PART-II

FUTURE MANAGEMENT DISCUSSED

AND

PRESCRIBED

BASIS OF PROPOSALS
Objectives of Management

9.1. General Objectives of Management

The forests of Bhadarwah Forest Division shall be managed with a view to achieve the following objectives.

- Conservation of biodiversity and natural habitat through preservation of natural forests with the vast variety of flora and fauna and maintenance of environmental stability.
- Rehabilitation of degraded forests so as to optimize their productivity and restore their potential to provide ecosystem goods and services on sustainable basis. Checking denudation and soil erosion in catchments through integrated watershed management techniques and practices.
- Securing regeneration of conifer forests under working through assisted natural regeneration and artificial regeneration and maintenance of the health of forest vegetation and forest soils.
- Achievement of a balanced, normal structure of forests through management of forests as per silvicultural requirements of the crop.
- Meeting the bonafide requirements of the local population in respect of forest based resources to the extent possible within the sustainable yield potential of the natural forests.
- Optimally utilising the mitigation and adaptation potential of forests in the context of climate change and achievement of environmental security.
- Encouraging principles and practises of sustainable grazing through participatory management.
- Reducing pressure on forests through appropriate interventions including development of forest fringe belt into high production tree strips.
- Utilisation of natural resources using best management practices and institutionalization and operationalization of concepts of eco-tourism and nature tourism.
- Consistent with the above, to derive the yield of timber and other forest produce on sustainable basis for commercial markets.

9.2. Method of Treatment to be adopted

The following treatments are proposed to meet the objectives listed above.

- Areas that have previously been worked, and in which the regeneration has failed to establish, shall be restocked by artificial regeneration and assisted natural regeneration.
- Areas taken for working in the present plan, shall be closed and all kind of efforts must be taken for ensuring proper regeneration in the area.
- Forest areas close to habitation that have degraded due to heavy biotic pressure shall be rehabilitated by raising indigenous species preferred by local inhabitants to meet their demands.
- Commercial forests on easier slopes, with adequate advance growth shall be treated suitably as per the silvic ultural requirements of the crop to liberate the advance growth.
- Forests on steep and precipitous slopes shall be conserved and improved.
- Sections of forest along the roads that are prone to landslides, shall be protected and treated through vegetative and mechanical methods.
- Over exploited and mal-treated forests shall be given complete rest and concentrated efforts shall be made to restore them to their normal condition of growth and stocking.
- Degraded areas covered with uneconomical bushes and shrubs shall be planted up with grasses to meet the demand for fodder.
- Forests around places of tourist shall not only be preserved for aesthetic purposes, but shall also be protected against degradation and encroachments owing to the ever increasing tourist business.

9.3. Constitution of Working Circles, their Area and Distribution

In order to achieve the objects of management, the following working circles are constituted.

1. Deodar- Kail Irregular Working Circle
2. Mixed Conifers Selection Working Circle
3. Fir Selection Working Circle
4. Chir Rehabilitation Working Circle

5. Reboisement Working Circle
6. Protection Working Circle
7. Grassland Development (Overlapping) Working Circle
8. Ecotourism (Overlapping) Working Circle

The following mandatory working circles as per the National Working Plan code:

9. NTFP (Overlapping) Working Circle
10. Forest Protection (overlapping) Working Circle
11. Joint Forest Management (Overlapping) Working Circle
12. Wild Life Management (Overlapping) Working Circle

TABLE 9.1. RANGEWISE AREA (HECTARES) UNDER VARIOUS WORKING CIRCLES OF BHADARWAH FOREST DIVISION41

Range	Working Circle	Commercial Area (ha)	Uncommercial Area (ha)	Total Area (ha)
Bhalesh	**DK WC**	178.75	357.33	536.08
	MC WC	3230.04	3792.11	7022.15
	FS WC	3544.25	5576.08	9120.33
	CR WC	0.00	0.00	0.00
	P WC	4105.79	11394.67	15500.46
	RB WC	654.34	3744.35	4398.69
	Sub-Total	**11713.17**	**24864.54**	**36577.71**
Chiralla	**DK WC**	3313.47	1823.85	5137.32
	MC WC	1113.29	959.10	2072.39
	FS WC	1883.16	1490.17	3373.33
	CR WC	814.26	1066.91	1881.17
	P WC	749.24	1029.51	1778.75
	RB WC	690.02	1200.39	1890.41
	Sub-Total	**8563.44**	**7569.93**	**16133.37**
Kellar	**DK WC**	3253.61	2009.20	5262.81
	MC WC	1504.27	802.82	2307.09
	FS WC	1437.05	885.93	2322.98
	CR WC	484.30	590.03	1074.33
	P WC	1710.3	2072.93	3783.23
	RB WC	808.78	879.41	1688.19
	Sub-Total	**9198.31**	**7240.32**	**16438.63**
Neeru	**DK WC**	3053.81	2269.50	5323.31
	MC WC	1816.47	1384.12	3200.59
	FS WC	1735.02	1309.00	3044.02
	CR WC	0.00	0.00	0.00
	P WC	3097.27	3380.96	6478.23
	RB WC	88.50	311.71	400.21
	Sub-Total	**9791.07**	**8655.29**	**18446.36**
	Grand Total	**39265.99**	**48330.08**	**87596.07**

