.

Working	Variable	Sample	Mean	Variance	Standard	Standard	Coefficient	Confidence (95%)	limits )	Confidence	Lower limit as
Circle	(per ha.)	Points			Deviation	Error	of variation	(X <u>+</u> t x S	5.E.)	Interval	% of mean
		(17)	()()	$(c^2)$	(6)		(0/)	Louise limit	Upper		(0()
		(n)	(X)	(5)	(5)	(S.E.)	(%)	Lower limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
									T=1.96		
	No. of										
	Stems	73	233.95	7042.89	83.92	9.82	35.87	214.70	253.20	38.50	92%
Reboisement	Volume	73	176.84	7049.42	83.96	9.83	47.48	157.58	196.10	38.52	89%
Working											
Circle	Basal Area	73	29.18	107.32	10.36	1.21	35.50	26.80	31.56	4.75	92%
	1						1				

#### Results of Statistical analysis for Reboisement Working Circle

Column7 : S.E. = S/ square root (n)

Column 8 : C.O.V (%) = (S/X) x 100

Column 9 : Lower limit =  $X - 1.96 \times S.E.$ 

Column 10 : Upper Limit =  $X + 1.96 \times S.E.$ 

Column 11 : C.I. = Upper limit - Lower limit

#### Table No. 12.4.

	Diameter Class (Cm)										
Species	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total	
Deodar	0.00	1.59	1.16	0.12	0.37	0.05	0.04	0.00	0.00	3.33	
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chir	27.07	98.82	85.19	6.15	2.18	0.84	0.38	0.05	0.03	220.71	
B.L.	2.21	3.82	3.16	0.52	0.18	0.00	0.00	0.00	0.00	9.89	
Total	29.28	104.23	89.51	6.79	2.73	0.89	0.42	0.05	0.03	233.93	

#### Statement showing species and diameter(cm) class wise tree count of Reboisement Working CircleTree count per hectare (Mean Value).

#### Table No. 12.5

Total tree count over the entire commercial area of Reboisement Working Circle $(Area = 3455 here)$												
	Diameter Class (Cm)											
Species	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total		
Deodar	0	5493	4008	415	1278	173	138	0	0	11505		
Kail	0	0	0	0	0	0	0	0	0	0		
Fir	0	0	0	0	0	0	0	0	0	0		
Chir	93527	341423	294331	21248	7532	2902	1313	173	104	762553		
B.L.	7636	13198	10918	1797	622	0	0	0	0	34170		
Total	101162	360115	309257	23459	9432	3075	1451	173	104	808228		

#### Table No. 12.6.

Statement showing species and diameter(cm) class wise volume(m<sup>3</sup>)

of Conifers in Reboisement Working CircleVolume of conifers per hectare (Mean Value).

		Diameter Class (Cm)											
Species	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total				
Deodar	1.21	1.55	0.26	1.16	0.24	0.23	0.00	0.00	4.65				
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Chir	47.43	96.27	13.59	7.86	4.07	2.38	0.38	0.20	172.18				
Total	48.64	97.82	13.85	9.02	4.31	2.61	0.38	0.20	176.83				

#### **Table No. 12.7.**

Total volume of conifers over the entire commercial area

of Reboisement Working Circle

(Area = 3455 hectares)

				Diame	eter Class	(Cm)			Grand
Species	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total
Deodar	4181	5355	898	4008	829	795	0	0	16066
Kail	0	0	0	0	0	0	0	0	0
Fir	0	0	0	0	0	0	0	0	0
Chir	163871	332613	46953	27156	14062	8223	1313	691	594882
Total	168051	337968	47852	31164	14891	9018	1313	691	610948

Table No. 12.8.

	Diameter Class (Cm)												
Species	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total			
Deodar	0	5054	3687	381	1176	159	127	0	0	10585			
Kail	0	0	0	0	0	0	0	0	0	0			
Fir	0	0	0	0	0	0	0	0	0	0			
Chir	86045	314109	270785	19548	6929	2670	1208	159	95	701549			
B.L.	7025	12142	10044	1653	572	0	0	0	0	31436			
Total	93069	331305	284516	21583	8678	2829	1335	159	95	743570			

#### Table No. 12.9.

Total volume of conifers over the entire commercial area (3455 ha) computed

at lower confidence interval for Reboisement Working Circle Lower limit = 89% **Diameter Class (Cm)** Grand 30-40 **Species** 40-50 50-60 60-70 70-80 80-90 90-100 100 < Total Deodar Kail Fir Chir Total

#### 12.6 <u>Method of Treatment Prescribed</u>

- 12.6.1 The forests with in the area of this working circle have been degraded to such extent that its natural rehabilitation is very difficult (as all the locality factors of these forests are unfavourable for natural regeneration), so in order to bring these forests back to their old glory, the following measures are prescribed.
  - 1. Establishment of closures in consultion the local inhabitants.
  - 2. Planting of fast growing, small timber and fodder yielding, trees species which will boost the socioeconomic condition of local inhabitants.
  - 3. Planting and Patch sowing of principal species after 2-3 years i.e. Deodar / Kail/ Fir / Chir.
  - 4. Planting of grass slips/ patch sowing of grass seed having good fodder value, high milk yielding capacity and a good soil binding quality.
  - 5. Soil and moisture conservation works such as construction of water harvesting structures, Dry Rubber Stone Massanory (DRSM) check / retaining walls and meshwire crates.
  - 6. A time bound treatment of this working circle is required to be adopted otherwise further degradation will take place and a stage will come reach when the entire tract shall become barren which will be followed by slips and landslides.
  - 7. Highly degraded sites may be planted with water hardly and drought resistant species.
- 12.6.2 A multi dimensional approach is required to be adopted, keeping in view the socio economic condition of the local people who are mostly dependent upon these forests. A comprehensive work programme on water-sheds basis should be prepared by involving the entire sister departments such as (social forestry, Soil conservation, Agrostology, Minor Forest Produce and demarcation) of forest departments and other departments like Horticulture, Sericulture, Apiculture, Agriculture, Irrigation and Flood Control who are directly or indirectly involved in watershed management.
- 12.6.3 The Divisional Forest Officer Territorial in consultation with other officers of above mentioned departments should prepare a comprehensive treatment plan which should be completed within the prescribed time frame.

#### 12.7 Areas bearing scrub forests (category C)

12.7.1 These are the most difficult areas needing treatment on a priority basis. Silvi-pasture model shall be applied in these areas. Good quality grasses shall be raised. As these areas are prone to severe soil erosion, intensive soil and moisture conservation technique shall be adopted. 30cm deep continuous / staggered V shaped ditch cum bunds shall be made along the contour at 5 cm spacing. In the ditch trees species shall be planted and sowing of seeds of shrub species shall be carried out on bunds at a spacement of 50 cm. Grass seeds shall be sown in between in continuous contour furrows one meter apart. Grass species like Napier, Dinanath, Sataria, Stylosenthies hamata, Lucrrn etc.shall be planted. The forest area falling in this category should be developed as a fodder bank with the special objective of meeting the requirement of nomadic graziers as well.

#### 12.8 Area bearing degraded forests of Fir (category D)

- 12.8.1 The crop of Fir forests is constituted mainly of trees of mature and over mature age classes and there is a marked absence of trees of younger age classes and regeneration. Factors causing failure of natural regeneration of Fir and the method of treatment to overcome it is summarized as under:
  - i. Pasture lands capping fir forests attract a large number of migratory, as well as local livestock during summer months. Fir forest adjoining these pastures also fall victim to heavy grazing. To reduce grazing within acceptable limit it is essential to introduce rotational grazing and introduction of stall feeding.
  - ii. Excessive growth of herbs and shrubs is also responsible for inadequate regeneration of Fir. The shrub growth should be cut in order to allow regeneration to establish.

- iii. Failure of regeneration of Fir is also attributed to un-decomposed acidic humus, it should be raked before seeding and sowing. Planting of broad leaved species like poplars reduces the acidity of soil and makes the soil conditions favourable for establishment of Fir seedlings.
- iv. Infrequent good seed years are also partly responsible for failure of regeneration. The problem can be over-comed by establishing seed orchards.
- v. Removal of debris and collection and disposal of slash should be carried out in felled areas to help regeneration to come up. The follow up of culture operation in felled over areas have been neglected altogether in past.
- 12.8.2 In the absence of proper cultural operations, regeneration of Fir has been inadequate. In areas where regeneration of Fir has failed to come up naturally, it should be restocked by artificial methods. Spruce should be preferred to Fir on exposed sites plantation of Popular along with Fir will also help in improving the soil conditions.

#### 12.9. Artificial Regeneration of Fir

12.9.1 It is an irony that despite occupying a substantial portion of the total area of the Division with a serious regeneration problem. The Fir forests failed to attract the attention of foresters. No effort was made to either promote natural regeneration and artificial regeneration of Fir. No Fir nursery exists in the Division at present.

#### 12.10. Afforesation Measures

12.10.1 Plantation programme should be made by territorial Divisional Forest Officer in advance. If the total area of the working circle (5635 hectares) is tackled over a period of 30 years thus annually an area of 187 hectares is proposed to be taken up for reforestation and rehabilitation. Planning process should involve all agencies associated with rural development and local communities. All sister organizations like MFP Project, Social Forestry Project, Astrology wing and Directorate of Soil Conservation should be involved in the rehabilitation of degraded forests and they should work in tandem, in the selected micro-water sheds to improve the ecology of the tract and Socio-economic conditions of the people. The nursery and plantation techniques have been discussed in Plantation Working Circle.

## **CHAPTER-XIII**

### **Working Plan for Resin Working Circle**

#### CHAPTER-XIII

#### Working Plan for Resin Development (Overlapping) Working Circle

#### 13.1 General Constitution of the Working Circle

13.1.1 This working circle shall be overlapping covering all the Chir areas of Ramnagar Forest Division.

#### 13.2 General Character of the Vegetation

13.2.1 The details pertaining to Chir crop has been discussed in detail in Chir Working Circle and thus the details of vegetation are the same.

#### 13.3 Special Objectives of Management

- 1. To obtain yield of resin on sustained basis without causing any damage to the Chir crop.
- 2. To ensure smooth working for resin extraction and supply of raw material to resin industry on a sustained basis.
- 3. To provide rest to poorly stocked Chir crop from resin extraction.

#### 13.4. Evaluation and Analysis of the Crop

13.4.1 The Chir forest falls in almost all Working Circles except Fir Working Circle and major portion of forest available for resin tapping falls in Chir Working Circle.

#### 13.5 System and Method of Tapping

- 13.5.1 Previously, the resin was tapped by cup and lip method. From 1988-89 onwards the rill method was adopted and it was considered that the rill method is more scientific and cause less damage to the trees as it is confined to only superficial layer of bole (2mm in depth). The silent features of the rill method are given below:-
  - 1. The first blaze is given in the tree surface 15cm above the ground level.
  - 2. The width of the blaze is 20 cm and the height upto 38cm is attained during one tapping season.
  - 3. That average width of the inter-space left between two consecutive rills is 5mm and the average width of rill 6 to 7cm.
  - 4. The depth of the rill is 2mm (inside wood).
  - 5. There will be five blazes in the channel thus a channel can be tapped for five years.
  - 6. Inter-space between two channels will be 7.5 cm.
  - 7. Freshening's will be done after every week.
  - 8. The rills should be parallel to each other. They should not extend beyond the limits of the blaze nor fall short of it.

The length and height of each channel above the ground level in respect of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>& 5<sup>th</sup> years is shown in the Table below:-

Table	No.	13.1
-------	-----	------

Years	Height of channel in Cms.	Height of channel above ground level	Height of topmost point of channel from the ground by the end of year.
1 <sup>st</sup>	10 + 38 = 48	15 + 3 = 18cms	66cm
2 <sup>nd</sup>	48 + 38 = 86		104cm
3 <sup>rd</sup>	86 + 38 = 124		142cm
4 <sup>th</sup>	124 + 38 = 162		180cm
5 <sup>th</sup>	162 + 38 = 200		218cm (If found described)

#### 13.6 Schedule of Operations

13.6.1 A definite schedule of operation for resin tapping followed is given below:-

• • •	Auction of resin lots Compilation of auction results Communication of sanction Signing of agreement and issuance of work order	Latest by February Ending February 2 <sup>nd</sup> week of March Latest by end of March
•	Crop setting Regular collection of Resin	Latest by 2 <sup>nd</sup> week of April From 4 <sup>th</sup> week of April to ending November
• • •	Collection of Regor Final delivery of resin at transit depot Handling back of areas to the department Transportation of resin to central depot	Upto 5 <sup>™</sup> December Ending January Ending January
		By 15 <sup>th</sup> February

#### 13.7 Resin Channel Survey Exercise

13.7.1 In order to calculate the total availability of space for making new blazes in future the resin channel survey was carried out. A total of 125 sample points were surveyed. The tree wise number of old blazes (by cup & lip and Rill methods) were recorded, the tree wise space available for making new blazes were also recorded.

The abstract of resin channel survey exercise is given in tabular form below:-

#### Table No. 13.2

Diameter class	AVERAGE	PER TREE
	Total No. of Blazes (C&L + Rill Method	Available space for making new blazes
40-50	14.62	1.00
50-60	21.68	1.32
60-70	25.63	2.98
70-80	32.43	1.67
80 & ab	33.82	1.73

#### 13.8 Availability of Space for Making New Blazes

Dia Class				Average availabilit	Total availabilit			
	Chir	Ecological Conservati on	Reboisement	Eco- Tourism	Broad Leaved	Total	y of space for No. of Blazes	y of space for No. of Blazes
40-50	240334	60118	270785	37019	11106	619362	1.00	619362
50-60	73362	17114	19548	12934	2123	125081	1.32	165107
60-70	25101	6839	6929	2738	493	42100	2.98	125458
70-80	12837	1437	2670	738	168	17850	1.67	29809
80 & above	7853	937	1462	1599	0	11851	1.73	20502
Total	359487	86445	301394	55028	13890	816244		960238

#### Table No. 13.3

Deduct 15% on account of fire damage, dry age, illicit damage and other unforeseen reasons :-

Total Number of blazes	=	9,602,38
Deduction (15%)	=	8,16,202
Rounding Off	=	8,00,000

So 80,000 blazes are prescribed for resin tapping annually.

#### 13.9 Miscellaneous Regulations

- 13.9.1 Since the Rill method of resin extraction is high-tech so it requires special attentions.
  - 1. Imparting training to labour and staff who supervise the resin extraction work and yearly refresher course before the start of resin extraction work at Range level.
  - 2. The tools used for resin extraction should be supplied to Resin wag-mates by the Department and should of a better quality.
  - 3. The acid supplied to the resin wag-mate should be supplied in diluted form. The mixture of acids should be prepared under the supervision of Range Officer.
  - 4. The resin tapping operations should be inspected periodically.
  - 5. Forest floor around tapped tree should be kept clear of all inflammable material.

# **CHAPTER-XIV**

### Working Plan for Broad-Leaved Working Circle

#### **CHAPTER-XIV**

#### Working Plan for Broad Leaved Working Circle

#### 14.1 General constitution of the Working Circle

14.1.1 This Working Circle comprises of all such compartments which have Broad-Leaved species as the dominant crop, spread over an appreciable area. This Working Circle constitutes 19.53% area of the Division. This Working Circle is identical in constitution with respect to the Plan under revision except for compartment numbers 27b/R-N which has been excluded from this Working Circle and allotted to Eco-Tourism Working Circle. The detail of compartments allotted to this Working Circle in the Plan under revision and the proposed plan is given in Table No.14.1.

	Plan under Revision	Proposed Plan			
Range	Comptt No.	Area in	Area in Comptt No.		
		Hectare		Hectare	
Ramnagar	3b, 10c, 16, 18, 26a, 26c,	4073	3b, 10c, 16, 18, 26a,	3868	
North	26d, 27b		26c, 26d		
Ramnagar	28a, 33b, 35, 36, 38, 55,	1762	28a, 33b, 35, 36, 38,	1762	
South	59		55, 59		
Basantgarh	1a, 68b, 68c, 69a, 69b,	1645	1a, 68b, 68c, 69a, 69b,	1645	
	72a, 76		72a, 76		
Total		7480		7275	

#### Table No. 14.1

#### 14.2 General character of the vegetation

- 14.2.1 The broad leaved forests of this Division are classified into:-
  - 1. Ban Oak Forest
  - 2. Broad-Leaved Scrub Forest
  - 1. <u>Ban Oak Forest:</u> Ban Oak (*Quercus leucotrichophora*) forests are found in large stretches in Ramnagar North and Basantgarh Range and to a small extent in Ramnagar South Range. The Ban Oak occurs in pure form pure or mixed with other broad leaved species and few Chir trees at some places. The Ban Oak is a very important species used as fuel wood and leaf fodder. Due to its enormous demand for fuel and fodder these trees are heavily lopped, resulting in their stunted and malformed growth. In past artificial regeneration measures prescribed were sowing and planting of nursery raised plants, cutting back of Oak to induce coppicing and rotational grazing, but these measures have not been adopted fully for the improvement of Ban Oak Forests. Though the Ban Oak forests have a limited use i.e. fuel wood, charcoal and fodder but these forests are considered to be the best ones for water conservation. The prominent associates of Ban Oak are *Pyrus pashia* (Kainth,) *Fraxinus floribunda, Cedrella senata.* Amongst the shrubs *Rubus ellipticus, Rosa moschata, Prinsepia utilise* and *Indigofera* species are common.
  - <u>Broad-Leaved Scrub Forests</u>: Broad Leaved Scrub or Benseri Forests are mostly found along the lower limits of the zone of distribution of Chir. The broad leaved scrub forests consist of numerous trees and shrubs. These are mostly found on moist places such as nallah banks, khads, and near other natural water resources. The broad leaved forest consists of *Acacia modesta*, *Acacia*

catechu, Dalbergia sissoo, Bombax ceiba, Terminalia chebula, Syzgium cumini, Emblica officinalis, Buxas sempervirens, Mallotus philippinensis, Ficus religiosa, Olea cuspidate, Ficus palmate and Shrubs include punica granatum, Berberis lyceum, Xanthxylum elatum, Nerium indica, Vitex negundo, Dodonaea viscose and Plecranthus rugosus etc.

#### 14.3 Area Statement

14.3.1 The detailed statement of area of compartments/Sub-Compartment allotted to this Working Circle is given in the Appendix- VI. However, range wise abstract of the distribution of species wise area is provided is given in below Table No. 14.2.

#### Table No. 14.2

#### Range wise distribution of area (in hectares) allotted to Broad-Leaved Working Circle of Ramnagar Forest Division

Range	Comme	ercial ar	ea (Ar	ea in he	Un-( (A	Grand			
	Deodar	Kail	Fir	Chir	Sub- Total	B/L	Blank/	Sub- Total	Total (Area
					Totai		Scrub	Total	in hectare)
Ramnagar North	Nil	130	164	204	498	2213	839/318	3370	3868
Ramnagar South	Nil	Nil	Nil	252	252	782	174/554	1510	1762
Basantgarh	Nil	Nil	Nil	296	296	1103	0/246	1349	1645
Total		130	164	752	1046	4098	2131	6229	7275

#### 14.4 Special Objectives of Management

- 14.4.1 The special objectives of management of broad leaved Working Circle are:
  - 1. To conserve, preserve and improve the existing broad leaved forest for soil and water conservation.
  - 2. To protect the broad leaved forest especially Ban Oak from further over exploitation and degradation.
  - 3. To adopt modern scientific nursery and plantation techniques for improvement of broad leaved forests in general and Ban Oak and Chikri Forests in particular.
  - 4. To ensure natural regeneration of broad leaved species especially Ban Oak and Chikri.

#### 14.5 Analysis and Evaluation of Crop

14.5.1 The plot sampling technique was used for the assessment of growing stock in these broad leaved forests. A total of 57 plots, each measuring 31.62 × 31.62 m. (i.e., 0.1 hectare were laid in the field. The total enumeration of *Chikri* has been carried out as well.Mean value of three variables viz. number of stems per hectare, volume of conifers 30 cm. dbh (ob) above and basal area of conifers per hectare have been computed species wise and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 14.3.

The diameter class and species wise average number of trees per hectare are given in Table No. 14.4.

The diameter class and species wise total number of trees commercial area (1046 hectare) of the working circle are given in Table No. 14.5.

The diameter class and species wise average volume of trees per hectare are given in Table No. 14.6.

The diameter class and species wise total volume of coniferous trees commercial area (1046 hectare) of the working circle are given in Table No. 14.7.

The diameter class and species wise total number of trees calculated at lower confidence limit commercial area (1046 hectare) of the working circle are given in Table No. 14.8.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (1046 hectare) of the working circle are given in Table No. 14.9.

Working	Variable	Sample	Mean	Variance	Standard	Standard	Coefficient	Confider	nce limits	Confidence	Lower
								(95	5%)		limit as
Circle	(per ha.)	Points			Deviation	Error	of variation	(X <u>+</u> t	x S.E.)	Interval	% of mean
								Lower	Upper		
		(n)	(X)	(S <sup>2</sup> )	(S)	(S.E.)	(%)	limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
									T=1.96		
Broad	No. of										
leafed	Stems	57	223.33	8440.48	91.87	12.17	41.14	199.48	247.18	47.70	89%
Circle											
	Volume	57	54.51	5431.11	73.70	9.76	135.20	35.38	73.64	38.26	65%
	(only chir)										
	Basal Area	57	23.76	76.27	8.73	1.16	36.75	21.49	26.03	4.53	90%
	(only chir)										

Column 7 : S.E. = S/ square root (n)

Column 8 : C.O.V (%) = (S/X) x 100

Column 9 : Lower limit = X - 1.96 x S.E.

Column 10 : Upper Limit = X + 1.96 x S.E.

Column 11: C.I. = Upper limit - Lower limit

Species	Diameter Class (Cm)											
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total		
Deodar										0.00		
Kail	1.43	2.86	1.61	0.54	0.00	0.00	0.00	0.00	0.00	6.44		
Fir	1.61	5.00	3.04	0.36	0.18	0.18	0.00	0.00	0.00	10.37		
Chir	17.89	33.16	11.93	2.28	0.53	0.18	0.00	0.00	0.00	65.97		
B.L.	36.84	61.05	33.86	5.79	1.93	1.05	0.18	0.00	0.00	140.70		
Total	57.77	102.07	50.44	8.97	2.64	1.41	0.18	0.00	0.00	223.48		

Statement showing species and diameter(cm) class wise tree count of Broad Leafed Working Circle Tree count per hectare (Mean Value)

#### Table No. 14.5

Total tree count over the entire commercial and broad leafed area

of the Working Circle Commercial Area 1046 hectares Species **Diameter Class (Cm)** Grand 60-70 20-30 30-40 40-50 50-60 70-80 80-90 90-100 100 < Total Deodar Kail Fir Chir B.L. Total
Statement showing species and diameter(cm) class wise volume (m<sup>3</sup>) of Conifers in Broad Leafed Working Circle Volume of conifers per hectare (Mean Value).