The Estate Area Statement of Bhadarwah Forest Division is enclosed as Appendix II. The compartment wise area allotted to each of the working circles, have been listed under Appendices IV to IX. The allotment of compartments to various Commercial Working Circles in the previous plan by Sh. A.K. Singh has been retained mostly with few modifications in this plan like addition of Reboisement Working Circle.

9.4. Reasons for the Constitution of the Working Circles

The allotment of compartments to various Working Circles in the previous Plan by Sh. A.K. Singh, have been grossly retained in this plan with minor modification by addition of a new Reboisement Working Circle. The reason to retain working circle of A.K. Singh Plan is because the regular working of forests was stalled midway during intervening period of militancy which coincided with the period of the previous plan and the pace of conversion came to a virtual halt and distortion due to heavy illicit felling in the garb of militancy by smugglers and local people, resulting in plunder of green wealth of Bhadarwah Forest Division. Secondly, there has neither been any significant improvement in the status of regeneration of compartments from one working circle to another, or from one periodic block to another within the working circle. Instances of serious degradation have been found around the fringe areas of human habitations that required the transfer of many compartment to Protection or a new Reboisement Working Circles.

9.4.1 Deodar Kail Irregular Working Circle

This working circle shall include all valuable, easily accessible, forests of Deodar and Kail occurring on easier slopes considered suitable to be managed under the system of concentrated regeneration felling. The forests are composed predominantly of Kail with fair amount of Deodar. The stocking of these forests is good. This working circle comprises of those areas which were included in the Deodar- Kail Working Circle in the previous plan.

9.4.2 Mixed Conifer Selection Working Circle

This working circle shall include all commercial forests of Deodar and Kail, with varying proportion of Fir and of Spruce in higher reaches, and Chir in the lower reaches, occupying

comparatively steeper slopes and rugged grounds. They are considered unsuitable for management under the system of concentrated regeneration fellings from the point of view of soil and water conservation. The detailed area statement is enclosed as Appendix VII.

9.4.3 Fir Selection Working Circle

This working circle shall include all the commercial Fir forests, considered suitable for commercial exploitation under Selection System. These forests are consisting of mixture of Fir with a sprinkling of Spruce, Deodar and Kail. The crop consists of predominantly mature to over mature trees with a fair proportion of middle-aged to mature trees. Regeneration is either absent or inadequate due to heavy deposition of undecomposed organic matter in the forest floor. The detailed area statement is enclosed as Appendix VIII.

9.4.4 Chir Rehabilitation Working Circle

This working circle consists of more or less pure Chir forests of Chiralla and Kellar ranges, containing mature and over mature trees sparsely distributed. The young regeneration is deficient or absent in these forests with exception of a few compartments. Most of the Chir forests have been under excessive biotic pressure of grazing, encroachments, lopping, fire and resin tapping and therefore are under stocked, in spite of ban on resin extraction. The Chir forests due to excessive biotic-interference, have not responded favourably.

9.4.5 Reboisement Working Circle:

“Reboisement” (pronounced rabouzmah) is a French word meaning reforestation. The areas that are heavily degraded and have lost the capacity to re-coupe on its own have been included in this Working Circle. These are the areas that have lost the potential for production and thus need immediate intervention for rehabilitation. The compartments situated adjacent to villages clusters bearing the brunt of the relentless demand, and the ones with more open forest have been included in this Working Circle. Additionally the compartments adjacent to the town have also been included in this Working Circle.

9.4.6 Protection Working Circle

All those demarcated forests of Bhadarwah Forest Division which are not covered under any of the working circles described heretofore, shall be placed under this working circle. These forests are either degraded or occupy very steep slopes and need complete protection from all kinds of interference.

9.4.7 Grassland Development (overlapping) Working Circle

This working circle includes the area under pasture lands in the alpine and the sub-alpine zone. In addition, the prescriptions of this working circle shall be operative in those areas of the sub-tropical zone, especially degraded sites and landslide areas, that support, or have the potential to support suitable grass species.

9.4.8 Ecotourism (Overlapping) Working Circle

Bhadarwah is referred as *Chota Kashmir* for its mesmerizing natural beauty. The Bhadarwah Forest Division has many tourist destinations preferred both by local as well as tourists from rest part of the country and abroad as well, for enjoying the nature, adventure sports and for religious purposes also. Hence the working circle is created to tape the benefit of the tourism in a sustainable manner.

As per the National Working Plan Code, the following mandatory Working Circles are also created in the present plan.

9.4.9 NTFP (Overlapping) Working Circle

The Bhadarwah Forest Division is bestowed with many valuable Non Timber Forest Produces. The forest areas which harbour the NTFP's are brought under this overlapping working circle.

9.4.10 Forest Protection (overlapping) Working Circle

The forests are prone to damage by illicit felling, encroachment, fire, etc. The protection aspects of the forests are dealt under this working circle.

9.4.11 Joint Forest Management (Overlapping) Working Circle

The registered Village Forest Committees and the adjacent forest areas to be treated are dealt under this working circle.

9.4.12 Wild Life Management (Overlapping) Working Circle

The forest areas where the presence of important wild animals and their signage are being recorded and the areas which are potentially suitable for wild life are being incorporated under the overlapping working circle for the better management.

9.5. Blocks and Compartments

9.5.1 This plan does not involve any change in the compartment boundaries over the previous plan. The same is true of beats and blocks. Appendix II provides the estate area statement giving the list of compartments, Range wise, along with their respective areas and allotments.

9.5.2 In the forest area, the compartments and sub-compartments are marked by a single coal tar ring of 10 cm width, in the centre of 30 cm wide dry ring, on the trunks of suitable trees, preferably middle-aged, at breast height, inter-visible from two consecutive points. Similarly double coal tar rings indicate the range boundary and three coal tar rings indicate divisional boundary. These rings, along ridges and spurs follow the slope linearly, whereas, in *nallas*, paths and roads, they have been put alternately on both the sides in a staggered way, being mutually inter visible. Compartment number and usual symbols for boundary features have been carved and painted with coal tar at breast height on suitable tree trunks at the base, middle and top of the compartments, as well as, at important locations, such as, roads, paths, saddle crossings etc. The layout exercise for the current working plan exercise was executed by the Bhadarwah Forest (Territorial) Division. Sufficient number of boards depicting compartment boundary have not been carved at various places. Due care has not been exercised in depicting the symbols for compartment boundary and compartment number with reference to the actual position of board on tree trunks. The Divisional forest Officer shall exercise due care in maintaining the compartment boundaries. The details of which have been given in Compartment Description Form.

9.6. Period of the Plan and Necessity for Intermediate Revision

9.6.1 This plan shall remain in force for a period of 10 years beginning from 1st April 2016 till 31st March 2026. The plans under revision shall be deemed to have been extended from April 1987 to March 2016, the period, between the expiry of the last plans under revision and the beginning of this plan. Intermediate revision is not required.

WORKING PLAN FOR

THE DEODAR-KAIL IRREGULAR WORKING CIRCLE

10.1. General Constitution of the Working Circle

10.1.1 All well-stocked Deodar – Kail forests occupying easier slopes that are fit for working under concentrated regeneration felling system (shelterwood compartment system or system of successive regeneration fellings), have been included in this working circle. These forests are confined to the easier slopes. Out of total area of 16259.52 ha allotted to this working circle 9799.64 ha is commercial forest area and the rest 6459.88 ha is uncommercial and non-wooded area. This working circle is mostly identical in constitution to the corresponding working circle of the plan under revision except few compartments given to Reboisement Working. This working circle mainly confines to Neeru range, Kelar range and Chiralla range.

10.2. General Character of the Vegetation

10.2.1 The forests constituting this working circle consist mainly of Deodar and Kail with some amount of Fir and Spruce, which happen to be interspersed or intimately mixed up with Kail and Deodar, in higher reaches. On the whole, Fir and Spruce constitute 19.67% of the stocking by volume in this working circle.