Species		Diameter Class (Cm)										
	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total			
Deodar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Kail	2.17	2.19	1.22	0.00	0.00	0.00	0.00	0.00	5.58			
Fir	4.20	4.74	1.06	0.88	1.22	0.00	0.00	0.00	12.10			
Chir	15.92	13.48	5.04	1.86	0.85	0.00	0.00	0.00	37.15			
Total	22.29	20.41	7.32	2.74	2.07	0.00	0.00	0.00	54.83			

#### Table No. 14.7

Total volume of conifers over the entire commercial area of

Broad Lea	Broad Leafed Working Circle (Area = 1046 h											
				Diar	neter Cla	ss (Cm)			Grand			
Species	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total			
Deodar	0	0	0	0	0	0	0	0	0			
Kail	2270	2291	1276	0	0	0	0	0	5837			
Fir	4393	4958	1109	920	1276	0	0	0	12657			
Chir	16652	14100	5272	1946	889	0	0	0	38859			
Total	23315	21349	7657	2866	2165	0	0	0	57352			

Lower Limit: 89%

Species		Diameter Class (Cm)										
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total		
Deodar	0	0	0	0	0	0	0	0	0	0		
Kail	1331	2662	1499	503	0	0	0	0	0	5995		
Fir	1499	4655	2830	335	168	168	0	0	0	9654		
Chir	16655	30870	11106	2123	493	168	0	0	0	61414		
B.L.	134364	222663	123495	21117	7039	3830	656	0	0	513164		
Total	153848	260850	138930	24078	7700	4165	656	0	0	590227		

Total tree count of commercial and broad leaf area computer at lower confidence interval for Broad Leafed Working Circle

## Table No. 14.9

Total volume of conifers over the entire commercial area (1046 ha) computed at lower confidence interval for Broad Leafed Working Circle Lower Limit: 65%

		U											
Species		Diameter Class (Cm)											
	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total				
Deodar	0	0	0	0	0	0	0	0	0				
Kail	1475	1489	829	0	0	0	0	0	3794				
Fir	2856	3223	721	598	829	0	0	0	8227				
Chir	10824	9165	3427	1265	578	0	0	0	25258				
Total	15155	13877	<b>49</b> 77	1863	1407	0	0	0	37279				

## 14.6 Felling Series

14.6.1 There will be only one felling series for the entire Working Circle for carrying out hygienic and improvement fellings.

## 14.7 Felling Cycle

14.7.1 A felling cycle of 30 years will be adopted.

## 14.8 Method of Treatment of Oak Forests

14.8.1 In the past no due care was taken for the management of Ban Oak because of which the condition of these forests deteriorated. The Ban Oak forests which are located near habitations are over exploited for fuel and fodder purpose. These trees are heavily lopped which result in their malformed and stunted growth. Since the total area of the working circle is 7275 hectares in which 1046 is commercial area 4100 hectares under Oak. Thus about 2100 hectares area is as blank. If half of the area is available for plantation and taken up during 20 years. Thus an area of about 50 hectares is proposed for treatment annually.

For management of Oak Forests the following treatments are prescribed:

- i. Establishment of effective closures in a phased manner, so that small units can be properly managed, leaving some areas for the grazing of cattle of local inhabitants.
- ii. Since Ban Oak is a good coppicer, the cutting back of malformed and stunted trees to induce new shoots should be resorted to. Only two vigorous shoots shall be retained during the first year and during the 2<sup>nd</sup> year the most vigorous between the two shall be retained.
- iii. In the blanks the artificial regeneration measures in the form of sowing of Ban Oak seeds and planting of nursery raised poly bagged plants, should be taken.
- iv. Soil and moisture conservation works such as DRSM (Dry Rubber Stone Missionary), check walls, mesh wire crates and water harvesting structures should be constructed.

<u>Uses</u>

A tassar silk industry based on Oak Forests can be developed as a cottage industry in these areas. The timber of Ban Oak can be utilized for manufacture of vats / barrels for maturing bear / wine.

## 14.9 Method of Treatment of Broad Leaved Scrub

14.9.1 The broad leaved scrub forest consists of a variety of broad leaved species and their distribution depends upon the locality factors such as soil, moisture, altitude and aspect etc. The most of the area under broad leaved scrub forest is covered by shrubs and thorny species such as Xanthoxylum elatum, Nerium indicum, Indigofera species and Dodonea viscose etc.

The treatments prescribed for broad leaved scrub forest are as under:

- 1. Establishment of closures especially in the forest which are located near habitations.
- 2. To plant nursery raised poly-bagged / naked rooted fast growing, fodder and fuel yielding species such as Acacia catechu (khair), Dendrocalamus stricus (Bamboo), *Emblica officinalis (Amla), Terminalia chebula (Baheda), Dalbergia sissoo (Tali), Robinia pseudoacacia (Kikkar) and Dhaman* etc.
- 3. Soil and moisture conservation works such as DRSM (Dry Rubber Stone Missionary) check walls, mesh wire crates and water harvesting structures.

## 14.10 Artificial Regeneration (Nursery and Plantation Technique)

14.10.1 The Nursery and plantation techniques of *Aesculas indica, Robinia pseudoacacia, Popular species* Dendrocalamus strictus Delbergi sissoo is given in Plantation Working Circle.

# **CHAPTER-XV**

# Working Plan for Ecological Conservation Working Circle

## CHAPTER-XV

## Working Pan for Ecological Conservation Working Circle

## 15.1 General Constitution of Working Circle

15.1.1 All the forest areas which are situated on steep and precipitous slopes or head of catchments shall be allotted to this Working Circle. Though these areas are commercially uneconomical but these play a vital role in soil and moisture conservation. Special attention is required to be focused on these forests to protect these forests from illicit felling, forest fires, overgrazing etc. This Working Circle is identical in-constitution to the Protection Working Circle of the plan under revision except compartment numbers 5a and 5b of Ramnagar North Range, compartment numbers 34c of Ramnagar South Range and compartment numbers 17b of Basantgarh Range which have been allotted to Eco-Tourism of the proposed plan.

	Plan under Revision		Proposed Plan			
Range	Comptt No.	Area in	Comptt No.	Area in		
		Hectare		Hectare		
Ramnagar	5a, 5b, 10d, 14b, 15, 19,	2039	10d, 14b, 15, 19, 22b,	1840		
North	22b, 23b, 23c, 24, 25,		23b, 23c, 24, 25, 26b,			
	26b, 29b, 29c		29b, 29c			
Ramnagar	31b, 31c, 32c, 33c, 34c,	1907	31b, 31c, 32c, 33c, 39,	1873		
South	39, 40a,		40a			
Basantgarh	1b, 4b, 5a, 17b, 18, 19,	6317	1b, 4b, 5a, 18, 19, 20,	6202		
	20, 22, 24, 25, 27, 30,		22, 24, 25, 27, 30, 31,			
	31, 34, 35, 37, 39, 40		34, 35, 37, 39, 40			

## Table No. 15.1

## 15.2 General Character of Vegetation

15.2.1 This working circle falls in all the ranges of the division. In Basantgarh range the vegetation mainly consists of mostly Alpine species at higher elevations and followed Fir / Spruce, Deodar-Kail at lower elevation. In Ramnagar North Range the vegetation consists of Fir/Spruce, Deodar-Kail crop at higher reaches in a little proportion, Chir at lower reaches and other broadleaved species depending upon altitudinal zones. In Ramnagar South Range vegetation consist of mainly Chir associated with Broadleaved species. The composition of crop is poor and stunted.

## 15.3 Area Statement

15.3.1 The detail compartment wise detail of the area under different species is given in Annexure-VIII. Range wise abstract of area under different species is given in Table No. 15.2.

## Table No. 15.2.

						Un-Co	Grand		
Range		Com	mercial a	rcial area hectare.					
	Deodar	Kail	Fir	Chir	Sub-	B/L Blank/ Sub-			
					Total		Scrub	Total	
Ramnagar	0	4	0	902	906	118	257/559	934	1840
North									
Ramnagar	0	0	0	669	669	0	0/1204	1204	1873
South									
Basantgarh	323	88	1229	294	1934	2073	0/2195	4268	6202
Total	323	92	1229	1865	3509	2191	4215	6406	9915

## Range wise distribution of area (in hectares) allotted to Ecological Conservation Working Circle of Ramnagar Forest Division

## 15.4 Special Objects of Management

- a. To protect and preserve the vegetative cover from further deterioration so as to conserve Soil and Water and increase the aesthetic value of the hill tops and slopes.
- b. To improve the conditions of the existing crop by protecting these areas till they become fit for working as whole or in parts in the future.

## 15.5 Analysis and Evaluation of the Crop

15.5.1 The point sampling technique has been adopted for assessment of growing stock. The field data was collected from 81 sample points. Mean value of three variables viz. number of stems per hectare, volume of conifers 30 cm. dbh (ob) above and basal area of conifers per hectare have been computed species wise and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 15.3.

The diameter class and species wise average number of trees per hectare are given in Table No. 15.4

The diameter class and species wise total number of trees commercial area (3509 hectare) of the working circle are given in Table No. 15.5

The diameter class and species wise average volume of trees per hectare are given in Table No. 15.6

The diameter class and species wise total volume of coniferous trees commercial area (3509 hectare) of the working circle are given in Table No. 15.7.

The diameter class and species wise total number of trees calculated at lower confidence limit commercial area (3509 hectare) of the working circle are given in Table No. 15.8.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (3509 hectare) of the working circle are given in Table No. 15.9

								Confide	nce limits		Lower
Working	Variable	Sample	Mean	Variance	Standard	Standard	Coefficient	(9	5%)	Confidence	limit as
											% of
Circle	(per ha.)	Points			Deviation	Error	of variation	(X <u>+</u> t	: x S.E.)	Interval	mean
								Lower	Upper		
		(n)	(X)	(S <sup>2</sup> )	(S)	(S.E.)	(%)	limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
								t=	1.96		
Ecological	No. of Stems	81	170.02	6960.89	83.43	9.27	49.07	151.85	188.19	36.34	89%
Conservation											
Working	Volume	81	183.29	16113.48	126.94	14.10	69.26	155.65	210.93	55.29	85%
Circle											
	Basal Area	81	22.79	134.51	11.60	1.29	50.89	20.26	25.32	5.05	89%

Table No. 15.3

Results of Statistical analysis for Ecological Conservation Working Circle

-5.12 - 5/3400 - 1001(11)	Column 7 :	S.E. = S/ square root (	n)
---------------------------	------------	-------------------------	----

Column 8 : C.O.V (%) = (S/X) x 100

Column 9 : Lower limit = X - 1.96 x S.E.

Column 10 : Upper Limit = X + 1.96 x S.E.

Column 11 : C.I. = Upper limit - Lower limit

Statement showing species and diameter(cm) class wise tree count of Ecological Conservation Working Circle

Species				Diam	eter Class (	Cm)				Grand
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total
Deodar	3.16	4.16	3.28	3.70	1.05	0.35	0.07	0.07	0.00	15.84
Kail	0.19	0.73	0.88	0.65	0.32	0.06	0.00	0.00	0.00	2.83
Fir	5.80	24.67	13.27	7.96	3.00	1.38	0.46	0.11	0.07	56.72
Chir	13.40	35.08	19.25	5.48	2.19	0.46	0.26	0.04	0.00	76.16
B.L.	4.30	8.83	3.75	0.88	0.57	0.12	0.05	0.00	0.00	18.50
Total	26.85	73.47	40.43	18.67	7.13	2.37	0.84	0.22	0.07	170.05

Tree count per hectare (Mean Value).

## Table No. 15.5

Total tree count over the entire commercial area of Ecological Conservation Working Circle(Area = 35)											
Species				Diamo	eter Class (	Cm)				Grand	
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total	
Deodar	11088	14597	11510	12983	3684	1228	246	246	0	55583	
Kail	667	2562	3088	2281	1123	211	0	0	0	9930	
Fir	20352	86567	46564	27932	10527	4842	1614	386	246	199030	
Chir	47021	123096	67548	19229	7685	1614	912	140	0	267245	
B.L.	15089	30984	13159	3088	2000	421	175	0	0	64917	
Total	94217	257806	141869	65513	25019	8316	2948	772	246	596705	

Statement showing species and diameter(cm) class wise volume(m <sup>3</sup> ) of Conifers in Ecological Conservation	Working	Circle
Volume of conifers per hectare (Mean value).		

Species		Diameter Class (Cm)											
	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total				
Deodar	3.48	4.37	7.78	3.30	1.52	0.42	0.51	0.00	21.38				
Kail	0.55	1.19	1.49	1.07	0.27	0.00	0.00	0.00	4.57				
Fir	20.72	20.70	23.65	14.70	9.47	3.79	1.04	0.75	94.82				
Chir	16.83	21.75	12.11	7.74	2.22	1.61	0.26	0.00	62.52				
Total	41.58	48.01	45.03	26.81	13.48	5.82	1.81	0.75	183.29				

## Table No. 15.7

Total volume of conifers over the entire commercial area of Ecological Conservation Working Circle

Ecologica	Ecological Conservation Working Circle (Area = 35												
Species	Species Diameter Class (Cm)												
_	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total				
Deodar	12211	15334	27300	11580	5334	1474	1790	0	75022				
Kail	1930	4176	5228	3755	947	0	0	0	16036				
Fir	72706	72636	82988	51582	33230	13299	3649	2632	332723				
Chir	59056	76321	42494	27160	7790	5649	912	0	219383				
Total	145904	168467	158010	94076	47301	20422	6351	2632	643165				

Distribution of stems and volume (m<sup>3</sup>) in Ecological Conservation working circle computed at lower confidence interval.

Total tree	otal tree count of commercial area (3509 ha) at lower interval for Ecological Conservation Working CircleLower limit 8										r limit 89%		
Species										Grand			
	Diameter Class (Cm)									Total			
	10-20	10-20     20-30     30-40     40-50     50-60     60-70     70-80     80-90     90-100     100 <											
Deodar		9869	12992	10243	11555	3279	1093	219	219	0	49468		
Kail		593	2280	2748	2030	999	187	0	0	0	8838		
Fir		18113	77045	41442	24859	9369	4310	1437	344	219	177137		
Chir		41848	109555	60118	17114	6839	1437	812	125	0	237848		
B.L.		13429 27576 11711 2748 1780 375 156 0 0											
Total	0.00	0.00 83853 229448 126263 58307 22267 7402 2623 687 219											

## Table No. 15.9

Total volume of conifers over the entire commercial area (3509 ha) at lower interval for Ecological Conservation Working Circle

at lower in	at lower interval for Ecological Conservation Working Circle Low											
Species			Ι	Diameter C	lass (Cm)				Grand			
	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total			
Deodar	10380	13034	23205	9843	4534	1253	1521	0	63769			
Kail	1640	3549	4444	3191	805	0	0	0	13631			
Fir	61801	61741	70540	43845	28246	11304	3102	2237	282815			
Chir	50198	50198     64873     36120     23086     6621     4802     775     0										
Total	124019	143197	134309	79965	40206	17359	5399	2237	546690			

## 15.6 Method of Treatment Prescribed

- a. No other treatment, except complete rest, is prescribed for these forests.
- b. No felling, of what-so-ever nature, shall be allowed in these areas.
- c. There shall be strict control against forest fires illicit damage, encroachments and excessive grazing etc.
- d. Establishment of closures in degraded areas and plantation of local species.
- e. Soil and moisture conservation measures should be used for treatment of areas which are prone to soil erosion.

# **CHAPTER-XVI**

## **Working Plan**

## for

## **Eco-Tourism Working Circle**

### **CHAPTER-XVI**

## Working Plan for Eco-Tourism Working Circle

## 16.1 General Constitution of Working Circle

16.1.1 This Working Circle covers the forests which are located near Rannagar Town, Basantgarh, Dalsar Lake and near religious places such as Pingla Mata, Chountra Mata etc. This Working Circle is introduced for the first time in this division and is constituted by shifting compartments from other working circles of the plan under revision.

## 16.2 General Character of Vegetation

16.2.1 Since these sites are situated in temperate to sub-tropical zones, the main crop consists of Deodar, Kail, Chir Sissoo, Khair, Anardana etc. Since these forests are located close to habitations the condition of the crop and its natural regeneration is not satisfactory. There is a continuous pressure of both human beings and their cattles on these forests.

## 16.3 Area Statement

16.3.1 The detail of compartment wise area under different species is given in Annexure VIII. However, the range wise abstract of the area under different species is given in below Table No. 16.1

## Table No. 16.1.

## Range wise distribution of area (in hectares) allotted to Eco-Tourism Working Circle of Ramnagar Forest Division

Danga		Con	ımercia	l area		Un-C	Commerci	al Area in	Crand
Kange	Kail	Fir Chir		Sub- Total	B/L	Blank/ Scrub	Sub-Total	Total	
Ramnagar North	Nil	Nil	15	349	364	199	167/0	366	730
Ramnagar South	Nil	Nil	0	706	706	0	179/7	186	892
Basantgarh	568	Nil	215	0	783	68	78/7	146	929
Total	568	Nil	230	1055	1853	267	438	698	2551

## 16.4 Objects of Management

- a. To conserve, preserve and rehabilitate these forests so that sylvan beauty of the area is preserved and enhanced.
- b. To developmental of infrastructure to provide the facilities to tourists and devotees.

## 16.5 Evaluation of the Crop

16.5.1 The point sampling technique has been adopted for assessment of growing stock. The field data was collected from 27 sample points. Mean value of three variables viz. number of stems

per hectare, volume of conifers 30 cm. dbh (ob) above and basal area of conifers per hectare have been computed species wise and diameter class wise. The results obtained on the basis of statistical analysis are summarized in Table No 16.2.

The diameter class and species wise average number of trees per hectare are given in Table No. 16.3.

The diameter class and species wise total number of trees commercial area (1853 hectare) of the working circle are given in Table No. 16.4.

The diameter class and species wise average volume of trees per hectare are given in Table No. 16.5.

The diameter class and species wise total volume of coniferous trees commercial area (1853 hectare) of the working circle are given in Table No. 16.6.

The diameter class and species wise total number of trees calculated at lower confidence limit commercial area (1853 hectare) of the working circle are given in Table No. 16.7.

The diameter class and species wise total volume of coniferous trees calculated at lower confidence limit commercial area (1853 hectare) of the working circle are given in Table No. 16.8.

Montring	Variable	Comple	Maan	Variance	Ctondord	Ctondord	Coofficient	Confider	ice limits	Confidonco	Lower lim
working	variable	Sample	wean	variance	Standard	Standard	Coefficient	(95	9%)	Confidence	as
Circle	(per ha.)	Points			Deviation	Error	of variation	(X <u>+</u> t	x S.E.)	Interval	% of mean
								Lower	Upper		
		(n)	(X)	(S²)	(S)	(S.E.)	(%)	limit	limit	(C.I.)	(%)
1	2	3	4	5	6	7	8	9	10	11	12
								t=	1.96		
	No. of										
Ecological	Stems	27	160.59	5106.02	71.46	13.75	44.50	133.64	187.54	53.91	83%
Conservation											
Working	Volume	27	164.35	4227.66	65.02	12.51	39.56	139.82	188.88	49.05	85%
Circle											
	Basal Area	27	21.57	44.72	6.69	1.29	31.00	19.05	24.09	5.04	88%

Column 7 : S.E. = S/ square root (n)

Column 8 : C.O.V (%) = (S/X) x 100

Lower limit = X - 1.96 x S.E. Column 9 :

Column 10 : Upper Limit = X + 1.96 x S.E.

Column 11 : C.I. = Upper limit - Lower limit

Statement showing species and diameter(cm) class wise tree count of Eco-Tourism Working Circle

Species		Diameter Class (Cm)								
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total
Deodar	0.56	10.74	8.19	8.44	3.48	1.59	0.30	0.22	0.11	33.63
Kail	0.59	3.07	2.74	1.26	0.00	0.00	0.22	0.00	0.00	7.88
Fir	0.56	0.00	1.00	0.30	0.22	0.00	0.15	0.11	0.00	2.34
Chir	19.63	61.33	24.07	8.41	1.78	0.48	0.93	0.00	0.11	116.74
B.L.	0	0	0	0	0	0	0	0	0	0.00
Total	21.34	75.14	36.00	18.41	5.48	2.07	1.60	0.33	0.22	160.59

Tree count per hectare (Mean Value).

## Table No. 16.4

Total tree	ee count over the entire commercial area of Eco-Tourism Working Circle (Area = 1853)											
Species				Diar	neter Class	s (Cm)				Grand		
	20-30	<u>) 30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 &lt;</u>										
Deodar	1038	8 19901 15176 15639 6448 2946 556 408 204										
Kail	1093	93 5689 5077 2335 0 0 408 0 0										
Fir	1038	0	1853	556	408	0	278	204	0	4336		
Chir	36374	113644	44602	15584	3298	889	1723	0	204	216319		
B.L.	0											
Total	39543	139234	66708	34114	10154	3836	2965	611	408	297573		

Statement showing species and diameter(cm) class wise volume(m<sup>3</sup>) of Conifers in Eco-Tourism Working Circle Volume of conifers per hectare (Mean Value).

Species	Diameter Class (Cm)										
	30-40	30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 <									
Deodar	8.16	10.89	17.73	10.93	6.99	1.68	1.52	0.84	58.74		
Kail	2.34	3.73	2.86	0.00	0.00	1.19	0.00	0.00	10.12		
Fir	0.00	1.56	0.88	1.09	0.00	1.23	1.04	0.00	5.80		
Chir	29.44	27.20	18.58	6.29	2.34	5.00	0.00	0.83	89.68		
Total	39.94	43.38	40.05	18.31	9.33	9.10	2.56	1.67	164.34		

### Table No. 16.6

Total volume of conifers over the entire commercial area of Eco-Tourism Working Circle

Eco-Tourism Working Circle (Area = 1853											
Species Diameter Class (Cm)											
	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total		
Deodar	15120	20179	32854	20253	12952	3113	2817	1557	108845		
Kail	4336	6912	5300	0	0	2205	0	0	18752		
Fir	0	2891	1631	2020	0	2279	1927	0	10747		
Chir	54552	50402	34429	11655	4336	9265	0	1538	166177		
Total	74009	80383	74213	33928	17288	16862	4744	3095	304522		

Total tree	al tree count of commercial area (1853 ha) at lower interval for Eco-Tourism Working Circle Lower limit												
				Dian	neter Class	s (Cm)				Grand			
Species	20-30	<u>30 30-40 40-50 50-60 60-70 70-80 80-90 90-100 100 &lt;</u>											
Deodar	861	16518     12596     12981     5352     2445     461     338     169											
Kail	907	4722 4214 1938 0 0 338 0 0											
Fir	861	0	1538	461	338	0	231	169	0	3599			
Chir	30191	94325	37019	12934	2738	738	1430	0	169	179545			
B.L.	0	0 0 0 0 0 0 0 0 0											
Total	32821	115565	55368	28314	8428	3184	2461	508	338	246986			

## Table No. 16.8

Total volume of conifers over the entire commercial area (1853 ha) at lower interval for Eco-Tourism Working Circle

at lower is	at lower interval for Eco-Tourism Working Circle Lowe											
Species	pecies Diameter Class											
	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Total			
Deodar	12852	17152	27926	17215	11010	2646	2394	1323	92518			
Kail	3686	5875	4505	0	0	1874	0	0	15940			
Fir	0	2457	1386	1717	0	1937	1638	0	9135			
Chir	46369	42841	29264	9907	3686	7875	0	1307	141250			
Total	62907	68326	63081	28839	14695	14333	4032	2630	258844			

## 16.6 Famous Location of the Division

- i. **Ramnagar:-**The Ramnagar town is famous for its Fort, a Palace and the Narsingh Temple which are situated near the bottom of compartment 34a and 34b of Ramnagar South Range. A large number of locals, tourist and devotees visit these places round the year.
- ii. **Basantgarh:-** Basantgarh is located North West about 60 km. on side of Ramnagar Tehsil headquarters. It is famous for its natural beauty with lush green Deodar forests.
- iii. **Dalsar Lake:-**It is located about 6kms from Ramnagar town and falls in Ramnagar North Range.