10.2.2 The general character of the vegetation has already been discussed in detail in Chapter II of Part I of this plan. The forests allotted in this working circle conform to the Champion and Seth's Forest Types of India $12/C_{1c}$, $12/C_{1d}$, $12/C_{1e}$, $12/C_{1f}$, and $12/1S_1$. The distribution of stems over various diameter classes is not quite balanced as can be observed from the perusal of the following table:

Table 10.1. Normal and actual distribution of stems over diameter-classes

Diameter – class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Normal Distribution in percentage	41.00%	25.00%	15.00%	9.00%	5.00%	3.00%	2.00%
Actual Distribution in percentage	16.14%	12.14%	15.87%	17.85%	15.98%	11.13%	10.89%

10.2.3 There is a deficiency of stems in the lower diameter classes and preponderance of middle aged and mature trees. The diameter distribution of stems for the working circle, instead of being inverse 'J' shaped, is almost flat shaped.

10.2.4 For the purposes of management planning, the growing stock can be differentiated into the following three main categories.

10.2.5 Mature and over-mature trees either quite dense or diffused and sporadic with scantly or no regeneration of either poles or saplings.

10.2.6 Even-aged Kail and Deodar (converted) forests with predominance of young pole-sized trees with scantly, scattered or even no mature trees as over wood.

10.2.7 A mixture of mature, over-mature, middle-aged trees with adequate, established or unestablished regeneration.

10.2.8 The broad-leaved species occupy very insignificant area under this working circle. They are confined mostly to shady and moist localities, depressions, and the banks of perennial streams. Found in pure patches or intermixed with conifers.

10.3. Area and Allotment

10.3.1 The detail statement of area of compartments/ sub-compartments allotted to this working circle appears in Appendix IV, V & VI. However, block wise summary of the distribution of area is provided under Table 10.2.

Table 10.2. Summary of block wise distribution of area in the working circle

S. No.	Forest Range	Forest Block	Compartments	Total area (ha)	Commercial Area (ha)
1	Bhalesh	Jatota	12/Jt, 14/Jt	536.08	178.75
2	Chiralla	Chiralla	3a/Ch, 3d/Ch, 4a/Ch, 5b/Ch, 6a/Ch, 6b/Ch, 7/Ch, 8/Ch, 10/Ch, 11/Ch, 12b/Ch, 13b/Ch, 14a/Ch, 15/Ch, 16/Ch, 17/Ch, 18/Ch, 20/Ch, 21/Ch, 22/Ch, 23a/Ch, 23b/Ch, 24a/Ch, 27/Ch, 28/Ch, 29/Ch, 31b/Ch, and 32b/Ch	3340.92	2278.23
3		Jai	12/Jai, 16c/Jai, 17a/Jai and 33/Jai	757.89	424.77
4		Jangalwar	2a/Jwr, 4b/Jwr, 5/Jwr, 7/Jwr and 8a/Jwr	1038.51	610.47
5	Kellar	Guraka	2/K, 3/K, 6/K, 7/K, 8/K, 10/K, 12/K, 13/K, 14/K, 15/K, 16a/K, 17b/K and 21/K	2160.68	1355.39
6		Malothi	24/K, 25a/K, 25b/K, 26/K, 27/K, 28a/K, 43/K, 44a/K, 49a/K, 50a/K, 54/K, 55/K, 58/K, 59/K and 60a/K	1695.52	1141.43
7		Marmat	67/K, 4/M, 5/M, 6a/M, 6c/M, 7a/M and 7b/M	1025.05	492.57
8		Trown	63a/K, 65a/K, and 66a/K	381.56	264.22
9	Neeru	Dandi	52/N, 57/N, 58b/N, 59/N, 64/N, 66a/N, 66b/N, 66c/N, 66d/N and 66e/N	1277.72	731.52
10	Neeru	Duggi	1b/N, 2/N, 3/N, 4b/N, 5a/N, 5b/N, 5c/N, 6b/N, 7/N, 8/N, 13/N, 15/N, 16a/N, 18a/N, 18b/N, 19a/N and 19b/N	2260.49	1272.81
11		Puneja	23b/N, 30b/N, 31b/N, 32/N, 33a/N, 34c/N, 35/N, 36/N, 42b/N, 43a/N, 43b/N, 43c/N, 45a/N, 48/N, 49a/N and 51/N	1785.1	1049.48
Total				**16259.52**	**9799.64**

Abstact:

S.No.	Block	Total Area (ha)	Commercial Area (ha)
1.	Converted	9038.34	5227.42
2.	Conversion	2326.55	1666.25
3.	Un-alloted	4894.13	2905.97
Total		**16259.52**	**9799.64**

10.4. Silvicultural System Adopted

10.4.1 Indian Irregular Shelterwood System with floating periodic block shall be applied for the management of forests placed under this working circle. Even in the previous plans, the treatments and working prescribed *de facto* amounted to irregular working although the term '*Modified Indian Shelterwood System'* was used.