## 16.7 Method of Treatment

- 1. The condition of the boundary pillars is very shabby. As these forests are located near habitations, these are prone to encroachment. So the first and for most activity should be the fresh demarcation of these forests and erection of large size boundary pillar on the pattern adopted under CAMPA.
- 2. To rehabilitate these forests by artificial regeneration particularly by the species of the area i.e. Deodar and Kail for Basantgarh and Chir for Ramnagar and Dalsar Lake.
- 3. To plant ornamental and shade bearing plants like Chinar, Ashoka, Silver Oak, Bottle Brush and cupresses, Rhododendron, weeping Willow, Drank and Neem etc.
- 4. Construction of trekking paths criss-crossing the compartments and planting of ornamental trees and shrubs along them.
- 5. Construction of wooden view points and at prominent location
- 6. Display of sign boards at prominent locations highlighting the importance of forests.
- 7. Labelling of trees and shrubs by giving their botanical name, common name and few important uses.
- 8. Nailing and Hanging of advertisement board to be strictly prohibited.
- 9. Creation of sacred grooves at Chountara Mata, Pingle Mata and Chandi Mata Temple.
- 16.7.1 A city forest is proposed for Ramnagar in Compartment number 34a, and 34c. The treatments prescribed for this forest are detailed as under:
  - i. Chain link fencing of the whole compartments to protect them from encroachments, cattle interference and trespassing.
  - ii. Construction of a network of zig-zag stone paved paths and fixing of benches (Wooden / Iron) along the path.
  - Planting of shade bearing and ornamental plants like Drank (Melia azederichtw) Neem (Azedirchta indica) weeping willow (Sialix species), Ashoka (Polyathenia longifolia), Silver Oak and Bottle brush etc.
  - iv. Planting of flowering herbs and shrubs like Boughin villia and rose etc. along the paths to increase the aesthetic beauty of the area.
  - v. Construction of wooden look out points at suitable places for providing the commanding view of the landscape.
  - vi. Establishment of a children park.
  - vii. Establishment of a medicinal herbal gardens.
  - viii. Establishment of a rose garden to attract the tourist.
  - ix. All the trees, bushes and even herbs existing naturally or planted artificially should be labelled giving details like the botanical name, common name and few important uses.
  - x. Display boards, highlighting the importance / thoughts of prominent scholars / leaders shall be erected at prominent places. Places where tourists are allowed to sit and relax

for recreation activities shall be marked. They shall not be allowed to picnic all over the areas.

xi. Construction of public convenience at central location and fixing of dustbins along the path and the places meant for picnic purpose is the need of the hour.

# **CHAPTER-XVII**

# Working Plan for Non Timber Forest Produce Working Circle

## **CHAPTER-XVII**

## Working Plan for Non Timber Forest Produce (NTFP) (Overlapping) Working Circle

## 17.1 General Constitution of the Working Circle

17.1.1 This circle will be an overlapping working circle and will spread over to entire division. Since the Ramnagar Division has a wide range of altitudinal zones, so there naturally occurs a variety of flora which have economic importance other than the value of timber.

## 17.2 Objects of Management

- 1. Conservation and Protection of Non Timber Forest Produce (NTFP) yielding species.
- 2. Propagation and cultivation of some Non Timber Forest Produce (NTFP) yielding plant species in degraded area which have a good market value.
- 3. To boost the socio-economic status of poor people which reside a forest fringes to minimize the illicit damages to the forests.

## 17.3 Management

- 1.3.1 Though a variety of Non Timber Forest Produce (NTFP) yielding species occur naturally in all the altitudinal zones of the tract, but in past proper measure have not been taken for their conservations and propagation. In the past the Non Timber Forest Produce (NTFP) was collected by locals and the Forest Department used to auction these Non-Timber Forest Produce (NTFP) on royalty basis.
- 1.3.2 It is pertinent to mention here that certain Non-Timber Forest Produce (NTFP) yielding shrubs have reduced drastically. The cause of their depletion may be degradation and depletion of the habitat, encroachments, grazing and uncontrolled and unregulated extraction of Non Timber Forest Produce (NTFP) in the past.
- 1.3.3 The Non Timber Forest Produce (NTFP) yielding species, herbs, shrubs and plants which occur in the Division are as under:-

Pinus roxburghii (Chir) which yields resin, Dioscorea deltaidea (Kins) [a source of Diosgerth], Punica granatum (Anardana), Spaindus mukuroosii (Soapnut), Viola species (Banafsha), Berberis lycium (Kaimal), Pistacia integerrima (Kakarsinghi), Syzugium cumini (Jamun), Emblica officinala (Amla), Terminalia chebula (Harner) and Terminalia belerica (Baheda).

## 17.4 Cultivation of Non Timber Forest Produce (NTFP)

17.4.1 The various initiatives for the cultivation of Non Timber Forest Produces (NTFP) are being taken up by the department especially by the MFP / Research Division, but the result is not so fruitful as no proper techniques were adopted for their propagation. Since the demand for Non Timber Forest Produce (NTFP) has increased many folds the following measures are suggested for their cultivation:-

- i. The field staff should be provided the necessary training for cultivation, utilization and marketing of the NTFP species.
- ii. It should be made compulsory to introduce NTFP yielding species in various project works. The training should also be given to local growers, collectors and processors with regards to the cultivation and handling of NTFP's to ensure sustainable and efficient use of resources which will uplift their socio-economic condition.
- iii. The unscientific method of collection without bothering about the natural regeneration of the species is posing a great danger to the survival of many species particularly those whose roots are in demand. So it has become necessary to impart the training about the method of collection or processing NTFP's till they are delivered to the contractors and finally to the consumers.
- iv. Further the scientific method of storing these products should be taught to the villagers.
- v. Various farms to grow the endangered or extinct species should be set up and knowledge of new species coming to light should be given to the villagers.
- vi. In order to protect the wealth of NTFP yielding species it is necessary to carry out sample survey of their total availability in the various forest types.

# **CHAPTER-XVIII**

# Plantation Working Circle (Overlapping)

## **CHAPTER-XVIII**

## Plantation Working Circle (Overlapping)

## 18.1 General Constitution of the Working Circle

This plantation (Overlapping) Circle is constituted for the first time in Ramnagar Forest Division. This will include all the degraded forests areas and those compartment which are situated near habitations, which are prone to heavy biotic interference and are poorly stocked and degraded.

## 18.2 General Character of Vegetation

Since this circle is an overlapping working circle, the general character of vegetation has been already discussed in major working circles. However, due to excessive biotic interference the density of these areas has decreased drastically.Due to excessive lopping and browsing fodder yielding species have become malformed and stunted growth. The regeneration is negligible. The platable bushes and grasses have been replaced by unplatable thorny bushes and grasses.

## 18.3 Special objects of Management

Plantation working circle has been constituted keeping in view the following objects:

- 1. To conserve and preserve soil and moisture contents.
- 2. To rehabilitate the degraded fringe forest areas.
- 3. To increase the green cover around the habitations.
- 4. To meet the local demand of fuel, fodder and small timber.
- 5. To reduce the pressure on natural forests by creating buffer zones between villages and natural forests.

## 18.4 Area of Treatment

The working circle wise area proposed to be treated annually is tabulated in below Table No.

S.No.	Working Circle	Area in hectares
1	Deodar-Kail Selection Working Circle	85
2	Fir Selection Working Circle	79
3	ChirSelection Working Circle	156
4	ReboisementWorking Circle	187
5	Broad Leaved Working Circle	50
	Total	557

Table No. 18.1

The annual treatment plan is left at the discretion of Divisional Forest Officer Ramnagar Forest Division in consultation with other wings of the Forest department such as Social Forestry, Agrostology, M.F.P. Division and Soil Conservation Department.

## 18.5 Treatments proposed

A multidimensional approach is required to be initiated with a missionary vision in order to rehabilitate these forests and bring them back to their old glory by involving the habitants who reside in vicinity of these forests. The main focus of rehabilitation is to increase the vegetal cover of existing forest, conserve and preserve soil and moisture contents, besides fulfilling the

day to day requirements of fuel and fodder of local inhabitants. These degraded forests can be treated keeping in view both short and long term measures, so that local inhabitants who get involved in rehabilitation of these forests gets immediate benefits such as fuel, fodder, collection of NTFP raised in these areas (especially shoot/fruit portion) and small timber. The long term benefits such as sharing of major forest produce. The measures proposed to the adopted are as follows:-

- 1. Closing of area by barbed wire with P.C.C. posts or / chain link fencing with angle iron.
- 2. Planting of exotic / local fast growing fodder yielding species.
- 3. Planting of medicinal herbs, shrubs and plants.
- 4. Planting/ sowing of grasses having good fodder value.
- 5. Construction of dry rubble stone missionary (DRSM) check walls, stone filled mesh wire crates and water harvesting structures in order to conserve, preserve and increase soil and moisture contents of the area.
- 6. Construction of permanent fire lines around the plantation areas.

## 18.6 Choice of Species

Since Ramnagar Forest Division has a vast altitudinal variation so a wide range of flora from alpine zone to sub-tropical zone are existing. Such as *Acacia catechu*(wood used for extraction of katha), *Aesculus indica* (good fodder tree of temperate zone), *Berberis lycium* (rasount), *Boxus wallichiana* (timber used for making toys and wood carving), *Dalbergia sissoo* (Timber value), *Dioscorea deltuidea* (Medicinal value), *Grewia optiva* (best fodder yielding tree of sub-tropical zone), *Olea cuspidate* (Fodder tree of sub-tropical and temperate zone), *Punica granatum* (Fruit edible having medicinal value also), *Quercus species* (Fodder value timber used for agricultural implements and fuel wood), *Rubina pseudoacacia* (Fodder value), *Trifolium pretense* (Red clover grass, good fodder value), *Trifolium repens* (white clover grass, good fodder value).

## 18.7 Nursery and Plantation Technique

## <u>18.7.1.</u> Dalbergia sissoo (shisham)

Occurrence:- It occur in sub-Himalayan tract upto an altitude of 900 meters.

Seed:- The pods ripen from end of November to early January.

Seed Weight:-It weighs 53 seeds per gram.

<u>Nursery Technique:-</u> Seeds are sown in nursery beds in drills in February / March, if plantation is to be carried out in ensuing monsoon and in July when the plantation is to be carried out in next monsoons. During summer proper weeding and watering is carried out.

<u>Planting Technique:-</u>The plants are planted in pits of size 45cm x 45cm x 45cm at a spacing of 3m x 3m. In earlier stages it is sensitive to drought but at later stages it is drought resistant. It is a good coppicer and produce root sucker freely.

## 18.7.2 Dendrocalemus strictus (Bamboo)

**Occurrence:** It occur in North India upto 900 meters, It is frost hardly and extremely drought resistant.

**<u>Seed:</u>** Seed ripen from April to June.

Seed Weight: It weighs 32 seeds per gram.

**Nursery Technique:** The seed is sown in nursery beds in drills made 15 to 20 cm apart in June and covered with soil lightly. The germination starts is a week. The 8 cm seedlings are transplanted in poly bags which contains mixture of farm yard manure (FYM) and Soil. Proper weeding and watering is carried out during summer.

**<u>Planting Technique</u>**: One year old poly bagged plants are planted in the field in pits of size 45cm x 45cm x 45cm at a spacing of 3cm x 3cm.

*ii.* **Popular Species (Poplars):** Popular is a genus mostly found in Northern hemisphere. It is fast growing, reproduce vegetatively and hybridize freely. It is a strong light demander and require moisture.

**<u>Nursery Technique</u>**: Popular cuttings of about 20cm in length are planted at of 80cm x 60cm in nursery beds in December – January and nursery beds are flooded with water . periodically weeding and watering is carried out.

**Planting technique:** The entire plants with naked roots are planted in pits of size 45cm x 45cm x 45cm at an spacing of 2m x 2m.

## <u>18.7.3</u> Robinia pseudoacacia (kikar)

**Occurrence:** It is native of north America and can grow at an elevation between1500 to 2000 meters.

*Seed:* The seed ripen in the month of October-November.

*Seed Weight:* It weighs about 33 to 77 seeds per gram.

**Nursery Technique:** Seed is sown in Nursery beds by broad casting or in lines 20cm apart. Depth of sowing should be about 1.5cm. Germination starts in a week. Proper watering and weeding is done.

<u>Planting Technique</u>: 8-9 months entire plants can be planted in pits of size  $45 \text{ cm}^3$  at a spacing of 2.5 m x 2.5 m and plantation area be closed for grazing.

## <u>18.7.4</u> Aesculus indica (Horse Chest Nut)

**Occurrence:** It occur at an altitude between 1200 to 2700 meters in moist shady locations.

Seed: It ripens in September-November.

Seed Weight: It weighs about 640 seeds per kilogram.

Germination Capacity: 70 to 90 percent.

## Nursery Technique:

<u>Seed:</u> Sowing is done in shady and cool nursery beds. Sowing be done 5 cm below the soil in drills 15 - 30 cm apart. Periodic weeding and watering is done.

**Planting Technique:** Seedlings with naked roots are transplanted during winter in pits of size 45cm x 45cm x 45cm at a spacing of 2m x 2m in moist and shady areas.

## <u>18.7.5</u> Terminalia chebula

Artificial regeneration is generally brought about by sowing. The seeds are soaked is moist manure for 3-4 days, prior to sowing. Thereafter, sowing is done in mounds in patches or lines. Germination may take about three weeks or even more.

## <u>18.7.6</u> Acacia catechu

- *a.* **Direct sowing :** Seeds are soaked for about 24 hours in water or kept in cowdung, Broadcast, or line or patch sowings are carried out.
- *b.* **Planting :** Six to eight month old Khair seedlings which have been raised in the nursery, are transplanted in the rainy season.

# **CHAPTER-XIX**

# Forest Protection Working Circle (Overlapping)

## CHAPTER-XIX

## Working Plan for Forest Protection Working Circle (Overlapping)

## **19.1** General Constitution of the Working Circle

19.1.1 This Working Circle is being introduced for the first time in this Division. This shall be an overlapping Working Circle with special focus on those forests which are prone to illicit felling and illegal transportation of forest produce, encroachment, forest fires, excessive grazing and browsing and pest and diseases. Since the Ramnagar Division has a wide range of altitudinal zones, so all the major species are found mixed together such as Deodar, Kail, Chir, Sissoo, Khair and Medicinal Plants.

## 19.2 Objects of Management

- 1. The main object is to protect these forests from illicit damages.
- 2. To check the smuggling of Forest Produce.
- 3. To check the encroachment upon the Forest land.
- 4. To prevent Forest fires.
- 5. To protect forest crop against pests and diseases.

## 19.3 Agencies Responsible for Forest Damage in Ramnagar Forest Division are

- 1. Illicit felling and illegal transportation of forest produce.
- 2. Encroachments
- 3. Forest Fires.
- 4. Grazing and Browsing
- 5. Pest and Diseases.
- 6. Illicit felling and illegal transportation of forest produce.

## 19.3.1 Illicit felling and illegal transportation of forest produce

The illicit damages are confined to forests situated at fringe areas and its impact is more in the areas adjoining the thickly populated villages and least in the deep Forests. The Broadleaved trees are illicitly felled for firewood purpose. Oak trees are heavily lopped for fodder purpose. In Basantgarh Range the Deodar/Fir is illicitly felled for the construction of houses. The broad leaved species such as Chikhri is also illicitly damaged for firewood and for making decoration pieces after carving it into different shapes.

## Preventive Measures:

- 1. Intensive patrolling of the area.
- 2. When ever cases are registered they should be persued vigourously till a logical conclusion in the court.
- 3. The important compartments with species of high economic value such as Deodar forest and other forest which are prone to illicit damages should be listed up.
- 4. These compartments should be provided species protection and periodical checking by Divisional Forest Officer / Range Officer.
- 5. The combing of forest compartments prone to illicit damage by specially formed squads of territorial field staff and Forest Protection Force periodically.

- 6. Concentrated efforts have to be made to the misconception of the villagers who think of forests to be an un exhaustible natural resource. By constant publicity they need to be explained that the illicit felling wood eventually decrease the forest cover to a large extent in course of time which will have an adverse impact on their prosperity.
- 7. The goodwill of people has to be earned, as mere publicity of the advantages of forests will not help. This goodwill of the people can be earned, by easy and quick supply of forest produce in form of rights and concessions and meeting the genuine demand of villagers.
- 8. The illegal activity should not be encouraged as a mean of livelihood. Strengthening of Check Posts:-
- i. <u>Kulwanta Check Post</u>: The Kulwanta Check Post is located on the Ramnagar- Basantgarh road at the Range Boundary of Basantgarh and Ramnagar South Range. This Check Post plays an important role in checking the smuggling of Deodar and Kail. Since Deodar and Kail Forests are confined to Basantgarh Range only, there is a great demand for Deodar and Kail Timber in the Ramnagar Town and adjoining areas. There is an urgent need to strengthen this check post with more manpower.
- ii. <u>Kuh-Nallah Check Post</u>: This Check Post is situated on Ramnagar-Udhampur road at Kuh-Nallah at the Divisional Boundary of Ramnagar Division and Udhampur Division which is about 19 kms from the Ramnagar Town. This check post plays an important role in controlling smuggling of timber, resin and firewood. The strength of staff posted at Check Post is insufficient to manage the check post round the clock, so it is proposed that at least 4 personals should be posted at this check post.
- iii. <u>Establishment of New Check Post</u>: The Ramnagar North Range is connected with Udhampur Bye-pass National Highway at Jaganoo by a motorable road. This road has become an alternate route for smuggling of forest produce. So it has become necessary to establish a check post at the Range Boundary of North Range.

## 19.3.2 Encroachment

The problem of encroachment in this division is grave and this is the main cause of shrinkage of forest cover. Though there are various causes of encroachments which are interlinked. The problem of encroachment on forest land prevails in entire division and there is no particular area in which encroachment is more or does not exist, though it depend upon the edaphic factors of the site. The encroachment on forest land is done in a well-planned and organized manner, which involve the following steps.

- i. The main crop is dried up by girdling the tree at ground level so that it is not noticed easily.
- ii. These dry trees are felled either illicitly or through concessions.
- iii. Ground flora (Shrubs) is removed in order to boost the grass.
- iv. The area adjoining to private land is enclosed to protect the grass by thorny.
- v. Then the enclosed encroached forest land is slowly and steadily converted into agricultural land and simultaneously fruit bearing trees are also planted in it.

The following are the reasons which are responsible for encroachment in this division are as follows:

- 1. Poor condition of Boundary Pillars.
- 2. In complete demarcation record .
- 3. Discrepancies in Revenue and Forest records.

- 4. Non-mutation of many forest areas in revenue records.
- 5. Rising land prices.
- 6. Population explosion.

The present status of boundary pillars is alarming and in most of the cases no boundary pillar exists. The forest guards find it very difficult to locate the demarcation line which has added fuel to fire. Moreover, it has become a routine saying that the encroachment is an old one. There is no proper record available which shows how much forest land is encroached. There is a wide gap between actually encroached forest land and recorded encroachments. The recorded encroached forest area of this division 235.10 hectares.

## Preventive Measures:

- i. The boundary pillars should be distinct and clear and its record complete.
- ii. Boundary pillars should be visible from the previous to next pillar.
- iii. The boundary should be regularly inspected by the Forest Guard and occasionally inspected by higher officers.

## **Remedial Measures:**

- i. Erecting of RCC boundary pillars on the pattern of CAMPA.
- ii. Erecting of RCC pillars around the forest in order to delineate the encroached land, so that the encroacher may not exceed further. The distance from boundary pillar and its bearings and geo-references must also be noted down. In other words at places where encroachment had occurred, there shall be two types of pillars, one main boundary pillar which will show the actual demarcation line and other one will exhibit the line of encroachment. This will help in making the staff accountable for further encroachments.
- iii. The forest areas near to the habitation which are highly vulnerable to encroachments with missing Demarcation files and boundary pillars are to be taken on priority for the reconstruction of boundary pillars and the demarcation files on war footing. For the said purposes a specialised team of Officers comprising of Divisional Forest Officer Demarcation-I, Revenue Officers at the rank of Assistant Commissioner Revenue need to be constituted and the Boundary pillars of new design are to be placed on grounds as early as possible.
- iv. In most vulnerable areas Toe wall fencing/ Chain link fencing needs to be erected.
- v. In many places in this Division the Boundary pillars or displaced or removed or not available which need to be re-fixed as per new design of boundry pillars alongwith their Geocoordinates which are to be mentioned in Tashree- Burjiaat or Description of boundary pillars.
- vi. The records of Revenue Department and Forest Department should be brought in agreement.
- vii. The Nomadic graziers should not be allowed to construct semi permanent/permanent structures in compartments allotted for grazing.
- viii. If anybody make any attempt to do this, his allotment be cancelled forever in whole of the Division.
- ix. A legal cell of territorial as well as forest Protection Force staff be constituted in each Range which will work under close supervision of Range Officer to thwart any attempt of encroachment without any delay and report be sent to higher officials immediately.
- x. There is an imminent need to book the prominent habitual land mafia for encroaching forest land under Public Safety Act. This step will serve as deterrent against the further encroachments.

xi. The punishment for encroachments and damage of boundary pillars should be doubled and necessary amendments should be made in section 6(E) and section 35(c) of J&K Forests Act.