10.4.2 Most critical aspect in the management of any forest under any silvicultural system is the regeneration. The regeneration, whether natural or artificial, can be obtained at will on a large scale in Bhadarwah Forest Division. Neeru, Kellar and few pockets of Chiralla range have excellent status of regeneration. It require only protection from grazing, grass cutting and trampling rest nature will take its course to restock the area. Sometimes due to heavy grazing and grass cutting activity by the locals, the regeneration fails to establish.

10.4.3 Under some instances, where regeneration is achieved with difficulty in PB-I areas, we have to distribute the PB-I over areas where regeneration already exists thereby necessitating the adoption of a floating periodic block system. This system envisages retention of advance growth upto 50 cm in diameter as a part of the future crop. On very steep slopes, the markings shall be of selection nature. In adopting this method, the idea of uniformity is sacrificed and the resultant crop is irregular in nature. The rate of removal is variable, depending upon the extent of regeneration present, and therefore, the type of marking varies from place to place even in the same compartment.

10.5. Regeneration Felling and Thinning

10.5.1 The method of treatment of the crops shall generally be limited to mostly two important factors i.e. successive regeneration fellings and thinnings. In view of the typical crop characteristics and composition, no preparatory/ seeding felling shall be needed as a rule. Generally either secondary or secondary cum final fellings shall be mostly required to treat the

existing crop. Fellings shall be restricted to patches where established regeneration already exists, or where there is sufficient advance growth. Apart from regeneration felling, thinning is the second most important treatment to be given to these forests. Light but frequent thinning at a thinning cycle of 10 years is considered ideal under the prevailing crop conditions. Generally, the regeneration fellings are followed by natural regeneration. However, efforts shall be made to force and induce the regeneration through artificial means, as and when the regeneration fails to come up to the desired extent after the regeneration fellings.

10.5.2 By and large, the problem of regeneration of conifer forests in this tract can be resolved by judicious manipulation of canopy and protection of the young regeneration from grazing. Although silvicultural system adopted therein is suitable for canopy manipulation, yet grazing and grass cutting form the crux of the problem of regeneration. Grazing, and other associated factors are responsible to a large extent for the failure of regeneration. The principle of conversion to uniformity remained more of an objective than reality. Therefore, regeneration felling and thinning shall be carried out taking into consideration the degree of severity to which the area in question is subject to grazing. The failed areas should be effectively closed to the total exclusion of grazing. Strict closure should be followed with sowing in patches of the species most suitable to the locality. The permanent gaps if fail to respond favourably to the sowing, shall be treated by planting saplings raised at site. The failed area shall continue to form a part of the conversion block till these are fully covered with established regeneration.

10.6. Rotation, Conversion and Regeneration Period

10.6.1 In order to achieve the objectives of management, a rotation of 150 years is fixed, which corresponds to 70 cm d.b.h in the case of Deodar and Kail. Considering the difficulties in securing regeneration, a regeneration period of 30 years shall be adopted. In case of Fir and Spruce, the exploitable diameter is fixed to be 80 cm that corresponds to rotation age of 225 years.

10.6.2 The conversion of the forests of Bhadarwah Forest Division started in the year 1902 and over 114 years have elapsed since then. The entire process of conversion came to a halt after 1997 where a ban was imposed on the felling of green trees by the Hon'ble Supreme Court of India. It is observed that, the forests which were worked during the past did regenerate adequately. Keeping in view the biotic interference exerted in the forests now a day, adequate care must be

taken to reduce the biotic interference in the conversion areas to ensure adequate regeneration.

10.6.3 In view of the discussion above, the crop upto 50 cm diameter shall be considered to be included in the regeneration and will form a part of the future crop. This will reduce excessive sacrifice of younger diameter classes and act as a safe guard against large openings. The average age of Deodar and Kail crop, corresponding to 50 cm d.b.h is 90 years

10.6.4 Due to disturbed condition prevailing during 1990's, the forest working was stalled. No planned markings and felling were carried out by the department. Most of the growing stock that was removed from the forests was illegally extracted in the garb of militancy. Therefore, the cycle of conversion is disturbed. Further in view of the Hon'ble Supreme Court ban on green felling, the pace of conversion is virtually halted from last 20 years. Hence it is proposed to treat an area of 2326.55 ha of forest under conversion (commercial area: 1666.25 ha) during the next 30 years.

10.7. Periodic Blocks

10.7.1 In conformity with the requirements of the silvicultural system prescribed, the system of floating period block shall be adopted. The conversion block, which corresponds to the PB-I, shall include areas which are to be taken up for conversion during the currency of the current plan. The converted block, which corresponds to the PB-last, includes areas that have been successfully regenerated. The rest of the areas, not taken up for conversion during this plan have been classed as the unallotted block. The character and type of crop that shall constitute the above three P.B's is as under:

10.7.2 The unallotted block shall include those unconverted areas that have not been allotted for conversion during the currency of this plan.

10.7.3 While secondary or secondary-cum-final fellings shall be done in the conversion block, the converted block shall be treated for the removal of the left over shelterwood along with the spacing out of advance growth. Only improvement felling, together with occasional light grade thinning is prescribed for the unallotted block, if necessary.

10.8. Felling Series

There shall be only one felling series identical to constitution of this working circle.

10.9. Annual Conversion Unit

The annual conversion unit in case of Irregular Shelterwood System is theoretical only.

10.10. Size of the Annual Coupe

10.10.1 Out of the total commercial area of 9799.64 hectares, 1666.25 hectares have been allotted to the conversion block under this plan. Given a regeneration period of 30 years, the size of annual coupe is worked out as under:

$$\text{Annual coupe (ha)} = \frac{\text{Commercial area in conversion block}}{\text{Regeneration period remaining}} = \frac{1666.25}{30} = 55.54 \text{ ha}$$

10.10.2 For rest of the 8133.39 hectares of commercial area in the converted and unallotted blocks, the size of the annual thinning coupe on a ten year thinning cycle shall be 522.74 hectares for converted block and 290.60 hectares for unallotted block, which makes a total of 813.34 hectares.

10.11. Analysis and Valuation of the Crop

10.11.1 The quantitative assessment of growing stock and preparation of its inventory in this working circle has been made on the basis of data collected and analysed from 16 sample plots in conversion block, 56 sample plots in converted block, and 41 sample plots in unallotted block. The methodology adopted has been discussed in Chapter VIII of this plan. Mean values of two variables viz. number of stems, and volume of conifers, (cum) per plot of 1 ha have been computed diameter-class and species wise separately, for the conversion, converted and unallotted blocks. Statistical tests have been applied to the sampling data and the results of statistical analysis are summarized in Table 10.3 overleaf.

Table 10.3. Summary of Statistical tests of Deodar-Kail Irregular Working Circle

Block	Variable (Per ha)	No. of sample plots (n)	Mean X	Variance S2	Standard Deviation S	Standard Error S.E	Coefficient of Variation %	95% Confidence Limits		Confidence Interval (CI)	Lower Limit as % of Mean
								Lower Limit	Upper Limit		
1	2	3	4	5	6	7	8	9	10	11	12
Conversion	No. of Stems	16	217.500	6766.667	82.260	20.565	37.821	177.193	257.807	80.614	81.468
	Volume (Cum.)	16	390.600	37327.470	193.203	48.301	49.463	295.93	485.270	189.340	75.763
Converted	No. of Stems	56	259.643	25123.510	158.504	21.181	61.047	218.128	301.158	83.030	84.011
	Volume (Cum.)	56	369.995	22104.990	148.677	19.868	40.184	331.054	408.936	77.882	89.475
Unallotted	No. of Stems	41	209.512	11174.760	105.711	16.509	50.456	177.154	241.870	64.716	84.556
	Volume (Cum.)	41	427.212	46593.010	215.854	33.711	50.526	361.138	493.286	132.148	84.534
Total WC	No. of Stems	113	232.478	17140.230	130.921	12.316	56.315	208.339	256.617	48.278	89.617
	Volume (Cum.)	113	384.565	27496.850	165.822	15.599	43.119	353.991	415.139	61.148	92.050

Column 7 : S.E = S/ $\sqrt{n}$

Column 8 : COV % = (S/X) x 100

Column 9 : Lower limit = X- (1.96 * SE)

Column 10 : Upper limit = X + (1.96 * SE)

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

10.11.2 The diameter class and species wise distribution of growing stock in the three blocks, assessed in terms of number and volume of conifer trees in the commercial area of the three blocks, on the basis of mean values of 1 hectare are summarized in table 10.4 (a/b), 10.5 (a/b) and 10.6 (a/b) for conversion, converted and unallotted blocks respectively.

10.11.3 The number of stems and volume of conifer trees in the commercial area of the entire working circle and per hectare is tabulated in table 10.7 (a - d).

10.11.4. On comparison to the previous working plan, the estimate of volume of growing stock/ha is found to be higher. It is due to the change in methodology from point sampling to 0.1 ha sample plots.