## 19.3.2 Forest Fire

Fire is a major factor that causes considerable damage to the forests of this division. The fires both accidental and intentional are very common in this tract due to the reason that majority of forests are easily approachable by roads/Paths and State Highways and other roads. Also most of the forests lie in dry/hot areas. As most of the forests are either chir or scrub forests, any incident of severe fire has a considerable adverse effect not only on the vegetation but it also deteriorates the habitat. Fire has an adverse effect on soil, water and ecological balance of the affected area. Soil becomes vulnerable to erosion and its structure gets affected, thereby retarding plant growth. The soil building flora are destroyed and the area is ultimately rendered susceptible to erosion and decreasing productivity. The young regeneration is wiped out, growth of surviving vegetation is adversely affected, the yield of forest produce is immensely reduced and the vegetation damaged by fire becomes vulnerable to insect and fungal attack. In the fire burnt forests change in crop pattern takes place, resulting in mixed crop in the forests. The Chir forests in this division are highly susceptible and are subject to frequent fires in the months of April to June. Because of all these reasons prevention and control of forest fire assumes great importance in Ramnagar Forest Division and there is an urgent need to take effective steps to counter the menace of forest fires, with the aim of:

- a) Protecting forests from damaging fires by taking up all preventive measures like administrative, technical, social, legal etc.
- b) Preparing adequately and taking appropriate action for controlling, suppressing and extinguishing forest fires, in order to minimize the loss caused by them;
- c) Educating local people about fire damage and eliciting their cooperation in preventing, controlling and extinguishing fires.

**Major Causes of Forest Fires:** The main causes attributable for the out break of fires are various and can be summarised as under:-

**Natural:** This is caused due to lightening, friction between quartzite stones and dry bamboo culms and trees. Such fires are rare.

Accidental: Such fires are more common and are caused due to

- 1. Charcoal burning and control burning the forests.
- 2. Gross carelessness of the passersby, smokers, grazlers, hikers, campers, hunters, wood collectors, honey collectors, labourers working in the forests etc.
- 3. Burning of refuse in the cultivated fields by the people without suitable precautions or supervision.

## Intentional:

- 1. People set fire to forest under the false belief, that the resultant grass growth will be better and more abundant.
  - 2. Fires are started for scaring away wild animals for

poaching.Since a set of the evidence of the e

**Factors Contributing To Fire Damage:** Fire is the product of fire environment, which has mainly following components:

(i) High temperature

(ii) Low humidity

iii) Inflammable material

## (i) High Temperature:

With the increase in temperature during summer season, the possibility of fire increases. In this area about 40°c is considered the critical temperature, above which the cases of fires keep on increasing with increasing temperature. The detection of fire danger day can be assessed with the help of thermometer.

#### (ii) low humidity:

This factor also contributes towards spread of fire, The areas which are more humid are less prone to fire, than the areas, which have low humidity in summers. This is the reason that the casualrain-fall reduces the fire risk for a few days.

### (iii) Inflammable Material:

In most of the forests, grasses, chir needles, resin, fallen trees, bushes etc., make ample inflammable material. The possibility of forest fire depends upon the quantity of inflammable material on forest floor, to reduce the inflammable material in forests, control burning is done.

## Fire season:

The greatest danger of fire occurrence is during summer months from April to early July, up to the commencement of monsoon rains. During autumn, normally, the danger of forest fire is less but occasionally the fires do occur in this period also.

## **Fire Protection Strategies:**

**Special Fire risk zones:** Delineation of fire risk zones i,e compartments vulnerable to fire should be done .so that it could be managed beforehand. It is discussed in detail in Forest fire chapter.

Management of fire Protection: The following steps will prove effective in fire management.

- (a) Fire prevention measures
- (b) Timely detection of forest fires and information to concerned staff.
- (c) Process of fire control and fire fighting.
- (d) Penal provisions and a system of rewards
- I <u>**Fire Prevention measures:**</u> "Prevention is better than cure", and this holds good in case of forest fires too. Prevention of fire is more beneficial and cost effective than fighting the fire. For this effective steps should be taken well in time, such as summarised below:-
- II Earning good will of local people: The forests cannot be protected against fire without winning the good " will and co-operation of the local people. This can be done by making

regular contact with local villagers and meeting the reasonable bonafide demands of right holders, well in time. Also, the closures made should be affected for the minimum required period.

- III <u>Education and publicity:</u> Wide publicity especially in villages nearby forests should be given against the harms caused by forest fires. For this, timely action should be taken for distribution of pamphlets and other educative material during the fire season, well in advance, so as to acquaint the villagers/local people through Panchayats. The staff should hold regular meetings with local villagers in their areas to create awareness. Also, hoardings, notice boards and banners should be displayed at prominent points to make aware the tourists and local public regarding the damage caused by fires.
- IV **<u>Restriction on tarring of roads</u>**: During fire season, tarring of roads in forest areas should be banned, as P.W.D staff/labour burns fire underneath drums of bitumen leading to wild fires.
- V <u>Concept of Joint forest management:</u> Joint Forest Management may help in preventing and controlling fires. For this active participation of local villagers should be sought by' involving people in forestry activities.
- VI <u>Removal of pine needles:</u> Local villagers should be allowed and encouraged to collect and remove the pine needles, before hand, for domestic purposes and use as packing material for fruits and vegetables, fire brickets and other alternate uses. The strategy to collect, bundle/baling, and transport pine needle from forest areas be chalked out in participation with VFDC,s / JFMC,s / local people of the area and collaborating with Industry which use pine needle as raw material. This will reduce the fire hazard to a great extent.
- VII **Cleaning and thinning in regeneration areas:** All regeneration areas, should be isolated by cleaning a strip of 3 metre width all around from the inflammable material like leaves, bushes etc. Early cleanings and thinning in young regeneration should be done, to give a spacing of 1 metre, The pruning of trees, which have attained a height of 1.5 metres, should be done up to one third of their height and debris should be collected at suitable Nallah/place and control burnt.
- VIII <u>Fire protection staff:</u> Divisional Forest Officer will engage sufficient number of firewatchers in consultation with the Conservator of forests, during the fire season, Fire watchers (preferably the local villagers), will patrol the areas extensively for detection and protection against fires and will ensure all preventive measures with the local forest field staff, During fire season fire fighting squad be formed out of the daily waged who have been regularised. This squad should always be ready at every Range/Block H.Q. and as soon as any intimation of fire occurrence is received, they be rushed on "Fire Pick up Van", to that spot.
- IX <u>Fire Protection .Equipments</u>: The field staff (near the fire prone forests) should be provided with sufficient fire fighting equipments, such as brooms, shovels, slashers, axes, hatches, forks, buckets, gunny bags etc, so as to\_meet any emergency and for facilitating the speedy

xtinguishing of fire. Field staff should be imparted training for effectively controlling forest fires.

- X **<u>Fire lines</u>**: The existing fire lines be properly maintained and kept dear of all bushes, needles etc. to avoid any chance of fire, This Division has a very good network of State Highways, ·link roads, bridle/inspection paths passing along or through the majority of forests. Hence, no new fire lines are proposed. It is laid down that all such roads/paths should be kept clear of all inflammable material especially during the fire season, so as to ag as fire lines.
- XI <u>Construction of Watch towers:</u> A net work of watch towers, at suitable commanding locations, should be developed. These should be permanently manned by fire watchers/Forest Workers during the fire season. The fire watcher will immediately come to know and report to the beat guard, any outbreak of fire that may occur. The beat guard will take further necessary action for fire fighting. Fire watch towers, may be constructed wherever considered necessary. However following fire watch towers are proposed to be constructed in Ramnagar forest division at highest points of each Range.

## Table No. 19.1

S.No.	Range	Place	Compartment Nos.
1	Ramnagar North	Gand Top	9
2	Ramnagar South	Chountra	45
3	Basantgarh	Basantgarh	48
4	Basantgarh	Samna Banj	73

#### List of proposed fire watch towers

XII <u>Control Burning :</u> The Chir forms a thick bark at an early age, by virtue of which it can resist the effects of slow fire and this property is of great advantage and development of control burning. The burning should be thoroughly planned and organised and should be carried out under the supervision of competent officials.

All the forests must be isolated by clearing a strip of 1 metre width of all inflammable material, leaves, bushes etc. to act as fire barrier during the fire season. Grazing by cattle, should be permitted, in order to reduce inflammable material in the forests.

It is most essential, that forests, allotted to Chir Working Circle are adequately protected against fire. The control burning is the most important operation and should never be neglected, The triennial programme for control burning is the most important operation and should never be neglected. The forest areas have been prescribed in full, however it is laid done that all the forest areas planted should not be controlled burnt, until the plants attain a height of 1.5 Meter, The detailed instructions on control burning are given under: -

(1) The control burning should always be done during winters in January-February.

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special care should control. cleared lines. (2)

be taken, to keep the line of fire as straight as possible and under(3) The fire should start along the ridge, a cleared path or especially

Burning should progress from uphill to downhill in calm weather and

- (4) Chir needles and other inflammable material should be fully raked to ensure through burning.
- (5) In forests under resin tapping, it must be ensured that all chips, fallen resin, needles, etc. are cleared about 1.5 m away from the base of the trees by the resin labourers.

(6) Cleanings and early thinning in young regeneration areas must be completed before the control burning.

(7) Burning shall be done always under strict supervision and control of the executive staff and shall never be left to the engaged labour.

(8) The existing fire lines should be properly maintained and kept clear. The roads, bridle
and inspection paths etc. must be kept clear of all inflammable material, so as to act
as fire lines.

(9) Sufficient number of trained fire watchers should be employed during the fire season to help the field staff and provided with necessary equipments. No felling operations, even to the right holders, should be allowed during the fire season. It is, however, to be noted that areas under regeneration should not be control burnt, until the regeneration reaches a height of about 2.5 m. In such areas, however, the grass cutting/needle collection by right holders is encouraged.

The control burning will also form a part of control forms and deviation reflected therein should be explained very clearly giving valid reasons. In order to protect the forests, against fire risk, burning, and to maintain the sanitation of the forests, the following guidelines/steps are laid down:

- 1. The inflammable/fire hazard material from the forests should be collected and disposed off during the winters.
- 2. The job should be got done preferably, through the regular forest workers of concerned ranges.
- 3. Collection of humus and other inflammable material should begun by raking from top of the forest and working downhill.
- 4. Stack in moderate heaps in open places or suitable Nallahs.
- 5. Burn the heaps downhill so that the smoke does not interfere with men working below and reduces the risk of fire.
- 6. Burn the heaps in rotation to reduce the heat.
- 7. Burning operation should be carried out under the supervision of forest guard concerned.
- 8. Steps should be taken to make it mandatory for right holders and Forest Corporation, to collect the felling refuse after felling trees into heaps or its removal from the forest should be specified.

**Fire Fighting:** When a fire is observed, Forest Guard or the fire watcher should at once inform the Block Officer and the Range Forest Officer. He should also inform the Sarpanch of the local Panchayat immediately, as wen as, the staff of the Government Offices or institutions situated in the vicinity and seek their help in the fire fighting operations. In case of alarming situations, immediate help of various organisations like FPF, Army Cantonment Head Quarters, Fire Brigade,N.C.C.,N.S.S. situated near the vicinity of each range can be availed. District Administration may be requested for immediate help, as and when, required, Beating with a broom of green bushes normally controls the fire. The Senior Officer present will immediately, take command of the operations. He should know the local geography and have some idea of
labour force. The labour force should be organized in sections of suitable strength each under the order of one man and given definite task. A couple of men should be kept in waiting to take messages and instructions to the various sections. In case the fire goes beyond control, it is necessary to localize it by counter firing. Counter firing should only be done under order of a senior officer in charge of operations and attempted from a defined line such as road or ridge or fire line. A line is formed along the ridge by clearing the forest floor and cutting bushes and from this fire is started, so as to consume the fuel in advance of the oncoming fire. Wind direction and gradient should always be kept in mind, while counter firing. Roads/Paths are useful, provided, enough manpower is present. After the fire has been brought under control, the smouldering stumps should be extinguished by putting the dug earth on them and strict vigilance be kept till all dangers of fire spreading are taken care of. Arrangement for the transport of food; water and adequate fire fighting tools are essential. The rolls of right holders, who helped to fight the fire, should be kept in record, so that the rights of defaulting right holders can be suspended.

#### 19.3.4 Grazing

The entire division is prone to heavy grazing duringthe entire year due to large variation in altitude. There is no restriction on grazing in forest land except specifically closed areas. The practice of grazing has been going on in an unscientific manner as well as beyond the carrying capacity of the forests, which has resulted in the failure of regeneration of main crop. This has consequently degraded the forests over time. Besides local inhabitants, migratory nomads such as Gujjars, Bakerwals and Gaddis migrate to summer behaks twice in a calendar year with their live stocks (such as sheep, goats, horses, buffaloes, cattle),causing extensive damage to forest along route of migrations. Some their local inhabitants and nomads stay on higher reaches of Ramnagar North and Basantgarh Ranges during summer months. During winter season the nomads graze their live stocks in Behaks.

The livestock data of Ramnagar Division as per census of 2011 is as under:-

S.No.	Description	Number of Heads		
1	Cattle	95334		
2	Buffaloes	51110		
3	Sheep	123500		
4	Goats	78500		
5	Others	1637		
	Total	350081		

#### Table No. 1.8

Source :Distt. Sheep Husbandry & Distt.Animal Husbandry Officers, Udhampur.

#### Method of Treatment

Over grazing is a major and very complicated problem, which is causing main hurdles in the successful regeneration of Chir and Fir forests. Being a socio-economic problem, it has to be tackled accordingly. It calls for the active considerations of all the agencies, government, non-government, people and politics connected directly or indirectly with this problem. Therefore, the following method of treatment is suggested:

1. A detailed survey of all pasture lands should be carried out with respect to their carrying capacity and actual incidence of grazing. Grazing plan for the division be prepared in consistence with the Grazing Policy of the state. Grazing should, at the earliest be regulated and controlled on scientific lines under the proper plans required to be drawn up at micro levels.

- 2. All efforts should be made to scale down the population of unproductive cattle by encouraging the introduction of high yielding varieties of the cattle, and castration of unproductive cattle. The departments concerned with improvement of livestock are required to be actively involved in this stupendous task.
- 3. Till such time, a balance between the live stock population and carrying capacity of the grazing lands is struck, the live stock should be stall-fed with forage and other concentrates from various sources.
- 4. The local population needs to be encouraged for raising grasses and fodder yielding tree species on their private lands, in order to ease the excessive grazing pressure on the forests.
- 5. The pasture lands, at present, require much intensive management on scientific lines for the over all betterment, of the forests.

#### **Erosion Control in Grasslands**

Overgrazing reduces vegetative cover and also causes compaction of soil. Both these factors contribute towards accelerated soil erosion. In Ramnagar Forest Division, pastures are generally located in the uppermost reaches of the mountains. Thus, the phenomenon of erosion which is initiated in these pasture lands, assumes enormous proportions in the down hill areas and has devastating effect on forests, agricultural fields and National High Ways. Therefore, it is very important to initiate soil arid water conservation measures in the high pasture lands. The following methods are hence prescribed.

- Contour Furrows: Contour furrows are small channels or excavations, constructed on contours to store water and allow it to be held inside the ground level. The excavated material is put on the down stream side. Sites with long uniform and gentle slopes are found to be more suitable for constructing contour furrows. It is not recommended on steep slopes. The furrows are normally 10 to 20 cm wide and 10 to 15 cm deep and spaced 100 cm to 200 cm apart.
- 2. Contour Trenching: Contour trenching is also one of the mechanical measures for conservation of soil and moisture. This involves excavation of trenches along the contour, or across the slope of the land, generally in the top portions of the catchments. Contour trenching on very steep slopes is not practicable. Land with slope more than 20 percent is generally not contour trenched. The trenches are not more than 15 meters long and are usually staggered through out the area. In cross sections, they are 30 cm deep and 30 cm or 60 cm wide. The trenches should run perfectly level so as not to allow the trenches to be converted into gullies. The soil excavated in trenching is used to form a bund on the down stream side leaving a berm equal to the depth of the trench.
- 3. **Control of Gullies:** Gullies are normally formed when the rill and sheet erosion continues unchecked: It usually begins in areas with natural depressions, livestock trails etc. Overgrazing, intense rains and faulty land management practices are responsible for gully formation. The following measures are suggested for the control of gullies.
- 4. Construction Of Contour And Peripheral Bunds: To check the growth of gully formation and to control soil erosion, the first thing that needs to be done is to prevent the water from entering the gully. This can be done by retaining as much water in the catchment area as possible, and to safely dispose off the excess runoff. For this purpose contour and peripheral bunds may be constructed. Excess runoff can be disposed off safely by digging diversion channel above the gully head.
- 5. **Easing of The Head of the Gully:** To prevent the water fall erosion and eating back of the gully, one of the measures is the easing of gully head. This can be done by partly cutting at the top and filling the base. The head can be sloped to the angle of repose required by the soil.
- 6. **Gully Plugging** :\_Gully plugs are structures designed to halt the upstream progress of gullies by reducing the grade at the top of the slope which, when paved or protected, will allow the drainage to get from the upper to the lower level without further erosion. These are

constructed to check the velocity of runoff, to increase percolation and to encourage silting. Vegetation can be established on such silted areas. Various materials can be used for construction of gully plugs such as brush wood, live hedges, earth, sandbags and boulders.

#### • Pasture Improvement

The best way to rehabilitate and develop the rangeland is to manage it on ecological principles. By mere closing of the area and adoption of controlled grazing, rangeland improvement is possible. Reseeding of range is resorted to only when the grass regeneration is inadequate, native vegetation has disappeared and the range is required to be improved quickly. Some of the species suitable for difference zones of Ramnagar Forest Division are listed below.

#### **Sub-Tropical**

Cymbopogon coloratus Sehima nervosium Chloris gayana Arundinella nepalensis Eulaliopsis binata Themeda anathera Heteropogon contortus Apluda mutica Cymbopogon martini Themeda triandra Dichanthium annulatum Arundinella bengalensis Paspalum dilatatum Panicum anidoale Chrysopogon fulvus Pennisetum pedicellatum

#### Temperate

Cocks foot Phalaris tuberosa Bromus inermis Poa pratensis Lolium multiforum Festuca elatior

#### <u>Method of Seeding</u>

The most economical and quickest methodof sowing the seeds is by broadcasting. Broadcast sowing is suitable for light, fluffy soils, especially those which have been loosened by frost action. The cracks in the soil act as gaps for receiving the seeds. Broadcast sowing has been found to be more effective if the soil is covered by brush drag or harrows after sowing. Grass seeds are very small in size and light in weight. There is a risk of their being washed or blown away by the currents of water or wind. This can be avoided by sowing of palletized seeds. The seed is processed into small pellets which are easy to handle and are less vulnerable to be blown away by wind or water. A homogenous thick paste is prepared by incorporating seeds in the mixture of sand, clay, cow-dung and fertilizer in the ratio of 3: 1: 1 : 1 and using sufficient quantity of water. Pellets, or small balls of convenient size, are prepared in such a way that each pellet contains 2 or 3 seeds. The pellets are meant to give the seedling a vigorous start. The pellets are dried and stored for 4-6 months before sowing. Sowing of pellets is normally carried out just before the first monsoon or just after the premonsoon showers.

#### <u>Vegetative Propagation</u>

The practice of propagation through vegetative material is resorted to when sufficient quantity of seeds is not available. The practice consists of transplanting, grass seedlings raised in nursery, or rooted slips of old tussocks, on well prepared soils having optimum moisture condition. It ensures quick establishment of the grasses. It is more expensive than the direct seeding but has advantage of quick growth. In transplanting, it is easy to maintain the requisite plant population.

#### 19.3.5 Pests and Diseases

The pests and diseases form an important part of biotic factors affecting forest tree species. They cause damage to forest trees and also to the seedlings in nursery. Usually forest managers ignore the pests and disease. But the recent epidemics of Sal borer in Madhya Pradesh and Deodar defoliator in Himachal Pradesh are stern warnings to forest managers. It is very important to monitor forest pests and diseases in each division. In nurseries and plantations the insect pests causes serious damage and is a common occurrence every season. The negligence leads to loss of precious resources and time. Keeping these points in view some important insect pests and disease of prominent tree species of Ramnagar Forest Division are given below.

S.No.	Name of the Post	Control Measures	
1	Cut worms (Lepidoptera,	Mix with nursery soil Sqursery soil Aldrin 1% dust	
	Agrotis, Euoxa etc.	BHe 10% dust or heptachior 1% dust at the time of	
		preparation of soil mixture	
	Chafers	5% Aldrin dust @ 32 g per Sq km 10% BHe dust @	
		32 g per Sq m 5% Heptachlor dust 32 g per Sq m	
		mized with nursery soil at the time of bed	
		preparations gives full control	
	Cricketers and grass hoppers	Spray 0.5% Malathion on seedlings	
	(Ortho petra)		
	Termites (isopteran)	In Corporate Dieldrin aldrin or BHC in potting soil or	
		nursery @ 300 gm of 1% dust per cubic mtr of soil.	
	Defoliating beeltes and	Spray 0.02 – 0.01% of endosulfan or 1-0.25% ferni	
	caterpillars	trothion on foliage of seedlings.	

#### Pests of Trees in Forests / Plantations

S.No.	Name of the Post	Control Measures
1	Chirpine defoliator	Aerial spray of fenitrothion @ 1 liter per hectare.
	(Lebeda nobilis)	
2	Termites	Spray seedling, young plants with 0.0.2% Aldrin or
	(Sissoo, khair, Siris, Phulai etc)	BHC in water or incorporate 300 g of 1% dust per
		cum soil at the time of planting.
3	Chafers	Dipping roots of seedlings in 1% Aldrin before
		planting
4	Poplar defoliators	0.1 % carbyl or fenitrothien or 0.04% enclosulton
	(Pygaera species)	in water should be sprayed on leaves.
5	Sissoo defoliater	0.1 % carbyl or fenitrothien spray on foliage.
	(Plectoptrera reflexa)	
6	Semal shoot borer	Young plant should be sprayed with systematic
	(Tonica Niviferana)	insecticides like Rogar bidrin

Some important diseases occurring in prominent tree species of Ramnagar Forest Division are as under:

Collar (or ring) rot in Deodar, Heart rot in Kail, Root rot of chirpine, Root rot of Khair, Root rot of Sissoo,

Root rot of Siris, Wilt of Sissoo, Bamboo leaf rust, Khair Leaf rust, Sissoo Leaf rust.

#### • <u>Disease Management Practices</u>

The disease management is nothing but the selection and use of appropriate techniques to suppress diseases to a tolerable limit. The management aims at increasing productivity and reducing cost of production. The main management practices employed for the control of forest diseases are. Quarantine regulations choice of species, choice of planting site, sanitation, removal of alternate hosts, silvicultural and other cultural practices, solarisation chemical control measures and' use of resistant plant material. Long rotation periods and low value per unit area of forest species make the use of chemicals and rotation in disease management difficult options, however in forest nurseries and plantations the intensive management practices can be adopted, Apart from the above general guide lines the following control measures for most important diseases are prescribed.

- 1. Root rot of Khair: Ganoderma leucidum causes serious mortality due to root rot in reforested stands. The plants are susceptible at all ages. The yellowing of foliage and gradual drying are symptoms shown by affected plants.
  - a. Old stumps and debris should be created from the plantation site.
  - b. In young plantations isolation trenches should be dug if disease incidence is serious.
  - c. Resistant species like Semal (Bambax ceiba) should be mixed with Khair crop in plantations.
- 2. Vascular wilt of Sissoo: The disease is caused by Fusarium solani.

#### **Control Measures :**

This Sissoo Plantations should be avoided in poorly drained clay soil.

## **CHAPTER-XX**

## **Miscellaneous Regulations**

#### CHAPTER-XX

#### **Miscellaneous Regulations**

#### 20.1 Watershed Management

20.1.1 <u>Introduction</u>: Watershed or a drainage basin is a natural unit draining runoff water to a common point. It can be demarcated based on ridge and gully lines. The size of a watershed can be selected depending upon the possibilities of developing it completely within a reasonable period. Mini watershed and sub catchment could be the basis for the planning and execution.

#### 20.1.2 Aims and Objectives:

- 1. To protect, conserve and improve the land resources for efficient and sustained production.
- 2. To Protect and enhance water resources, moderate floods, reduce silting up of tanks, increase irrigation and conserve rain water for crops and thus mitigate droughts.
- 3. To utilize the natural local resources for improving agriculture and allied occupation or industries (small and cottage industries), so as to improve socio-economic conditions of the local residents.
- 20.1.3 Location & Codification of Watershed: The Ramnagar Forest Division is located between 75<sup>0</sup>-9' E to 75<sup>0</sup>-42 E longitude and 32<sup>0</sup>-40' N to 32<sup>0</sup>-53' North latitudes. The track is bounded on the North by Jug Dhar which extends from the south east to the highest peak [Kaples Peak (4341 mt.)]. In the South a low lying ridge Kharai or Sarend dhar forms the boundary. In the East the water parting ridge of Ujh catchment, separating the Basantgarh Range and Billawar Range, forms the boundary. In the west the river Tawi, Champal Khad, (part), Barmin Khad (part) and Nalla Nardan forms the boundary.
- 20.1.4 On the basis of watershed management the Ramnagar Forest Division can be divided into two regions.
  - 1. Ramnagar North/ South Ranges which form part of the catchment of Tawi River of Chenab basin.
  - 2. Basantgarh Range area which forms part of the Ujh catchment of Ravi Basin.

#### Table No. 20.1

#### Area Statement of Ramnagar Watershed of Tawi Catchment Included in Ramnagar North & Ramnagar South Range

Watershed	Micro-watershed	Area in hect.
T5A	T5a1	605 ha.
	T5a2	220 (part ½)
	T5a3	884
	T5a4	482 (part 2/3)
	T5a5	1055
	T5a6	773
	T5a7	811
	T5a8	843
	T5a9	701
	T5a10	763
	T5a11	482
	Total	7619 ha.

T5b	T5B1	703
	T5B2	814
	T5B3	402
	T5B4	400
	T5B5	1045
	T5B6	1067
	T5B7	502
	T5B8	964
	T5B9	843
	T5B10	723
	T5B10	954
	T5B12	582
	T5B13	793
	T5B14	815
	T5B15	843
	Total	11450 ha.
T5c	T5c1	1123
	T5c2	864
	T5c3	803
	T5c4	361
	T5c5	743
	T5c6	532
	T5c7	1125
	T5c8	412
	T5c9	452
	T5c10	892
	T5c11	904
	T5c12	964
	T5c13	862
	T5c14	985
	T5c15	952
	T5c16	903
	T5c17	964
	T5c18	1065
	T5c19	814
	T5c20	582
	T5c21	597
	Total	16901
T5d	T5d1	474
	T5d1	564
	T5d1	843
	T5d1	802
		2206
		803
		1047
		1102
	T5d1	1064
	1201	1001

	T5d1	723
	T5d1	561
	T5d1	753
	T5d1	934
	Total	10876 ha.
T4a	T4a32	211 (Part 2/3)
	T4a33	1407 (Full)
	G. Total	48,864 ha.

#### 20.2 Forest Nurseries

20.2.1 The forest nurseries are an important component of Forestry Activity. These play an important role in artificial regeneration programme. The nurseries of this Division are well maintained but not the desired extent i.e. modern scientific techniques such as root trainers, glass houses and sprinkle irrigation. Seeds from genetically superior trees should be used for raising good quality planting stock in the nurseries. The detail of nurseries existing in this Division is has been listed in Appendix-X.

#### 20.3 Social Forestry

20.3.1 The social forestry is an important component which plays a vital role in rehabilitation of degraded forests, providing fuel and fodder to peoples. The Ramnagar Forest Division falls in the jurisdiction of Social Forestry Division Udhampur. Ramnagar Forest Division has one Range Officer from the Social Forestry wing with headquarter at Ramnagar, who looks after all the activities of the division. There are various activities of social forestry under which plantation and other works are carried out such as rehabilitation of degraded forests village wood lots silvi pasture, strip plantation and farm forestry. The data provided by DFO Social Forestry Udhampur is given in Table No. 20.2.

#### Table No. 20.2

#### Statement showing detail of Social Forestry Works of last 10 years in jurisdiction of Forest Division Ramnagar.

S.No.	Name of	Year of	Area	Work Done		Any other work Present Position			on		
	Unit / Location	Estt.	Tackled (in Hac.)	d Plantation (in Nos.) done aff 2.) Fencing Vear		Plantation (in Nos.)		done after Estt. Year-wise			
				Rft.					Area	Fencing	Plants
					Bagged	Naked	Total				
1	Co-23-c/N	2001-02	15	5500	0	5000	5000	0	15	5500	5000
	(Kanha)										
2	Co-23-c/N	2003-04	13	3000	6000	2000	8000	DRSM = 50 Cum	13	2500	7000
	(Gudian)										
3	Co-31b/N	2006-07	14	4800	11000	0	11000	I.P. 1.5 km	14	2000	1000
	(Shumbh)							DRSM = 50 Cum			
4	Co-23/N	2007-08	14	4800	9100	1500	10600	0	14	4800	1500
	(Chowki)			1700			1.0.0				
5	Co-28b/N	2008-09	20.70	6500	0	12400	12400	0	21	6000	2000
	(Dhirni)	2000.10	16.50		1.4200	0	1.4000	<u> </u>	16.50		2000
6	Co-43/S	2009-10	16.50	5575	14200	0	14200	0	16.50	5575	3000
7	((Dhanu)	2010 11	16.50	6676	14200	0	14200	0	16.50	<i>E E च E</i>	14200
/	CO-24/IN (Seri Nelte)	2010-11	10.50	5575	14200	0	14200	0	10.50	5575	14200
0	(Seff-Naka)	2011 12	16.50	5100	14200	0	14200	DDCM = 50 Cum	16.50	5100	14200
0	(Dhumala)	2011-12	10.50	5100	14200	0	14200	DKSIVI = 30 Culli DS = 1020 Noc	10.30	5100	14200
		SE DI OCK		( <b>D</b> )				$\Gamma.5. = 1950$ Nos.			
1		2000.01		<u>4300</u>	6000	4000	10000	0	10	3500	5000
2	Jano Lard	2000-01 d0	10	3000	0000	5500	5500	IP = 0.5  km	10	3000	1500
2	Maseeth	40	10	5000	0	5500	5500	1.1 = 0.3  Km	10	3000	1300
3	Krimoo	2001-02	15	4000	1300	0	1300	DRSM – 150 Cum	10	4000	0
5	Rimoo	2001 02	15	4000	1500	0	1500	IP = 15  km	10	4000	0
4	Khabru	d0	30	6000	0	17335	17335	DRSM = 250  Cum	30	6000	500
	i initio i u	uo	50	0000	Ŭ	17555	11000	I.P = 2  km	50	0000	200
5	Badol	2002-03	11.50	3500	3000	3000	6000	DRSM = 30 Cum.	11.50	3500	3500
								I.P. = 0.5  km			

6	Keharh	204-05	10	3600	4000	4000	8000	0	10	1800	1000
7	Incha	do	15	4500	12000	0	12000	DRSM = 50 Cum.	15	2500	4000
								L.P = 1  km			
8	Lerh	2005-06	15	4500	0	10000	10000	DRSM = 100 Cum.	15	4500	2000
9	Sugardi	2006-07	12	3600	8000	0	8000	DRSM = 100 Cum.	12	4500	6000
10	Trella	2008-09	15	4600	7000	2000	9000	0	15	4600	8000
11	Incha	2009-10	11	3675	0	8900	8900	DRSM = 90 Cum.	11	3675	8900
								I.P. = 1  km			
12	Badol Simbal	2010-11	11.50	3675	5000	4700	9700	DRSM = 50 Cum.	11.50	3675	5000
	Kali							I.P. = 1  km			
	VWL (SF	BLOCK GI	HORDI)								
1	Tabari	2000-01	10	3000	7000	0	7000	0	10	1500	1300
2	Ritti	2001-02	15	4500	7500	0	7500	0	15	2000	2000
3	Kuh-Nalla-II	DO	15	4000	7000	0	7000	DRSM = 200 Cum.	15	2000	4000
								G.S. = 10000 NOS			
4	Terlia-I	DO	10	3000	5000	0	5000	DRSM = 200 Cum.	10	0	1800
5	Balater	2010-11	16						16	0	0
6	Jaganoo	2011-12	11.50	3500	6000	4500	10500	P.S. 3000 NOS	11.50	3500	10500
								LP = 0.5  KM			
	Strip (SF	<b>Block Ram</b>	nagar)								
1	Kaghota	2003-04	8	2200	1000	800	1800	DRSM = 100 Cum.	8	2550	2000
2	Bhatyari	2007-08	2.24	2100	2100	0	2100	0	2.24	2100	2100
3	Bhatyari	2008-09	1.10	800	500	0	500	0	1.10	800	500
4	Bhatyari	2009-10	0.75	746	807	0	807	0	0.75	746	450
5	Gurlong	2010-11	0.75	700	800	0	800	0	0.75	700	700
6	Dodla	2011-12	0.75	700	800	0	800	0	0.75	700	800
	STRIP (SF BLOCK GHORDI)										
1	Khu Nalla	2007-08	0.75	1000	750	0	750	0	0.75	500	145
2	bhatyari	2008-09	1.10	800	500	0	750	0	1.10	800	500
	SILVI –I	PASTURE (	SF BLOCK	RAMNAG	AR)						
1	Co-31-b/R	2007-08	6.25	1850	2500	0	2500	G.S. = 12000 Nos.	6.25	1850	1800
								DRSM = 30 Cum			

2	Kanah	do	5	2000	1750	0	1750	DRSM = 15 Cum	5	2000	1500
3	Co-28-b/R	2008-09	8.46	2800	0	3000	3000	0	8.46	2500	500
	(Rehani)										
4	Co-43/R	2009-10	7.33	2500	1021	1600	2621	P.S. = 3000 Nos.	7.33	2500	1000
	(Dhanu)										
5	Bhatyari	do	0.75	746	807	0	807	0	0.75	746	807
6	Co-24/R	2010-11	7.33	2500	1021	1600	2621	P.S. = 3000 Nos.	7.33	2500	2621
	(Dhumak)										
7	Co-24/R	2011-12	7.33	2300	1600	1000	2600	P.S. = 3000 Nos.	7.33	2300	2600
	(Dhumak)							G.S. = 3500 Nos.			
	SILVI – PASTURE (SF BLOCK GHORDI)										
1	Gurhi	2005-06	15	4500	1000	6000	7000	DRSM = 60 Cum.	15	4500	5000
								I.P. = 1 km			
	13 <sup>TH</sup> FINANCE COMMISSION (SF BLOCK GHORDI										
1	Dadian	do	10	2500	0	1500	1500	0	10	2500	1500
	Bhughatyan										

#### 20.4 Developmental of Buxus Semipenvirens (Chikhri)

- 20.4.1 The Chikhri is a medium sized broadleaved, slow growing plant. It is a special class tree. It occur in compartment No. 26, 36 and 38 of Ramnagar South Range and Compartment 72 and 73 of Basantgarh Range. The wood of Chikhri is used in making combs, toys and decorative pieces. The enumeration data is given in Annexure No. XIII.
- 20.4.2 Since Chikhri is an important species so special attention has to be given on its protection and propagation. It can be propagated by cutting and with Harmon treatment the percentage can be enhance. The nursery stocks can use for afforestation in those compartments where it occur naturally.

#### 20.5 Wildlife

- 20.5.1 Wildlife Protection Act 1972 defines wildlife as "The native uncultivated flora and fauna". From the definition of wildlife, the prescriptions have been made for preservation and conservation of native flora. As per National Forest Policy (1988) the prescriptions are also given for the management of wildlife outside the game reserve and rakhs, in order to maintain the biological diversity. The rakhs which exist in this Division are:-
  - 1. Ramnagar Rakh (Mar)
  - 2. Dalsar Rakh
  - 3. Chard Rakh.
- 20.5.2 These rakhs are prone to heavy grazing and illicit damages. These rakhs are allotted to nomads for grazing purpose.
- 20.5.3 These rakhs were given compartments numbers and were allotted to protection working circle. The Territorial Divisional Forest Officer has the power of a wildlife warden within his jurisdiction, thus it is the duty of the territorial staff to protect the existing wildlife from poachers / hunters.

#### 20.5.4 *Objects of Wildlife:*

- a. To conserve, preserve and improve the habitats so as to conserve wildlife.
- b. To protect wildlife from poaching and smuggling.

#### 20.5.5 *Method of Treatment:*

- 1. Keeping in view the socio-political considerations it is not possible to completely close these areas in one instance. For migratory tribes alternative grazing sites should be developed.
- 2. Wild animals should be introduced in these rakhs after closing them with their proof fencing.
- 3. No felling of whatsoever nature should be permitted in these rakhs.
- 4. The provisions of J&K wildlife protection act should be strictly followed for the development of wildlife habitat water points should be developed wherever required.
- 5. Plantation of local broadleaved species should be taken up in the gaps.
- 6. Effective measures should be taken to prevent the occurrence of forest fires.

#### 20.6 Pasture Development

- 20.6.1 Due to increase in cattle population and encroachment of forest lands the pasture lands are shrinking by every passing year. This has also resulted in the depletion and degradation of left ever pastures lands. Though numerous measures have been adopted in the past for their rehabilitation but good results are still awaited. The Agrostology wing of forest department is meant for propagation and rehabilitation of pastures.
- 20.6.2 The following measures are prescribed for rehabilitation and conservation of these forests:-
  - > Planting of high yielding verities of grasses and leguminous crops like Red clover etc.
  - > Planting of fodder yielding plants on forest fringes and state lands.
  - > Educating locals for adapting the practice of rotational grazing and it benefits.
  - Stall feeding should be encouraged.

#### 20.7 Improvement of Acacia Catechu (Khair)

- 20.7.1 The Khair is found scattered in compartment 10c/N, 23c/N, 33c/S, 34c/S in Ramnagar Forest Division. Mature to over mature trees and the natural regeneration is absent due to the heavy grazing by nomads and local inhabitants. These areas have a good scope of improvement if artificial regeneration of khair is done in phased manner.
- 20.7.2 Due to the imposition of ban on felling, by the honorable Supreme Court of India a good number of Khair trees have grown up on private lands.
- 20.7.3 Therefore, this species is mostly found well growing on private lands consisting of mature to over mature trees. The matured to over matured trees need to be exploited from private land for extraction of katha and to improve the economic condition of the inhabitants. Efforts are also needed to encourage the inhabitants to promote this valuable species.

## 20.8 Compensatory Afforestation Fund Management and Planning Authority (CAMPA)

**20.8.1** Introduction: The concept of compensatory afforestation is an old one but previously the funds were allotted by head of the department to the division where the land was diverted for nonforestry purpose. In 1997 the J&K Forest Conservation Act was enacted for diversion of forest land for not forestry purpose. Whenever forest land is diverted for nonforestry purpose, the user agency (The department in whose favour the land has to be diverted) has to compensate the loss in terms of the value that equals to (double the area of land diverted). Besides this the net present value of the land diverted has to be paid by the user agency. For management of these funds the State Government under SRO-354 has constituted compensatory afforestation Management Fund Management and Planning Authority) CAMPA).

#### 20.8.2 Aims and Objectives:

- To conserve, protect and regenerate the natural resources with the active participation of local inhabitants.
- To check and prevent the land degradation by adopting appropriate soil and water conservation measures.
- > To strengthen the natural resources base of rural livelihood and create assets in rural areas.
- > To conserve, protect and manage the wildlife and its habitat.

#### 20.9 Firewood Supply

20.9.1 The inhabitants of the Division are mostly dependent on firewood for cooking and heating purpose during winters. The requirement of fuel is met from the forests. Usually fallen material is lifted from forests, but in some cases they indulge in illicit damages. Though the other sources of energy such as LPG, Kerosene and electric heaters are also being used, but this is confined to only those areas which are located near the roadside.

#### 20.10 Timber Distribution to Concessionists

20.10.1 The timber is supplied to local inhabitants who reside in "A" Zone at concessional rates directly from forests i.e. one tree after 3 years Except Deodar all other species are supplied at concessional rates. Now "A" zone depots have been established to supply timber to inhabitants who reside in concession zone at concessional rates.

#### 20.11 Buildings

20.11.1 The detail of buildings of the Ramnagar Forest Division is listed in Appendix-XI. The condition of some of buildings is dilapidated and requires immediate repair / renovation besides construction of guard huts and residential accommodation for Block Foresters should be constructed at beat and block headquarters. The location of beats and blocksheadquarters are also needs to be fixed.

#### 20.12 Roads

20.12.1 Since the commercial exploitation of forests has been restricted to removal of dry / fallen material only (due to ban on green felling), the roads constructed during the past are in a miserable condition. At present a network of roads by R&B and PMGSY is spread to almost entire division.

#### 20.13 Paths

20.13.1 The inspection paths are the main components as these act as a link in hilly terrain. There is an urgent need for repair / renovation of old inspection paths, besides construction of new inspection paths.

#### 20.14 Bridges

20.14.1 Since there are a number of nallahs and khads which are flooded during rains, so construction of wooded foot bridges are an important component of forestry activity.

#### 20.15 Layout

20.15.1 The layout of the compartments was started in 2009 and completed during 2011-12 in the field. Black coal tar rings were marked on trees at the boundary of compartments, Ranges and Divisions. One ring was marked on trees to separate compartments, two rings to separate range boundary and 3 rings to divisional boundary. The running boards were made along the compartment boundaries adjacent to demarcation line.

#### 20.16 Maps (Digital):

20.16.1 The following maps have been prepared.

- 20.16.2 <u>Management Map:</u> A management map on 1:50,000 scale has been prepared.
- 20.16.3 <u>Stock Map:</u> A stock map on a scale 1:50,000 has also been prepared.indicating the compartments allotted to various working circles by colour scheme.Stock maps of individual compartments on 1:15,000 scale have also been prepared giving details of Species, Density and regeneration status.

#### 20.17 Compartment Description

The compartment description was compiled by writing down all important features of compartment in the field.

#### 20.18 Working Plan Draft

It is being submitted in October 2013 in duplicate.

## **CHAPTER-XXI**

**Establishment and Labour** 

#### **CHAPTER-XXI**

#### **Establishment and Labour**

#### 21.1 Establishment

The detail of sanctioned strength and their actually working is given in chapter-IV of Part-I of the Plan. The present strength of the establishment especially at forester level and below is in adequate to cope up with the existing work load. The fact that a significant number of field staff is untrained.

#### 21.2 Labour

The labour supply is also not satisfactory although local labour is available for normal works such as plantation, fencing minor engineering works and timber extraction on small scale. The local labour is not well trained for resin taping (Rill method). The labour has to be imported for resin tapping and timber extraction.

## **CHAPTER-XXII**

Control

#### CHAPTER XXII

### Control

#### 22.1 Control Forms

#### 22.1.1 As per the standard procedure following control forms are prescribed to be maintained.

#### 1. Control form "A"

It shall be maintained on standard form for recording major markings done in Deodar Kail, Fir and Chir selection working circle, separately for each of the working circles. In this form volume marked and prescribed yield shall be noted and plus minus accounts shall be shown in annual abstract. The balance will be carried forward to the next year.

#### 2 Control form "B"

It shall be maintained in the standard form.

#### 3 Control form "C"

In this form progress of regeneration in area where regeneration fellings and artificial regeneration/plantation has been carried out, should be faithfully recorded.

#### 4. Control form "D"

This control form indicates territorial DFOs proposals for marking during next three years. It is submitted to the conservator of Forest, Working Plan and Research Circle, through CF (territorial), every year in January who will convey his approval after consultations with the CCF by march of the same year.

#### 22.2 Compartment Histories

22.2.1 The compartment history book shall contain complete record of all the major events that happen in the compartment e.g. volume marked and out turn obtained, details of cultural operations, status of regeneration, damage due to fire, insect-pest attack, encroachment etc. An officer, not below the rank of Range Forest Officer should make an entry summarizing the details of operations and other events in the compartment history book at the close of every year and send a copy to the DFO. The DFO should maintain the compartment histories on the basis of information supplied by Range Officer and a copy of compartment histories should be sent to the conservator of Forest, Working Plan & Research Circle. It is saddening to note that such an important documents is not being maintained by the division.

#### 22.3 Divisional Journals

22.3.1 The DFO shall maintain divisional journals in which he shall record all information like regeneration and plantation works under taken and there success or failure citing reasons thereof, seed years, insect-pest attack, condition of forest roads, bridges and buildings, important problems of the division etc. On the analogy of divisional journal, records must be maintained at Range and Block levels.

#### 22.4 Plantation Journals

22.4.1 Every plantation should have a plantation journal in which all the details of works executed should be recorded

#### 22.5. Nursery Journals

22.5.1 All nursery should have a nursery journal on which all the details of works executed in the nurseries should be recorded.

#### 22.6 Guard book

22.6.1 The forest guards shall be supplied with guard books containing enlarged working plan maps of their respective beats. The number of chaks and number of boundary pillars on the outer line as well as that in chaks boundary should be clear marked, numbered and entered in the Guard book. These Guard Books must be checked by concerned Range Officer, at least once a month and by the DFO at least, once in six months.

## **CHAPTER-XVIII**

## **Financial Forecast and Cost of Plan**

#### **CHAPTER-XXIII**

#### Financial Forecast and Cost of Plan

#### 23.1 Financial Forecast

23.1.1 Most of the revenue shall be accure from the sale of timber by State Forest Corporation and sale of Resin by Forest Department through open auction. The detail of timber that shall be extracted from the forests of this Division annually and on the basis of average rate chargeable from the State Forest Corporation for the above listed species, the total annual revenue from timber harvests worked out is as under:

S.No.	Species	Volume (m <sup>3</sup> )	Expected Sale Rate	<b>Expected Revenue in</b>
			Rs /m <sup>3</sup>	Rs
1	Deodar	8100 m <sup>3</sup>	3327.64	26953884
2	Kail	80 m <sup>3</sup>	1581	126480
3	Fir	3000 m <sup>3</sup>	1236.70	3710100
4	Chir	0 m <sup>3</sup>	1306.26	0
	Total	11180m <sup>3</sup>		30790464

#### Table No. 23.1

Say Rs. 30790000

23.1.2 If the resin tapping is continued as per working plan prescription about 2500 quintals of resin shall be extracted annually. Thus the revenue from resin, therefore calculated is as under :

#### Table No. 23.2

Quantity (Quintals)	Highest Sale Rate Rs/per quintal of 2012-13	Expected Revenue in Rs.
2000	6410	12820000

The total average annual revenue on account of timber, resin and other miscellaneous receipts, over the next ten years is estimate in to the tune of Rs. 43610000. However, in view of the ban on green felling of trees, the expected removals from the forests are not likely to exceed 20 percent of the prescribed yield. Hence, a figure in the range of Rs. 8722000 appears to be more realistic. This figure, of course, is bound to register a further increase on account of upward revision in the rates of timber and resin.