10.12. Calculation of the Yield

10.12.1 The yield shall be calculated on the basis of available trees or volume above 50 cm d.b.h. Growing stock up to 50 cm d.b.h. has been treated as advance growth and nothing below 50 cm d.b.h. shall be removed. The following assumptions have been made before calculating the available yield from this working circle.

10.12.2 Only commercial area and its coniferous growing stock have been taken into account for the purpose of calculation of yield.

10.12.3 The number of trees in all diameter classes has been reduced to the lower confidence limit of the mean value before being taken into account for yield calculation. The volume calculations have been made at lower confidence limit of number of trees above 30 cm d.b.h.

10.12.4 Trees in diameter classes 20-30, 30-40, and 40-50 form the advance growth. Since such groups are to be retained as an advance growth (future crop), practically no yield is available from 0-50 cm d.b.h. except, of course from occasional thinning, if carried out in congested patches.

10.12.5 Increment has not been taken into account for the purpose of yield calculation.

The following availability co-efficient percentage based on the past experience and marking data have been worked out and used in the yield calculation.

Diameter-class	Percentage availability of trees under		
	Deodar	Kail	Fir/ Spruce
50-60	30	40	--
60-70	50	60	30
70-80	90	90	60
80<	--	--	90

Table 10.4a. Summary of Number of Conifer Stems in the Commercial area of the Conversion Block of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	0	0	0	0	0	0	0	0	0	0
Deodar	35408	42698	49988	48946	42698	23952	23952	13538	3124	1041	285345
Kail	11455	9373	8331	7290	7290	6248	5207	0	1041	0	56235
Fir/ Spruce	3124	1041	3124	2083	3124	2083	2083	3124	1041	0	20827
Total	49987	53112	61443	58319	53112	32283	31242	16662	5206	1041	362407

Table 10.4b. Summary of Conifer Volume (Cum.) in the Commercial area of the Conversion Block of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deodar	4603.02	5550.78	37990.50	65098.39	89665.08	75210.36	105150.90	76626.67	21400.98	7873.031	489169.70
Kail	1489.30	1218.53	6331.75	9914.188	16548.03	20869.78	23015.08	0.00	6394.234	0.00	85780.88
Fir/ Spruce	406.23	135.47	2624.34	3249.188	9279.013	10205.78	14267.27	25931.02	9789.219	0.00	75887.52
Total	6498.54	6904.77	46946.59	78261.76	115492.1	106285.90	142433.20	102557.70	37584.43	7873.031	650838.10

Table 10.5a. Summary of Number of Conifer Stems in the Commercial area of the Converted Block of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	1867	3734	4668	3734	3734	934	0	0	0	18671
Deodar	163357	107349	164290	188560	161490	101748	60675	13069	3734	4668	968940
Kail	139086	36405	37339	55075	45740	28004	9335	1867	1867	0	354718
Fir/ Spruce	0	0	2800	4668	4668	934	934	0	0	934	14938
Total	302443	145621	208163	252971	215632	134420	71878	14936	5601	5602	1357267

Table 10.5b. Summary of Conifer Volume (Cum.) in the Commercial area of the Converted Block of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	242.55	1792.48	5273.94	8252.01	13218.05	4545.76	0.00	0.00	0.00	33324.79
Deodar	21236.39	13955.12	124860.59	250785.47	339128.87	319488.93	266365.28	73967.99	25577.24	35285.09	1470650.97
Kail	18081.12	4732.91	28377.57	74901.61	103829.63	93533.70	41259.50	9988.03	11463.21	0.00	386167.28
Fir/ Spruce	0.00	0.00	2352.34	7281.27	13862.07	4573.99	6394.18	0.00	0.00	9511.81	43975.66
Total	39317.51	18930.58	157382.98	338242.29	465072.58	430814.67	318564.72	83956.02	37040.45	44796.90	1934118.70

Table 10.6a. Summary of Number of Conifer Stems in the Commercial area of the Unallotted Block of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	2126	1418	2126	1418	2126	1418	0	0	0	10632
Deodar	29768	48905	60954	68751	60246	63081	46070	19846	5670	709	404000
Kail	6379	17011	26225	29768	26225	17011	12758	2835	709	0	138921
Fir/ Spruce	2835	14175	9923	4253	13467	2835	2126	4961	709	0	55284
Total	38982	82217	98520	104898	101356	85053	62372	27642	7088	709	608837