#### 23.2 Future Expenditure

23.2.1 The working circle wise area proposed to be taken for rehabilitation annually is as under:-

S.No.	Working Circle	Area in hectares	Average expenditure per	Annual Amount Required
			hectare	
1	Deodar-Kail Selection Working Circle	85	1,00,000	85,00,000
2	Fir Selection Working Circle	79	1,00,000	79,00,000
3	Chir Selection Working Circle	156	1,00,000	1,56,00,000
4	Reboisement Working Circle	187	1,00,000	1,87,00,000
5	Broad Leaved Working Circle	50	1,00,000	50,00,000
	Total	557		5,57,00,000

#### Table No. 23.3

Besides above the average amount required annually over the next 10 years for normal expenditure of the Division is as under:-

S.No.	ltem	Amount
1	Salary	3000000
2	T.E.	20000
3	O.E.	20000
4	P.O.L.	50000
5	Building	1000000
6	Firewood	200000
7	Timber	1500000
8	Resin	3500000
9	Miscellaneous	100000
	Total	36390000

#### Table No. 23.4

#### 23.3 Cost of the Plan

The expenditure incurred on the revision of the Working Plan for Ramnagar Forest Division is as under:

Unit of Appropriation	Amount (Rs.)
Non-Plan	
001- (12) - Salary	5885210
2071-Salary	304155
001- (12)- T.E.	99000
001- (12)- O.E.	94986
Telephone	20000
001- (03)- Motor Vehicle	3000
Sub-Total	6406351
Plan	
2406-iv-a (Working Plan & Res. Scheme)	1604980
Grand Total	8011331

#### Table No. 23.5

The expenditure above is inclusive of the amount spent on the purchase of equipments peripherals, paint, cartographic material, stationery and stock items.

## **CHAPTER-XXIV**

**Summary of Prescriptions** 

#### CHAPTER XXIV

## 24 .1

## Summary of Prescription

S.No.			Prescription	Section	Page
		D	eodar-Kail Selection Working Circle	9	75-88
	Total area of the Wor	9.3	75		
	Silvicultural System	=	Selection System	9.5	76
	Exploitable size			9.6	76
	Deodar and Kail	=	70cm. d.b.h.		
	Fir	=	80cm. d.b.h.		
	Rotation			9.7	76
	Deodar and Kail	=	150 years		
	Fir	=	230 years		
1	Felling Cycle	=	30 years	9.8	
	Annual yield from the	working	g circle	9.12	85
	Deodar	=	8000m <sup>3</sup>		
	Kail	=	80 m <sup>3</sup>		
	Fir	=	900 m <sup>3</sup>		
	Total	=	8980m <sup>3</sup>		
	Size of the Annual Cou	lpe	= 85 hectares	9.13	85
	Intensity of cut per he	ctare of	the commercial	9.14	85
	area of the working c	ircle	= 105 m <sup>3</sup> per annum		
	Fir Selection Working	Circle		10	89-102
	Total area of the Wor	king Circ	e = 3018 hectares	10.3	90
	Silvicultural System	=	Selection System	10.5	90
	Exploitable size			10.6	91
	Deodar and Kail	=	70cm. d.b.h.		
	Fir	=	80cm. d.b.h.		
	Rotation			10.7	99
	Deodar and Kail	=	150 years		
	Fir	=	230 years		
	Felling Cycle	=	30 years	10.8	99

2	Annual yield from the working circle		10.12	99
	Deodar = $100 \text{ m}^3$			
	Kail = $0 \text{ m}^3$			
	Fir = $2100m^3$			
	Total = 2200m <sup>3</sup>			
	Size of the Annual Coupe	= 79 hectares	10.13	
	Intensity of cut per hectare of the comm	nercial	10.14	
	area of the working circle	= 24 m <sup>3</sup> per annum		
	Chir Selection Working Circle		11	103-116
	Total area of the Working Circle	=	11.3	104
	Silvicultural System	= Selection System	11.5	104
	Exploitable size		11.6	104
	Chir = 70cm. d	.b.h.		
	Rotation		11.7	104
	Chir = 230 year	rs		
	Felling Cycle = 30 year	S	11.8	104
3	Annual yield from the working circle		11.13	113
	$Chir = 7000m^3$			
	Size of the Annual Coupe	= 156 hectares	11.14	113
	Intensity of annual cut per hectare of the	e	11.15	113
	commercial area of the working circle	= 45 m³ per annum		
	Reboisement Working Circle		12	117-124
	Total area of the Working Circle =	5635 hectares	12.3	117
4	Special objects of Management	=	12.4	118
	Method of Treatment prescribed	=	12.6	123
	Resin (Overlapping) Working Circle		13	126-128
	Schedule of Operations	= 40 cms. d.b.h.& above	13.6	127
	Number of Blazes Prescribed		13.7	128
	for tapping annually	= 80000 Blazes		
5	Broad Leaved Working Circle		14	129-136
	Total area of the Working Circle	= 7275 hectares	14.3	130
6				

	Method of treatment of Oak Forest	14.8	136
			125
	Method of treatment of Broad Leaved Scrub =	14.10	136
	Ecological Conservation Working Circle	15	137-
	Total area of the Working Circle = 9915 hectares	15.3	138
	Special objects of Management =	15.4	138
	Method of Treatment prescribed	15.6	143
	Eco-Tourism Working Circle	16	144-151
	Total area of the Working Circle = 2551 hectares	16.3	144
	Special objects of Management	16.4	144
7	Method of Treatment prescribed	16.7	15-
,	Non Timber Forest Produce (NTFP) Overlapping Working Circle	17	151-152
	Special objects of Management	17.3	152
8	Management	17.3	152
	Cultivation Forest Produce	17.4	152
	Plantation Working Circle (Overlapping)	18	154-157
9	Special objects of Management	18.3	154
	Treatments proposed	18.5	155
	Nursery and Plantation Techn ique	18.7	155
	Forest Protection Overlapping Working Circle	19	158
	Objects of Management	19.2	
	Agencies responsible for forest damages	19.3 to 19.5	

Financial fore	ecast and	cost of the plan	23	
Financial fore	ecast :		23.1	
Timber	=	Rs. 37090000		
Resin	=	Rs. 16025000		
Total	=	Rs. 53115000		
Future expen	nditures :		23.2	
Plan	=	Rs. 55700000		
normal	=	Rs. 36390000		
Total	=	Rs. 92090000		
cost of the pl	an		23.3	
Non-Plan	=	Rs. 640600		
Plan	=	Rs. 1605000		
Total	=	Rs. 801100		

# <u>APPENDICES</u>

### **ANNEXURE-Ia**

## Estate Area Statement of Ramnagar Forest Division

### Ramnagar North Range

			Area in hectares				
S.No	Range	Comptt. No.	Commercial	Un-commercial	Total	Working Circle	
1	Ramnagar North	1	241	0	241	Chir Selection Working Circle	
2	Ramnagar North	2	198	59	257	Chir Selection Working Circle	
3	Ramnagar North	3a	88	0	88	Chir Selection Working Circle	
4	Ramnagar North	3b	0	241	241	Broad Leaved Working Circle	
5	Ramnagar North	3c	132	0	132	ReboisementWorking Circle	
6	Ramnagar North	4a	51	0	51	ReboisementWorking Circle	
7	Ramnagar North	4b	102	0	102	ReboisementWorking Circle	
8	Ramnagar North	4c	0	85	85	ReboisementWorking Circle	
9	Ramnagar North	5a	15	146	161	Ecological Tourism Working Circle	
10	Ramnagar North	5b	9	29	38	Ecological Tourism Working Circle	
11	Ramnagar North	6	162	14	176	Ecological Tourism Working Circle	
12	Ramnagar North	7	206	6	212	ReboisementWorking Circle	
13	Ramnagar North	8	132	6	138	Chir Selection Working Circle	
14	Ramnagar North	9a	30	66	96	ReboisementWorking Circle	
15	Ramnagar North	9b	95	7	102	Chir Selection Working Circle	
16	Ramnagar North	10a	194	15	209	Chir Selection Working Circle	
17	Ramnagar North	10b	29	33	62	Chir Selection Working Circle	
18	Ramnagar North	10c	42	318	360	Broad Leaved Working Circle	
19	Ramnagar North	10d	0	182	182	Ecological Conservation Working Circle	
20	Ramnagar North	11	131	37	168	Chir Selection Working Circle	
21	Ramnagar North	12	226	35	261	Chir Selection Working Circle	
22	Ramnagar North	13	107	3	110	ReboisementWorking Circle	
23	Ramnagar North	14a	96	2	98	ReboisementWorking Circle	
24	Ramnagar North	14b	3	47	50	Ecological Conservation Working Circle	

25	Ramnagar North	15	277	10	287	Ecological Conservation Working Circle
26	Ramnagar North	16	104	444	548	Broad Leaved Working Circle
27	Ramnagar North	17a	74	27	101	Chir Selection Working Circle
28	Ramnagar North	17b	71	12	83	Chir Selection Working Circle
29	Ramnagar North	18	100	280	380	Broad Leaved Working Circle
30	Ramnagar North	19	140	72	212	Ecological Conservation Working Circle
31	Ramnagar North	20	157	20	177	Chir Selection Working Circle
32	Ramnagar North	21	133	18	151	ReboisementWorking Circle
33	Ramnagar North	22a	79	8	87	Chir Selection Working Circle
34	Ramnagar North	22b	0	35	35	Ecological Conservation Working Circle
35	Ramnagar North	23a	150	0	150	Ecological Tourism Working Circle
36	Ramnagar North	23b	0	40	40	Ecological Conservation Working Circle
37	Ramnagar North	23c	69	268	337	Ecological Conservation Working Circle
38	Ramnagar North	24	250	69	319	Ecological Conservation Working Circle
39	Ramnagar North	25	109	93	202	Ecological Conservation Working Circle
40	Ramnagar North	26a	62	504	566	Broad Leaved Working Circle
41	Ramnagar North	26b	0	56	56	Ecological Conservation Working Circle
42	Ramnagar North	26c	58	742	800	Broad Leaved Working Circle
43	Ramnagar North	26d	132	841	973	Broad Leaved Working Circle
44	Ramnagar North	27a	52	69	121	ReboisementWorking Circle
45	Ramnagar North	27b	28	177	205	Ecological Tourism Working Circle
46	Ramnagar North	27c	59	5	64	ReboisementWorking Circle
47	Ramnagar North	29a	130	39	169	ReboisementWorking Circle
48	Ramnagar North	29b	10	62	72	Ecological Conservation Working Circle
49	Ramnagar North	29c	48	0	48	Ecological Conservation Working Circle
50	Ramnagar North	30a	61	42	103	ReboisementWorking Circle
51	Ramnagar North	30b	54	0	54	ReboisementWorking Circle
52	Ramnagar North	31a	104	175	279	ReboisementWorking Circle
	Total		4800	5439	10239	

## ANNEXURE-Ib

### Ramnagar South Range

S.No	Range	Comptt. No.	Area in hectares		Grand	Working Circle	
			Commercial	Un-commercial	Total		
1	Ramnagar South	28a	59	347	406	Broad Leaved Working Circle	
2	Ramnagar South	28b	236	0	236	Chir Selection Working Circle	
3	Ramnagar South	31b	0	729	729	Ecological Conservation Working Circle	
4	Ramnagar South	31c	0	201	201	Ecological Conservation Working Circle	
5	Ramnagar South	32a	25	223	248	ReboisementWorking Circle	
6	Ramnagar South	32b	76	58	134	ReboisementWorking Circle	
7	Ramnagar South	32c	94	224	318	Ecological Conservation Working Circle	
8	Ramnagar South	33a	159	100	259	Chir Selection Working Circle	
9	Ramnagar South	33b	50	112	162	Broad Leaved Working Circle	
10	Ramnagar South	33c	157	50	207	Ecological Conservation Working Circle	
11	Ramnagar South	34a	3	51	54	ReboisementWorking Circle	
12	Ramnagar South	34b	293	140	433	Ecological Tourism Working Circle	
13	Ramnagar South	34c	26	9	35	Ecological Tourism Working Circle	
14	Ramnagar South	35	36	337	373	Broad Leaved Working Circle	
15	Ramnagar South	36	90	223	313	Broad Leaved Working Circle	
16	Ramnagar South	37	139	73	212	ReboisementWorking Circle	
17	Ramnagar South	38	17	214	231	Broad Leaved Working Circle	
18	Ramnagar South	39	230	0	230	Ecological Conservation Working Circle	
19	Ramnagar South	40a	188	0	188	Ecological Conservation Working Circle	
20	Ramnagar South	40b	0	95	95	ReboisementWorking Circle	
21	Ramnagar South	41	200	9	209	Chir Selection Working Circle	
22	Ramnagar South	42	160	0	160	Chir Selection Working Circle	
23	Ramnagar South	43	56	190	246	ReboisementWorking Circle	
24	Ramnagar South	44	163	71	234	Chir Selection Working Circle	
25	Ramnagar South	45	220	6	226	Ecological Tourism Working Circle	

26	Ramnagar South	46	263	0	263	Chir Selection Working Circle
27	Ramnagar South	47	146	16	162	Chir Selection Working Circle
28	Ramnagar South	48	121	0	121	Chir Selection Working Circle
29	Ramnagar South	49	135	0	135	Chir Selection Working Circle
30	Ramnagar South	50	172	0	172	Chir Selection Working Circle
31	Ramnagar South	51	227	19	246	Chir Selection Working Circle
32	Ramnagar South	52	179	35	214	Chir Selection Working Circle
33	Ramnagar South	53	90	25	115	Chir Selection Working Circle
34	Ramnagar South	54	155	0	155	Chir Selection Working Circle
35	Ramnagar South	55	0	36	36	Broad Leaved Working Circle
36	Ramnagar South	56	82	18	100	Chir Selection Working Circle
37	Ramnagar South	57	167	31	198	Ecological Tourism Working Circle
38	Ramnagar South	58	115	17	132	Chir Selection Working Circle
39	Ramnagar South	59	0	241	241	Broad Leaved Working Circle
40	Ramnagar South	60	28	247	275	ReboisementWorking Circle
41	Ramnagar South	61	0	47	47	ReboisementWorking Circle
	Total		4557	4194	8751	

## **ANNEXURE-Ic**

## **Basantgarh Range**

S No.	Comptt No	Area in hectares		Grand	Working Circle	
5.110.	comptt. No.	Commercial	Un-commercial	Total		
1	1a	53	216	269	Broad Leaved Working Circle	
2	1b	197	57	254	Ecological Conservation Working Circle	
3	2	150	0	150	ReboisementWorking Circle	
4	3	198	12	210	ReboisementWorking Circle	
5	4a	161	5	166	ReboisementWorking Circle	
6	4b	49	31	80	Ecological Conservation Working Circle	
7	5a	128	232	360	Ecological Conservation Working Circle	
8	5b	107	24	131	D-K Selection Working Circle	
9	6	190	26	216	D-K Selection Working Circle	
10	7	124	13	137	D-K Selection Working Circle	
11	8	182	54	236	D-K Selection Working Circle	
12	9a	72	20	92	D-K Selection Working Circle	
13	9b	78	40	118	D-K Selection Working Circle	
14	10	225	30	255	D-K Selection Working Circle	
15	11	68	20	88	Fir Selection Working Circle	
16	12	189	96	285	Fir Selection Working Circle	
17	13	52	0	52	D-K Selection Working Circle	
18	14a	102	14	116	D-K Selection Working Circle	
19	14b	35	6	41	D-K Selection Working Circle	
20	15	97	23	120	D-K Selection Working Circle	
21	16	200	30	230	Ecological Tourism Working Circle	
22	17a	165	0	165	Ecological Tourism Working Circle	
23	17b	85	30	115	Ecological Tourism Working Circle	
24	18	218	61	279	Ecological Conservation Working Circle	
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25	19	102	40	142	Ecological Conservation Working Circle	
26	20	94	58	152	Ecological Conservation Working Circle	
27	21	105	30	135	Fir Selection Working Circle	
28	22	150	52	202	Ecological Conservation Working Circle	
29	23	72	3	75	Fir Selection Working Circle	
30	24	103	382	485	Ecological Conservation Working Circle	
31	25	35	277	312	Ecological Conservation Working Circle	
32	26	88	9	97	Fir Selection Working Circle	
33	27	90	28	118	Ecological Conservation Working Circle	
34	28	140	20	160	D-K Selection Working Circle	
35	29	103	0	103	Fir Selection Working Circle	
36	30	152	358	510	Ecological Conservation Working Circle	
37	31	77	1153	1230	Ecological Conservation Working Circle	
38	32	204	11	215	Fir Selection Working Circle	
39	33	173	31	204	Fir Selection Working Circle	
40	34	100	320	420	Ecological Conservation Working Circle	
41	35	120	651	771	Ecological Conservation Working Circle	
42	36	111	9	120	Fir Selection Working Circle	
43	37	57	0	57	Ecological Conservation Working Circle	
44	38	126	18	144	Fir Selection Working Circle	
45	39	127	448	575	Ecological Conservation Working Circle	
46	40	135	120	255	Ecological Conservation Working Circle	
47	41	85	11	96	Fir Selection Working Circle	
48	42	84	0	84	Fir Selection Working Circle	
49	43	74	35	109	Fir Selection Working Circle	
50	44a	114	10	124	D-K Selection Working Circle	
51	44b	26	82	108	ReboisementWorking Circle	
52	45	178	17	195	D-K Selection Working Circle	
53	46a	99	50	149	D-K Selection Working Circle	
54	46b	35	0	35	D-K Selection Working Circle	
55	46c	15	0	15	D-K Selection Working Circle	
56	47	26	48	74	D-K Selection Working Circle	

ĺ	57	48	55	9	64	D-K Selection Working Circle
	58	49a	116	38	154	ReboisementWorking Circle
	59	49b	32	0	32	ReboisementWorking Circle
ĺ	60	50a	96	38	134	Ecological Tourism Working Circle
ĺ	61	50b	62	12	74	ReboisementWorking Circle
ĺ	62	51	65	0	65	Ecological Tourism Working Circle
ĺ	63	52	68	0	68	D-K Selection Working Circle
ĺ	64	53	60	8	68	Fir Selection Working Circle
ĺ	65	54	136	84	220	Fir Selection Working Circle
ĺ	66	55	378	239	617	Fir Selection Working Circle
ĺ	67	56	124	16	140	Fir Selection Working Circle
I	68	57	141	102	243	D-K Selection Working Circle
ĺ	69	58	7	0	7	D-K Selection Working Circle
I	70	59	181	37	218	Fir Selection Working Circle
ĺ	71	60	210	184	394	D-K Selection Working Circle
I	72	61	38	36	74	D-K Selection Working Circle
ĺ	73	62	8	45	53	D-K Selection Working Circle
ĺ	74	63	172	48	220	Ecological Tourism Working Circle
ĺ	75	64	118	102	220	D-K Selection Working Circle
	76	65	232	15	247	ReboisementWorking Circle
	77	66	74	0	74	ReboisementWorking Circle
	78	67	46	14	60	D-K Selection Working Circle
	79	68a	89	11	100	ReboisementWorking Circle
	80	68b	0	200	200	Broad Leaved Working Circle
	81	68c	18	225	243	Broad Leaved Working Circle
	82	68d	60	0	60	ReboisementWorking Circle
ĺ	83	69a	16	169	185	Broad Leaved Working Circle
	84	69b	30	94	124	Broad Leaved Working Circle
	85	69c	116	0	116	ReboisementWorking Circle
	86	70	190	32	222	Chir Selection Working Circle
	87	71	185	115	300	Chir Selection Working Circle
	88	72a	153	233	386	Broad Leaved Working Circle
	89	72b	145	22	167	ReboisementWorking Circle

90	73	247	116	363	ReboisementWorking Circle
91	74	182	52	234	ReboisementWorking Circle
92	75	201	41	242	ReboisementWorking Circle
93	76	26	212	238	Broad Leaved Working Circle
	Total	10402	7860	18262	

#### **ANNEXURE-II**

Area statement of Deodar-Kail Selection Working Circle in Ramnagar Forest Division

							Are	ea (in Hec	tare)			
<b></b>	-	Comptt.		Co	ommer	cial			Un-com	mercial		
S.No.	Range	No.	D	к	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Grand Total
1	Ramnagar North Range	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2	Ramnagar South Range	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
		5b	54	0	12	41	107	16	0	8	24	131
		6	100	0	72	18	190	19	0	7	26	216
		7	54	14	47	9	124	10	0	3	13	137
		8	120	16	13	33	182	50	0	4	54	236
		9a	43	3	26	0	72	20	0	0	20	92
		9b	37	24	17	0	78	40	0	0	40	118
		10	88	0	137	0	225	30	0	0	30	255
		13	52	0	0	0	52	0	0	0	0	52
		14a	102	0	0	0	102	14	0	0	14	116
		14b	35	0	0	0	35	6	0	0	6	41
		15	70	9	18	0	97	23	0	0	23	120
		28	112	0	28	0	140	0	0	20	20	160
		44a	114	0	0	0	114	0	0	10	10	124
3		45	142	8	28	0	178	7	0	10	17	195
	Basantgarh	46a	90	9	0	0	99	24	0	26	50	149
	Range	46b	35	0	0	0	35	0	0	0	0	35
		46c	15	0	0	0	15	0	0	0	0	15
		47	26	0	0	0	26	24	0	24	48	74
		48	55	0	0	0	55	9	0	0	9	64
		52	46	0	22	0	68	0	0	0	0	68
		57	118	0	23	0	141	0	0	102	102	243
		58	7	0	0	0	7	0	0	0	0	7
		60	102	13	95	0	210	0	0	184	184	394
		61	38	0	0	0	38	0	0	36	36	74
		62	8	0	0	0	8	0	0	45	45	53
		64	118	0	0	0	118	0	0	102	102	220
		67	40	0	0	6	46	14	0	0	14	60
	Sub-Total		1821	96	538	107	2562	306	0	581	887	3449
					AI	BSTRAC	T					
	R/North		0	0	0	0	0	0	0	0	0	0
	R/South		0	0	0	0	0	0	0	0	0	0
	Basantgarh		1821	96	538	107	2562	306	0	581	887	3449
	G. Total		1821	96	538	107	2562	306	0	581	887	3449

# **ANNEXURE-III**

# Area Statement of Fir Selection Working Circle

							А	rea (in Ho	ectare)			
S.No.	Range	Comptt. No.		C	ommerci	al			Un-com	mercial		Ground
			D	К	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Total
1	Ramnagar North	0	0	0	0	0	0	0	0	0	0	0
2	Ramnagar South	0	0	0	0	0	0	0	0	0	0	0
		11	11	0	57	0	68	0	0	20	20	88
		12	17	0	172	0	189	0	0	96	96	285
		21	5	0	100	0	105	8	0	22	30	135
		23	0	0	72	0	72	3	0	0	3	75
3	Basantgarh	26	0	0	88	0	88	9	0	0	9	97
		29	0	0	103	0	103	0	0	0	0	103
		32	0	51	153	0	204	0	0	11	11	215
		33	25	0	148	0	173	31	0	0	31	204
		36	13	0	98	0	111	9	0	0	9	120
		38	14	0	112	0	126	18	0	0	18	144
		41	0	0	85	0	85	0	0	11	11	96
		42	24	0	60	0	84	0	0	0	0	84
		43	13	0	61	0	74	19	0	16	35	109
		53	9	0	51	0	60	0	0	8	8	68
		54	9	0	127	0	136	75	0	9	84	220
		55	0	0	378	0	378	239	0	0	239	617
		56	0	0	124	0	124	0	0	16	16	140
		59	15	0	166	0	181	0	0	37	37	218
	Sub- Tota	al	155	51	2155	0	2361	411	0	246	657	3018
	T	1		1	ABST	RAC	Г	r				
	R/North		0	0	0	0	0	0	0	0	0	0
	R/South		0	0	0	0	0	0	0	0	0	0
	Basantgarh		155	51	2155	0	2361	411	0	246	657	3018
	G. Total		155	51	2155	0	2361	411	0	246	657	3018

# **ANNEXURE-IV**

# Area Statement of Chir Selection Working Circle

								Area (in	Hectare)			
S.No.	Range	Comptt. No.			Comi	mercial			Un-com	mercial		
			D	к	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Grand Total
		1	0	0	0	241	241	0	0	0	0	241
		2	0	0	0	198	198	0	0	59	59	257
		3a	0	0	0	88	88	0	0	0	0	88
		8	0	0	0	132	132	0	0	6	6	138
		9b	0	0	0	95	95	0	0	7	7	102
		10a	0	0	0	194	194	0	0	15	15	209
1	Ramnagar	10b	0	0	0	29	29	0	33	0	33	62
	North	11	0	0	0	131	131	0	37	0	37	168
		12	0	0	0	226	226	0	26	9	35	261
		17a	0	0	0	74	74	0	0	27	27	101
		17b	0	0	0	71	71	0	0	12	12	83
		20	0	0	0	157	157	0	0	20	20	177
		22a	0	0	0	79	79	0	0	8	8	87
		Sub-Total	0	0	0	1715	1715	0	96	163	259	1974
		28b	0	0	0	236	236	0	0	0	0	236
		33a	0	0	0	159	159	0	100	0	100	259
		41	0	0	0	200	200	0	0	9	9	209
		42	0	0	0	160	160	0	0	0	0	160
		44	0	0	0	163	163	0	0	71	71	234
		46	0	0	0	263	263	0	0	0	0	263
		47	0	0	0	146	146	0	0	16	16	162
	Ramnagar South	48	0	0	0	121	121	0	0	0	0	121
	bouth	49	0	0	0	135	135	0	0	0	0	135
		50	0	0	0	172	172	0	0	0	0	172
2		51	0	0	0	227	227	0	19	0	19	246
		52	0	0	0	179	179	0	0	35	35	214
		53	0	0	0	90	90	0	0	25	25	115
		54	0	0	0	155	155	0	0	0	0	155
		56	0	0	0	82	82	0	0	18	18	100
		58	0	0	0	115	115	0	0	17	17	132
	Sub-Total		0	0	0	2603	2603	0	119	191	310	2913

3	Basantgarh	70	0	0	0	190	190	32	0	0	32	222
		71	0	0	0	185	185	115	0	0	115	300
	Sub-Total		0	0	0	375	375	147	0	0	147	522
						ABSTRA	СТ					
	Ramnagar North		0	0	0	1715	1715	0	96	163	259	1974
	Ramnagar South		0	0	0	2603	2603	0	119	191	310	2913
	Basantgarh		0	0	0	375	375	147	0	0	147	522
	G. Total		0	0	0	4693	4693	147	215	354	716	5409

# **ANNEXURE-V**

# Area Statement of Reboisement Working Circle

							A	rea (in H	ectare)			
C No	Damas	Comptt.		(	Comm	ercial			Un-comm	nercial		
5.NO.	Kange	No.	D	к	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Grand Total
		3c	0	0	0	132	132	0	0	0	0	132
		4a	0	0	0	51	51	0	0	0	0	51
		4b	0	0	0	102	102	0	0	0	0	102
		4c	0	0	0	0	0	85	0	0	85	85
	Ramnagar	7	0	0	0	206	206	0	0	6	6	212
	North	9a	0	0	0	30	30	0	0	66	66	96
		13	0	0	0	107	107	0	0	3	3	110
		14a	0	0	0	96	96	0	0	2	2	98
		21	0	0	0	133	133	0	0	18	18	151
		27a	0	0	0	52	52	38	0	31	69	121
		27c	0	0	0	59	59	5	0	0	5	64
		29a	0	0	0	130	130	0	0	39	39	169
		30a	0	0	0	61	61	0	27	15	42	103
		30b	0	0	0	54	54	0	0	0	0	54
		31a	0	0	0	104	104	0	175	0	175	279
		Sub- Total	0	0	0	1317	1317	128	202	180	510	1827
		32a	0	0	0	25	25	0	203	20	223	248
	Ramnagar	32b	0	0	0	76	76	0	0	58	58	134
	South	34a	0	0	0	3	3	0	5	46	51	54
2		37	0	0	0	139	139	60	0	13	73	212
_		40b	0	0	0	0	0	0	0	95	95	95
		43	0	0	0	56	56	58	0	132	190	246
		60	0	0	0	28	28	0	199	48	247	275
		61	0	0	0	0	0	0	47	0	47	47
	Sub-Total		0	0	0	327	327	118	454	412	984	1311

Continued

		2	0	0	0	150	150	0	0	0	0	150
		3	3	0	0	195	198	12	0	0	12	210
		4a	0	0	0	161	161	5	0	0	5	166
		44b	22	0	4	0	26	20	0	62	82	108
	Desistent	49a	13	0	0	103	116	19	0	19	38	154
	Basantgarh	49b	0	0	0	32	32	0	0	0	0	32
		50b	4	0	0	58	62	12	0	0	12	74
3		65	12	0	0	220	232	15	0	0	15	247
		66	0	0	0	74	74	0	0	0	0	74
		68a	8	0	9	72	89	11	0	0	11	100
		68d	0	0	0	60	60	0	0	0	0	60
		69c	0	0	0	116	116	0	0	0	0	116
		72b	0	0	0	145	145	22	0	0	22	167
		73	0	0	0	247	247	0	0	116	116	363
		74	0	0	0	182	182	0	0	52	52	234
		75	0	0	0	201	201	41	0	0	41	242
	Sub-Total		62	0	13	2016	2091	157	0	249	406	2497
						ABSTR	АСТ					
	Ramnagar North		0	0	0	1317	1317	128	202	180	510	1827
	Ramnagar South		0	0	0	327	327	118	454	412	984	1311
	Basantgarh		62	0	13	2016	2091	157	0	249	406	2497
	G. Total		62	0	13	3660	3735	403	656	841	1900	5635

# **ANNEXURE-VI**

# Area Statement of Broad Leaved Working Circle

							Are	ea (in Hecta	re)			
C No.	Danga	Compt		C	ommer	cial			Un-comm	ercial		
5.NO.	kange	t. No.	D	к	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Tota l	Grand Total
		3b	0	0	0	0	0	11	0	230	241	241
	Ramnagar North	10c	0	0	0	42	42	0	318	0	318	360
1	North	16	0	30	0	74	104	386	0	58	444	548
		18	0	100	0	0	100	220	0	60	280	380
		26a	0	0	10	52	62	437	0	67	504	566
		26c	0	0	56	2	58	562	0	180	742	800
		26d	0	0	98	34	132	597	0	244	841	973
	Sub-To	tal	0	130	164	204	498	2213	318	839	337 0	3868
	Ramnagar	28a	0	0	0	59	59	300	0	47	347	406
	South	33b	0	0	0	50	50	0	112	0	112	162
2		35	0	0	0	36	36	296	0	41	337	373
		36	0	0	0	90	90	124	49	50	223	313
		38	0	0	0	17	17	62	152	0	214	231
		55	0	0	0	0	0	0	0	36	36	36
		59	0	0	0	0	0	0	241	0	241	241
	Sub-To	otal	0	0	0	252	252	782	554	174	151 0	1762
		1a	0	0	0	53	53	202	14	0	216	269
	Basantgarh	68b	0	0	0	0	0	200	0	0	200	200
		68c	0	0	0	18	18	208	17	0	225	243
3		69a	0	0	0	16	16	137	32	0	169	185
		69b	0	0	0	30	30	94	0	0	94	124
		72a	0	0	0	153	153	170	63	0	233	386
		76	0	0	0	26	26	92	120	0	212	238
	Sub-To	otal	0	0	0	296	296	1103	246	0	134 9	1645
						ABSTRA	АСТ					
	Ramnagar North		0	130	164	204	498	2213	318	839	337 0	3868
	Ramnagar South		0	0	0	252	252	782	554	174	151 0	1762
	Basantgarh		0	0	0	296	296	1103	246	0	134 9	1645
	G. Tot	al	0	130	164	752	1046	4098	1118	1013	622 9	7275

# **ANNEXURE-VII**

# Area Statement of Ecological Conservation Working Circle

							Are	ea (in Hec	tare)			
S No	Range	Comptt.			Comme	rcial			Un-com	mercial		
5.110.	Minge	No.	D	к	F	С	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Grand Total
		10d	0	0	0	0	0	0	182	0	182	182
		14b	0	0	0	3	3	0	47	0	47	50
		15	0	0	0	277	277	0	0	10	10	287
	Ramnagar	19	0	0	0	140	140	62	0	10	72	212
	North Range	22b	0	0	0	0	0	0	0	35	35	35
1		23b	0	0	0	0	0	0	0	40	40	40
1		23c	0	0	0	69	69	0	268	0	268	337
		24	0	0	0	250	250	0	0	69	69	319
		25	0	4	0	105	109	0	0	93	93	202
		26b	0	0	0	0	0	56	0	0	56	56
		29b	0	0	0	10	10	0	62	0	62	72
		29c	0	0	0	48	48	0	0	0	0	48
	Sub-To	otal	0	4	0	902	906	118	559	257	934	1840
	I			1								
	Ramnagar	31b	0	0	0	0	0	0	729	0	729	729
	South Range	31c	0	0	0	0	0	0	201	0	201	201
2		32c	0	0	0	94	94	0	224	0	224	318
		33c	0	0	0	157	157	0	50	0	50	207
		39	0	0	0	230	230	0	0	0	0	230
		40a	0	0	0	188	188	0	0	0	0	188
	Sub- To	otal	0	0	0	669	669	0	1204	0	1204	1873
		1b	7	0	0	190	197	13	44	0	57	254
		4b	13	0	0	36	49	31	0	0	31	80
		5a	60	0	0	68	128	232	0	0	232	360
		18	82	0	136	0	218	40	21	0	61	279
		19	102	0	0	0	102	0	40	0	40	142
	Basantgarh	20	0	16	78	0	94	6	52	0	58	152
	Range	22	0	0	150	0	150	38	14	0	52	202
		24	0	0	103	0	103	300	82	0	382	485
2		25	0	0	35	0	35	215	62	0	277	312
3		27	18	72	0	0	90	14	14	0	28	118

	30	0	0	152	0	152	115	243	0	358	510
	31	0	0	77	0	77	162	991	0	1153	1230
	34	0	0	100	0	100	140	180	0	320	420
	35	0	0	120	0	120	266	385	0	651	771
	37	41	0	16	0	57	0	0	0	0	57
	39	0	0	127	0	127	386	62	0	448	575
	40	0	0	135	0	135	115	5	0	120	255
Sub- To	otal	323	88	1229	294	1934	2073	2195	0	4268	6202
				AE	<b>SSTRA</b>	СТ					
Ramnagai	r North	0	4	0	902	906	118	559	257	934	1840
Ramnagar	South	0	0	0	669	669	0	1204	0	1204	1873
Basanta	garh	323	88	1229	294	1934	2073	2195	0	4268	6202
G. Tot	tal	323	92	1229	1865	3509	2191	3958	257	6406	9915

### **ANNEXURE-VIII**

# Area Statement of Eco-Tourism Working Circle

							Are	a (in Hectai	·e)			
		Comptt.		Cor	nmerci	al			Un-commo	ercial		
S.No.	Range	No.	D	К	F	C	Sub Total	Broad Oak	Leaved Scrubs Others	Blank /Scrub	Sub Total	Grand Total
	Ramnagar	5a	0	0	15	0	15	51	0	95	146	161
	North	5b	0	0	0	9	9	0	0	29	29	38
		6	0	0	0	162	162	0	0	14	14	176
		23a	0	0	0	150	150	0	0	0	0	150
		27b	0	0	0	28	28	148	0	29	177	205
	Sub-Total		0	0	15	349	364	199	0	167	366	730
	Ramnagar	34b	0	0	0	293	293	0	0	140	140	433
	South	34c	0	0	0	26	26	0	7	2	9	35
		45	0	0	0	220	220	0	0	6	6	226
2		57	0	0	0	167	167	0	0	31	31	198
	Sub-Total		0	0	0	706	706	0	7	179	186	892
		16	143	0	57	0	200	30	0	0	30	230
	Basantgarh	17a	94	0	71	0	165	0	0	0	0	165
		17b	28	0	57	0	85	0	0	30	30	115
		50a	96	0	0	0	96	38	0	0	38	134
		51	65	0	0	0	65	0	0	0	0	65
		63	142	0	30	0	172	0	0	48	48	220
	Sub-Total		568	0	215	0	783	68	0	78	146	929
					A	BSTRAC	Т					
	Ramnagar North		0	0	15	349	364	199	0	167	366	730
	Ramnagar South		0	0	0	706	706	0	7	179	186	892
	Basantgarh		568	0	215	0	783	68	7	78	146	929
	G. Total		568	0	230	1055	1853	267	14	424	698	2551

# **ANNEXURE-IX**

#### **Compartment wise composition of Beats, Blocks, Ranges**

Range	Block	Beat	Compartment Nos.
		Barmin	1,2,3 & 4
		Bindla	5,6,7&8
	Bermin	Samara	13,14 & 15
		Pathiar	16 & 17
		Renud	18, 19 & 20
		Kurta No. 1	27 & 29
Ramnagar North		Kurta No. II	26
	Kurta	Rassain	24 & 25
		Jandroda	21, 22 & 23
		Pray	30
		Chillar	31a
		Bhagpur	9&12
	Chillar	Dassuri	10a, 10b & 11
		Khail	10c & 10d
		Dalsar Rakh No. I &	23c
		II	
	3 Blocks	15 Beats	
		Amroh No. I	28 & 34
		Amroh No. II	35 & 36
	Amroh	Dehorn	38
		Baratta	39, 40 & 41
		Blond	37, 42, 43 & 44
		Udhar	45 & 46
		Malti	47, 48 & 49
Ramnagar South	Rang	Kaghota	31b & 31c
		Kidmoo	32 & 33
		Thelay No. I	50 & 51
	Thelay	Thelay No. II	52 & 53
		Pinger	54 to 10
		Dhanal-di-keri	61
		Rakh Mar	34c
		RakhCurah No. I	32c
	Ramnagar	RakhCurah No. II	33c
	4 Blocks	16 Beats	

		Kaitha Beat	68, 69 & 70
	Kaitha	Lehre beat	71 & 72
		Joffer Beat	73, 74, 75 & 76
		Gand Top Beat	63, 64, 65, 66 & 67
		Sia-Meri	1,2,3,4,5
	Sia-Meri	Harthal	6,7,8,9,10,11,12,13 & 14
		Khanaid Beat	15, 16, 17 & 18
	Khanaid	Raichak Kadwah	19, 20, 21, 22, 23, 24, 25,
			26, 27, 28, 29 & 30
Basantgarh		Lodhra	31, 32, 33, 34, 35, 36, 37,
			38, 39, 40, 41, 42, 43 &
	Basantgarh		44
		Jalaru	45, 46, 47,, 52, 53, 54, 55,
			56, 57 & 58
		Basantgarh	48, 49, 50, 51, 59, 60, 61,
			62
	4 Blocks	11 Beats	

### **ANNEXURE-X**

#### Detail of existing Nurseries of Ramnagar Forest Division

Range	Name of Nursery	Area (in Hectares)
Ramnagar North	Dalsar Nursery	0.5 hectares
Ramnagar South	Thandapani Nursery	1.8 hectares
	Basantgarh Nursery	0.5 hectares
Basantgarh	Kaitha Nursery	0.5 hectares

# **ANNEXURE XI**

## Detailed List of Departmental Buildings of Ramnagar Forest Division

S.No.	Name of the	Location of	Accommodation of	Purpose of the use	Present status of	Remark
	Building if any	the building	the building	of the buildings	the building	
1	Forest Rest House	Loudhra	Two rooms	Not fit for use /	Need repair and	
	Loudhra			accommodation	renovation	
2	Forest Rest House	Basantgarh	Two rooms	Not fit for use /	Need repair and	
	Basantgarh	_		accommodation	renovation	
3	Range Officer	do	One room	Not fit for use /	Need repair and	
	Quarter Basantgarh			accommodation	renovation	
4	Community Hall	do	One room	For Public use	In good condition	
	Basantgarh				for use	
5	Forest Range Hut	Gandhtop	Two rooms	Under use with	do	
	Gandhtop			B.O. Kaitha		
6	Guard Hut Kaitha	Kaitha	One room	For use of B.O.	In good condition	
				Kaitha		
7	Forest Check Post	Kulwanta	One room	For use of check	Need repair and	
	Kulwanta			post staff	renovation	
8	Forest Rest House	do	Two rooms	For use of visiting	Need repair and	
	Kulwanta			officers	renovation	
9	Chowkidar Hut	do	One room	For Chowkidar use	Need repair and	
	Kulwanta				renovation	
10	Resin Shed	do	Two rooms	For office use	do	
	Kulwanta					
11	Fire Control Room	do	One room	Used by fire	In good condition	
	Kulwanta			control staff		
12	Kuh Check Post-I	Kuh Nalla	One room	For use of Check	Need repair and	
				Post Staff	renovation	
13	Kuh Check Post-II	do	One room	do	do	
14	Resin Shed Kogha	Kaghote	One room	Old building	Need repair and	
45				dismantled	renovation	
15	Resin Depot Kogha	do	One room	Not fit for use /		
10	(Totally Damaged)		0	accommodation		
16	Resin Depot Dehari	Dehari	One room	Not fit for use /	Need repair and	
17				accommodation	renovation	
17	Guard Hut Plassain	Plassain	Two rooms,	For use of beat	In good condition	
			Ritchens,	Guara		
			Dauli oolii aliu Voranda			
10	Dhandal Cuard Hut	Dhandal	One room	Not fit for use /		
10		Ditallual	Une room	accommodation		
10	Forest Check Post	Ramnagar	Two rooms	For Check Post	Need repair and	
1,	Ramnagar	ivanniagai	1 00 1001115	staffuse	renovation	
20	Soil Range Quarter	do	Two rooms	Range Office	Need repair and	
20	Ramnagar		1 100 1001115	Quarter	renovation	
21	Chowkidar Hut	do	One room	For Chowkidar use	Need renair and	
	South Range	40			renovation	
22	Divisional Officer	do	Four rooms	For office use	Need renair and	
	Building Ramnagar	uu	1 001 1001113		renovation	
23	Divisional Quarters	do	Three rooms	Need renair and	Need renair and	
	(Residential)	40		renovation	renovation	
L	(		L			L

		1				
24	Inspection Hut	Ramnagar	Two rooms	Need repair and	Need repair and	
	Ramnagar			renovation	renovation	
25	Timber, Firewood	do	Two rooms	For residential	Need repair and	
	& Resin shed			purpose	renovation	
	Ramnagar					
26	Resin Hut	do	Two rooms	Timber / Firewood	Need repair and	
	Ramnagar			use	renovation	
27	IWDP Building	do	Five rooms	For residential	Need repair and	
	(DFO Residence			purpose	renovation	
	(Residential)					
28	Chowkidat Hut	do	One room	For chowkidar	Need repair and	
				residential	renovation	
29	Mali Hut Thanda	Thanda Pani	One room	For use of Nursery	Need repair and	
	Pani			Staff	renovation	
30	New Range Hut	Chowki	Two rooms	For office use	In good connection	
	Chowki					
31	Forest Hut Nagrota	Nagrota Panj	One room	For use of	do	
	Panj Grain	Grain		Forester/Fgd.		
32	Dalsar Guard Hut	Dalsar	Two rooms,	For beat guard use	do	
			Kitchen &			
			Bathroom			
33	Guard Hut Langa	Langa	One room	do	Repairable	
34	Ola Range Office	Chowki	One room,	For use in range	Not fit for use /	
	Hut Chowki		Bathroom & Store	Office	accommodation	
35	Guard / Mali Hut	Chigla Balota	One room	For use in forest	In good condition	
				staff		
36	Guard / Mali Hut	Dalsar	One room	For use of Nursery	do	
	-	Nursery		in-Charge		
37	Guard / Mali Hut	Thanna pani	One room	For use of Nursery	do	
	-	Nursery		in-Charge		

# **ANNEXURE-XII**

#### Statement showing the details of timber extracted by State Forest Corporation w.e.f 1996-97\_ to 2010-11

							Mar	kings							Extraction		
S.No	Year	Com ptt.	Deodar		Kail		Fir		Chir		Total			V	olume in Cft.	i i	
		No	No.	Vol. in Cft.	No.	Vol. in Cft.	No.	Vol. in Cft.	No.	Vol. in Cft.	No.	Vol. in Cft.	D	К	F	С	Total
1	1996-97	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
		51/B gh.	473 + 50P	28547	2	96	4	245	0	0	479 + 50P	28888	16267	60	122	0	16449
		46/B gh	618+5 5P	44584	38	3943	8	800	0	0	664 + 55P	48327	26717	2242	234	0	29193
		50/ Bgh	501+2 0P	34905	1	48	2	11	0	0	504 + 20P	35064	18926	30	52	0	19008
2	1997-98	45/B gh	477 + 42P	34688	3	211	137	9989	0	0	617 + 42P	44888	28330	70	5120	0	33520
		8/Bg h	198	15400	193	17234	40	4304	0	0	431	36938	11386	1171 5	1936	0	25037
		7/Bg h	168	13676	32	2765	215	28773	0	0	415	45014	10944	1969	11970	0	24883
		Sub.T otal	2435 + 167 P	171800	269	24297	406	44122	0	0	3110 + 167P	239119	112570	1608 6	19434	0	148090
3	1998-99	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
		21/B gh	66 + 219P	5562	30	1196	315	32136	Nil	Nil	411 + 219P	38894	4194	506	6633	Nil	11331
		28/B gh	722 + 370 P	72174	44	3550	181	13022	Nil	Nil	947 + 370 P	88746	32780	1642	630	Nil	35052
4	1999- 2000	Chan da in Ujh River									390	29840	992	1501	662	Nil	3155
		Sub- Total	788 + 589	77736	74	4746	496	45158	Nil	Nil	158 + 589 p + 390 Logs	157480	37966	3649	7923		49538

5	2000-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	2001-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10/B gh	551	55145	19	1927	405	61572	Nil	Nil	975	118644	26166	968	14161	Nil	41295
		13/B gh	236	23912	21	2210	66	8462	Nil	Nil	323	34593	12531	1063	2520	Nil	16114
		15/B gh	105	12297	162	16002	244	28634	Nil	Nil	511	56933	6054	7962	8472	Nil	22488
		16/B gh	176	17784	3	194	21	1365	Nil	Nil	200	19343	12356	213	520	Nil	13089
_		44/B gh	710	71412	0	0	56	10368	Nil	Nil	766	81780	43592	0	3268	Nil	46860
/	2002-03	45/B gh	220	23888	0	0	52	5091	Nil	Nil	272	28979	25220	0	100	N.'1	25016
		45/B gh	192	20206	0	0	4	488	Nil	Nil	196	20694	25320	0	496	NII	25816
		46ab /Bgh	58	4825	1	80	1	55	Nil	Nil	60	4960	15021	0	2166	NI:1	17007
		46ab /Bgh	301	29092	0	0	33	4689	Nil	Nil	334	33781	15831	0	2166	NII	1/99/
		Sub- Total	2549	258561	206	20413	882	120724	Nil	Nil	3637	399707	141850	1020 6	31603		183659
		10/В gh	44	4535	12	1231	34	7236	Nil	Nil	90	13002	2151	618	1664	Nil	4433
		44/B gh	138	14623	3	284	2	586	Nil	Nil	143	15493	89	Nil	3409	Nil	3498
		45/B gh	156	15398	29	2654	26	4061	Nil	Nil	211	22113	9476	4176	1428	Nil	15080
0	2002.04	46ab /Bgh	273	41176	4	344	Nil	Nil	Nil	Nil	277	41520	25340	784	Nil	Nil	26124
8	2003-04	9ab/ Bgh	160	19706	209	25811	222	63563	Nil	Nil	591	109080	13593	1381 2	20344	Nil	47749
		52/B gh	582	72589	3	334	90	19175	Nil	Nil	675	92098	34606	175	3726	Nil	38507
		57/B gh	896	97555	6	563	118	14500	Nil	Nil	0	0	41202	337	4300	Nil	45839
		Sub- Total	2249	265582	266	31221	492	109121	Nil	Nil	1987	293306	126457	1990 2	34871	nil	181230
		45/R amng r/S	Nil	Nil	Nil	Nil	Nil	Nil	1317	110083	Nil	Nil	Nil	Nil	Nil	129 18	
9	2004-05	46 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	1510	101041	Nil	Nil	Nil	Nil	Nil	114 75	
		47 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	622	50331	Nil	Nil	Nil	Nil	Nil	541 8	

		48 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	486	36403	Nil	Nil	Nil	Nil	Nil	675 9	
		49 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	682	63884	Nil	Nil	Nil	Nil	Nil	759 5	
		50 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	850	70339	Nil	Nil	Nil	Nil	Nil	109 53	
		51 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	680	54985	Nil	Nil	Nil	Nil	Nil	270 3	
		52 Ramn gr	Nil	Nil	Nil	Nil	Nil	Nil	478	29876	Nil	Nil	Nil	Nil	Nil	187 2	
		Sub- Total	0	0	0	0	0	0	6625	516942	0	0	0	0	0	596 93	
		5b/B gh	135	10141	11	1026	48	5926	Nil	Nil	194	17093	8753	513	508	Nil	9774
10	2005-06	7/Bg h	216	17667	26	2490	257	31194	Nil	Nil	499	51351	12610	1416	9770		23796
		8/Bg h	431	32392	211	18754	35	3641	Nil	Nil	677	54787	18332	1089 2	1259		30483
		Sub- Total	782	60200	248	22270	340	40761			1370	123231	39695	1282 1	11537		64053
11	2007-08	14/B gh	126	13705	63	6281	64	9029	Nil	Nil	253	29015	8838	2318	3171		14327
12	2008-09	63/B gh	237	16539	Nil	Nil	1	55	Nil	Nil	238	16594	12133	0	0	0	12133
13	2009-10	6/Bg h	237	25102	35	3879	21	4105	Nil	Nil	293	33086	Wor	k has no	t started yet		
		13/B gh	148	15994	19	2307	91	10167	Nil	Nil	258	28468	Wor	k has no	t started yet		
		51/B gh	653	64966	Nil	Nil	Nil	Nil	Nil	Nil	653	64966	24940	Extra	ction work u	nder	24940
	2010-11	57/B gh	359	37122	11	826	47	4888	Nil	Nil	417	42836	4761		progress		4761
		59/B gh	143	13139	119	13538	257	21253	Nil	Nil	519	47930	4303	3458	1494	0	9255
14		Sub- Total	1303	131221	149	16671	395	36308			1847	184200	34004	3458	1494	0	38956
15	2011-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SOURCE:-Divisional Manager (Extraction) J&K SFC Division Udhampur

# **ANNEXURE-XIII**

## Abstract of Enumeration of Chikhri

(Number of Stems)

Range	Comptt.		Diamet	er class		Total
_	_	0-10	10-20	20-30	30-40	
	28	2969	1912	644	13	5538
Ramnagar South						
	36	23222	1433	495	0	25150
	38	3749	2375	868	23	7015
Basantgarh	72	3755	1861	638	0	6254
	73	2460	1126	433	0	4019
	Total	36155	8707	3078	36	47976

## ANNEXURE-XIV-A

# Compartment wise number of blazes tapped in Ramnagar North Range of Ramnagar Forest Division from 1995-96 to 2011-12

Co. No.	95-96	96-97	97-98	98-99	99-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Total
1	8500	8500	5531	5500	5500	5500	5500	5500	5500	5300	5000	4000	0	3200	3200	0	
2	10900	10900	7225	7000	7000	7000	7000	7000	7000	7500	7300	5000	0	4000	4000	0	
3a	7250	6784	3933	3000	3000	3000	3000	3000	3000	2400	3400	2000	0	1600	1600	0	
4a	6550	4464	3215	3200	3200	3200	3200	3200	3200	3600	2200	3000	1200	0	0	0	
5a	2173	2173	0	1400	1400	1400	1400	1400	0	0	0	0	0	0	0	0	
6	6077	6077	0	3000	3000	3000	3000	3000	3000	1000	1000	0	0	0	0	0	
7	2050	2050	0	300	300	1000	1000	1000	1000	2000	2000	1500	0	0	0	0	
8	3050	3050	0	2100	2100	2100	2100	2100	2100	2100	2100	1500	0	0	0	0	
9a	0	0	2160	2100	2100	2100	2100	2100	1800	0	0	0	0	0	0	0	
9b	0	0	1800	1800	1800	1800	1800	1800	0	800	800	0	0	0	0	0	
10a	6200	5178	3705	3700	3700	3700	3700	3700	3700	1000	1000	1000	0	800	0	3600	
10b	0	0	1327	1300	1300	1300	1300	1300	0	0	0	0	0	0	0		
11	0	5101	5949	5900	5900	5900	5900	5900	5900	7400	7000	6000	0	4800	4800	4800	
12	4300	4221	4950	4800	4800	4800	4800	4800	4800	5000	6000	0	0	0	3000	3000	
13	2100	2100	12082	2000	2000	2000	2000	2000	2000	2000	2000	1500	0	1200	1200	1200	
14a	0	0	0	0	0	1500	1500	0	1500	0	0	0	3200	3200	3200	3200	
15	15600	15600	120	12000	12000	12000	12000	0	6000	7500	7500	6000	4800	4800	4800	4800	
17a	9000	9800	0	3000	3000	3000	3000	3000	0	0	0	0	0	0	2600	2600	
19	3000	3200	0	2500	2500	2500	2500	2500	2500	3700	3700	3000	2400	2400	2400	2400	
20	2000	3000	2083	3000	3000	3000	3000	3000	3000	2000	2000	1500	1200	1200	0	0	
21	7237	9237	0	300	300	2600	2600	2600	2600	0	1600	1000	800	800	800	0	
22a	0	0	0	2000	2000	2000	2000	2000	2000	0	1000	0	1500	1500	1500	0	
22b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

23a	3833	4833	0	3500	3500	3500	3500	3500	4100	0	1600	1000	0	0	0	0	
23b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23c	0	0	0	600	600	600	600	600	0	0	0	0	0	0	0	0	
24	7123	7123	6241	6200	6200		6200	6200	6200	0	6200	5000	4000	4000	4000	0	
25	2040	2040	0	2200	2200	2200	2200	2200	2200	0	0	0	0	0	0	0	
26a	1000	1000	0	2820	2820	2820	2820	2820	0	0	0	0	0	0	0	0	
27a	2974	2974	0	4280	4280	4280	4280	4280	4000	3000	3000	2000	0	1600	1600	0	
29a	4500	4500	0	1600	1600	1600	1600	1600	1600	2500	1000	1000	0	800	800	0	
30a		1500	0	1700	1700	1700	1700	1700	1700		1500	1500	0	1200	1200	0	
	117457	125405	60321	92800	92800	91100	97300	83800	80400	58800	68900	47500	19100	37100	40700	0	1113483

## ANNEXURE-XIV-B

# Compartment wise number of blazes tapped in Ramnagar South Range of Ramnagar Forest Division from 1995-96 to 2011-12

Co mpt t. No.	95-96	96-97	97-98	98-99	99-2000	2000-01	2001-02	2002- 03	2003-04	2004-05	2005- 06	2006- 07	2007-08	2008- 09	2009- 10	2010 -11	Total
28a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2600	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
28b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
31b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
31c	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
32a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
32b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
32c	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
33a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
33b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
33c	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
34a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
34b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
34c	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
40a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
40b	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3000	N/A	N/A	1500	N/A	N/A	N/A	N/A	
42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3000	N/A	N/A	2000	N/A	N/A	N/A	N/A	
43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	1500	N/A	N/A	N/A	N/A	

44	N/A	0	N/A	N/A	0	N/A	0	0	0								
45	N/A	2500	N/A	N/A	2000	N/A	0	0	0								
46	N/A	2500	N/A	N/A	2000	N/A	0	0	0								
47	N/A	300	N/A	N/A	0	N/A	0	0	0								
48	N/A	3500	N/A	N/A	3000	N/A	0	0	0								
49	N/A	3000	N/A	N/A	0	N/A	0	0	0								
50	N/A	2000	N/A	N/A	2000	N/A	0	0	0								
51	N/A	2500	N/A	N/A	2000	N/A	0	0	0								
52	N/A	4500	N/A	N/A	3000	N/A	0	0	0								
53	N/A	2900	N/A	N/A	2500	N/A	0	0	0								
54	N/A	2800	N/A	N/A	2000	N/A	0	0	0								
55	N/A	0	N/A	N/A	0	N/A	0	0	0								
56	N/A	2800	N/A	N/A	2000	N/A	0	0	0								
57	N/A	4000	N/A	N/A	3000	N/A	0	0	0								
58	N/A	3500	N/A	N/A	3000	N/A	0	0	0								
59	N/A	1500	N/A	N/A	3000	N/A	0	0	0								
60	N/A	0	N/A	0	0	0											
61	N/A	0	N/A	0	0	0											
Tot al	98084	45500	23600	74700	74700	77700	77700	77700	60300	23500	38000	34500	19000	0	0	0	724984

# **ANNEXURE-XIV-C**

#### Compartment wise number of blazes tapped in Basantgarh Range of Ramnagar Forest Division from 1995-96 to 2011-12

Co mpt t. No.	95- 96	96-97	97-98	98-99	99-2000	2000- 01	2001- 02	2002- 03	2003- 04	2004- 05	2005- 06	2006- 07	2007- 08	2008- 09	2009- 10	2010- 11	2011- 12	Total
1/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9300	9000	7200	0	0	7200	0	
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8500	6000	4800	4800	4800	4800	5000	
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9100	8000	6400	0	0	0	0	
4/5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	11200	10000	
49/ 50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5000	5000	4000	4000	0	0	0	
65/ 66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8100	7000	5600	5600	0	0	0	
68/ 69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7000	5000	4000	4000	4000	4000	5000	
70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10000	5000	4000	4000	4000	4000	6500	
71/ 72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7600	5000	4000	0	0	0	6000	
73/ 74/ 75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8000	0	6400	0	0	0	0	
Tot al	0	105936	0	74200	72700	91500	91500	91500	85000	57600	72600	50000	46400	22400	12800	31200	32500	922836

# **ANNEXURE-XV**

# List of Important Medicinal Plants

Botanical Name	Local name	English Name	Family
Acacia catechu	(Khair)		Mimosaceae
Aconitum heterophyllum	(Patis)	Mank's Hood Aconite	Ranunculaceae
Berberis lycium	Rasount (Kambal)		Berberidaceae
Dendrocalamus strictus	Bans	Bamboo	
Dioscorea deltoidea	Kins	Yam	Dioscoreaceae
Emblica officinalis	Amla		
Jurinea macrocephala	(Dhoop)		
Mallotus philippinensis	Kamila		
Morchella Species	(Guchhi)	Morels	Pezizales
Picrorhiza kurroa	(Kaur)		
Pistacia integerrima	Kakarsinghi		Anacardiaceae
Punica granatum	(Anardana)		Lythraceae
Terminalia belerica	Baheda		
Terminalia chebula	Harra		
Valeriana wallichii	(Muskbala)	All heal	Valerianaceae
Viola canescence	(Banafsa)	Violet	Violaceae

## **ANNEXURE-XVI**

#### Statement of cases involving transfer of forest land (Under Forest Conservation Act 1990 of Ramnagar Forest Division

S.No.	Agency	Particulars	Comptt.	Area in
				hectare
1	PMGSY	Constt. of road Dilhar to Amroh	34a/S	1.25
			34b/S	
2	PMGSY	Constt. of road from Kanghote to Lehri Shumb	31c/S	3.69
3	PMGSY	Constt. of road from Trilha to Sunetar	31a/N	1.32
4	PMGSY	Constt. of road from Lerh to Parkha	10a/N	1
5	PMGSY	Constt. of road from Chhatrari to Malote	68/Bsg.	0.92
6	R&B	Constt. of road from Seral to Siameri bridge	65/Bsg.	1.54
7	PMGSY	Constt. of road from Chunanta to BattalKhas	10c/N	0.65
8	R&B	Constt. of road from kirmoo to Chauntra Mata	47/S	1.18
9	PMGSY	Constt. of road from Langha to Sarmanjla	9a/N	1.52
			9b/N	0.48
10	PMGSY	Constt. of road from Langha to Marta	35/S	0.7
11	PMGSY	Constt. of road from Plassan to Rang	45/S	1
			46/S	0.5
			47/S	1.5
12	PMGSY	Constt. of road from Kulwanta to Bari ladhara	26d/N	3.15
			27a/N	2.1
			27b/N	3.15
13	PMGSY	Constt. of road from Garlong to Kurwalt	30/N	1.82
14	R&B	Constt. of road from Prey to Matt	30a/N	0.88
15	PMGSY	Constt. of road from Sarmanjli to Serbala	9b/N	0.426
16	PMGSY	Constt. of road from Plassan to Darwalaa	33/S	2.95
17	PMGSY	Constt. of road from Barmeen bridge to Dharnoo	3c/N	4.67
18	PMGSY	Constt. of road from Basantgarh to Khannaid	46/Bsg.	0.32
19	PMGSY	Constt. of road from Badhole to Surni	23c/N	0.6
20	PMGSY	Constt. of road from LehriShumbh to Kheen	31/N	0.75

#### **ANNEXURE XVII**

# Compartment wise detail of developmental works under taken in Ramnagar Forest Division from 2008-09 to 2012-13

Range	Compar tment	Area (in Hectares)	Fencing (in rft.)	Plantation (Nos.)	Patch Sowing (Nos.)	Soil an moistu consei works	nd 1re rvation	Miscellaneous
						DRSM	Crates	
	10	20	6000	15000	5000	100	0	2 km bridle path (EPA)
Ramnagar North	14	40	12000	30000	0	200	0	4 km bridle path (EPA)
ivortin	15	20	5000	8000	0	50	0	1 km bridle path (EPA)
	17	10	3000	4000	0	44	0	0
	18	20	5500	8000	6500	50	0	1.5 km bridle path (EPA)
	20	20	7000 (repair)	9000	0	0	0	0
	22	10	3000	4000	0	53	0	0
	23	32	9500	12000	3000	180	0	0
	24	22	6500	9000	4000	100	0	0
	27b	12	3000	4000	0	131	0	0
	31a	40	13000	17000	5000	71	0	0
			(7000					
			repair)					
	31c	15	4500	7000	5000	120	0	0
	32	24	9500	7000	3000	110	0	0
Ramnagar	33	74	26000	29100	10000	304	0	0
South	36	12	5000	3500	0	55	0	0
	37	13	3600	4000	0	32	0	0
	40	20	5000	7000	5000	71	0	0
	48	12	3500	4500	0	60	0	0
	49	12	5000	3600	0	56	0	0
	54	15	4500	6000	5000	100	0	0
	5	20	6000	3000	10000	115	0	1.5 km inspection path
Basantgarh	50	20	6000	10000	0	80	0	0
	52	35	10500	7000	15000	128	0	0
	55	13	4000	5000	0	55	0	0
	59	13	4000	5000	0	47.5	0	0
	60	20	6000	8000	5000	71	0	0
	61	21	6000	8000	5000	116	0	0
	66	22	6500	9000	4000	100	0	0
	70	12	3000	4000	0	34	0	0
	72	22	6500	12000	10000	100	0	0

#### **ANNEXURE XVIII**

# Compartment wise detail of developmental works under taken in Ramnagar Forest Division under CAMPA from 2010-11 to 2012-13

Range	Compartment	Area (in Hectares)	Fencing (in rft.)	Plantation (Nos.)	Patch Sowing (Nos.)	Soil an moistr conse works DRS M	nd ure rvation Crates	Miscellane ous
	3	20	5600	8000	0	144	63	
Ramnagar	10b	20	5600	15000	N/A	N/A	N/A	
North	17	20	5600	18000	N/A	N/A	N/A	
	20	N/A	5600	8000	15000	150	N/A	
	26	20	5600	20000	0	148	63	
	26 (II Unit)	N/A	5600	20000	10000	150	N/A	
Ramnagar	39/40	20	5600	20000	0	148	63	
South	42	N/A	5600	20000	10000	150	N/A	
	52	20	5600	10000	N/A	N/A	N/A	
	46	20	5600	8000	N/A	N/A	N/A	
	62	20	5600	20000	N/A	N/A	N/A	
Basantgarh	68	20	5600	15000	N/A	N/A	N/A	
-	66	N/A	5600	20000	10000	150	N/A	
	72	20	5600	20000	0	149	63	
	72 (ii unit)	N/A	5600	8000	15000	150	N/A	

# ANNEXURE-XIX

### Statement Showing Departmental extraction of timber w.e.f.1995-96 to 2010-11

S.No.	Year	Range	Comptt.	Species	No. of	Vol. in	Т	otal
					Scants	Cft.	No.	Vol.
1	1995-96 to	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	2001-02							
2	2001-02	Basantgarh	63	Deodar	N/A	7500	N/A	13500
			57	do	do	6000		
3	2002-03	Basantgarh	51	Deodar	3829	11262	3829	11262
4	2003-04	Basantgarh	51	Deodar	3229	10,000	3229	10,000
5	2004-05 to	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	2008-09							
6	2009-10	Basantgarh	60	Deodar	1839	6251	1839	6251
7	2010-2011	Basantgarh	60	Deodar	361	1105	2682	8708
		do	64	do	2321	7603		
								49721

# ANNEXURE-XX

### Royalty outstanding statement against SFC of Ramnagar Forest Division

S.No.	Compartment	Amount outstanding as
1	Compartment 56/Bab	1289224.00
2	Compartment 57/Bgh	226240.00
2	Compartment 46/Bgh	855542.00
3 A	Compartment 59/Bgh	168707.00
5	Compartment 33/S	477692.00
6	Compartment 58/S	55669.00
7	Compartment 7/N	150718.00
7 8	Compartment 51/Bab	831274.00
0	Compartment 40 51 52 / Rah	
9	Compartment 46/Bab	875012.00
10	Compartment 7 & 9 / Pah	2026080.00
11	Compartment 45 & 46/Pgh	E005102.00
12	Compartment F0 & F1/Pgh	4462122.00
13	Compartment 21.8.29/Dgh	4402132.00
14	Compartment 21 & 28/Bgn	51(2042.00 51(2042.00
15	Compartment 16, 44a, & 45/Bgn	5162043.00
10	Compartment 46aD/Bgn	2138105.00
1/	Compartment 44a, 45 & 46ab/Bgn	4951895.00
18	Compartment 15/Bgn	1/28683.00
19	Compartment 10 & 13/Bgn	6906071.00
20	Compartment 44, 45, 46ab & 10/Bgn	5658069.00
21	Compartment 9a, 9b, 52 & 57/Bgh	15/1//18.00
22	Compartment 45/S to 52/S	4779129.00
23	Compartment 5ab, 7&8/Bgh	5468962.00
24	Compartment 14a/Bgh	1267265.00
25	Compartment 63/Bgh	1169851.00
26	Compartment 6/Bgh	2682781.00
27	Compartment 47/S Bill No. : II/2009-10	164234.00
28	Compartment 33/S Bill No. : III/2009-10	106716.00
29	Compartment 30/N Bill No. : IV/2009-10	43633.00
30	Compartment 23/N Bill No. : V/2009-10	128688.00
31	Compartment 9a & 9b/N Bill No. : VI/2009-10	656481.00
32	Compartment 56, 57, 58/S Bill No. : VII/2009-10	852231.00
33	Compartment 35/S Bill No. : VIII/2009-10	35987.00
34	Compartment 34 & 34b/S Bill No. : IX/2009-10	107291.00
35	Compartment 27a, 27b & 26d/N Bill No. : X/2009-10	2399178.00
36	Compartment 456 & 47/S Bill No. : XI/2009-10	929622.00
37	Compartment 70, 71, 72 & 73/Bgh Bill No. : XII/2009-10	1365006.00
38	Compartment 34b&c/S, 27b/N, 70/Bgh, 68/Bgh & 64/	107009.00
	Bgh Bill No. : XIII/2009-10	
	Total	89765422