Table10.6b. Summary of Conifer Volume (Cum.) in the Commercial area of the Unallotted Block of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	276.36	680.29	2402.66	3132.64	7527.04	6903.42	0.00	0.00	0.00	20922.41
Deodar	3869.88	6357.68	46325.52	91438.96	126516.10	198073.80	202248.50	112326.5	38840.9	5358.32	831356.16
Kail	829.36	2211.44	19930.60	40485.10	59529.96	56815.20	56390.06	15167.71	4351.98	0.00	255711.41
Fir/ Spruce	368.48	1842.68	8335.19	6634.04	39996.03	13891.99	14565.30	41179.63	6662.52	0.00	133475.86
Total	5067.72	10688.16	75271.60	140960.8	229174.70	276308.10	280107.30	168673.8	49855.40	5358.32	1241465.80

Table 10.7a Summary of Conifer Stems in the Commercial area of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	4336	5204	6938	5204	6071	2602	0	0	0	30355
Deodar	215072	191656	266238	297458	258433	189922	131818	46831	12141	6071	1615640
Kail	146561	62440	73714	92793	80652	52033	28619	5204	3469	0	545485
Fir/ Spruce	6071	18212	16477	9540	19946	5204	4336	4336	1735	867	86724
Total	367704	276644	361633	406729	364235	253230	167375	56371	17345	6938	2278204

Table 10.7b Summary of Conifer Volume in the Commercial area of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	563.48	2497.93	7839.71	11499.88	21489.63	12669.95	0.00	0.00	0.00	56560.58
Deodar	27959.35	24915.58	202341.01	395619.31	542708.96	596356.11	578681.48	265058.70	83166.60	45893.67	2762700.77
Kail	19052.46	8117.04	56022.58	126198.78	183079.81	173791.72	126493.75	27837.84	21299.52	0.00	741893.50
Fir/ Spruce	788.87	2367.59	13841.01	14881.73	59239.80	25496.70	29702.71	35990.16	16303.66	8837.32	207449.55
Total	47800.68	35963.69	274702.53	544539.53	796528.45	817134.16	747547.89	328886.70	120769.78	54730.99	3768604.40

Table 10.7c Summary of Conifer Stems per hectare in the Commercial area of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.0000	0.4425	0.5310	0.7080	0.5310	0.6195	0.2655	0.0000	0.0000	0.0000	3.0975
Deodar	21.9469	19.5575	27.1681	30.3540	26.3717	19.3805	13.4513	4.7788	1.2389	0.6195	164.8672
Kail	14.9558	6.3717	7.5221	9.4690	8.2301	5.3097	2.9204	0.5310	0.3540	0.0000	55.6638
Fir/ Spruce	0.6195	1.8584	1.6814	0.9735	2.0354	0.5310	0.4425	0.4425	0.1770	0.0885	8.8497
Total	37.5222	28.2301	36.9026	41.5045	37.1682	25.8407	17.0797	5.7523	1.7699	0.7080	232.4782

Table 10.7d Summary of Conifer Volume per hectare in the Commercial area of the Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.000	0.058	0.255	0.800	1.174	2.193	1.293	0.000	0.000	0.000	5.772
Deodar	2.853	2.543	20.648	40.371	55.381	60.855	59.051	27.048	8.487	4.683	281.919
Kail	1.944	0.828	5.717	12.878	18.682	17.735	12.908	2.841	2.174	0.000	75.706
Fir/ Spruce	0.081	0.242	1.412	1.519	6.045	2.602	3.031	3.673	1.664	0.902	21.169
Total	4.878	3.670	28.032	55.567	81.281	83.384	76.283	33.561	12.324	5.585	384.566

10.12.6 With reference to the assumptions listed previously, the number and volume of trees, distributed species wise among broader diameter classes over the entire commercial area of conversion, converted and unallotted blocks as computed at lower confidence limit of mean value are tabulated under Table 10.8, 10.9 and 10.10 respectively. The distribution of growing stock in terms of number of stems and volume by broader diameter classes over the entire commercial area of the Deodar – Kail working circle is tabulated under 10.11 and 10.12.

Table 10.8. Summary of Statistics, calculated at Lower Confidence Limit of Mean Volume of Conifer in the Conversion Block

Species	Dia-classwise Volume of Conifers (Cum.)						Total
	DK	Upto 50	50-60	60-70	>70		
	FS	Upto 50	50-60	60-70	70-80	>80	
Chir		0	0	0	0		0
Deodar		85795	67933	56982	159899		370609
Kail		14359	12537	15812	22281		64989
Fir/ Spruce		4861	7030	7732	10809	27063	57495
Total		105015	87500	80526	192989	27063	493093

Table 10.9. Summary of Statistics, calculated at Lower Confidence Limit of Mean Volume of Conifer in the Converted Block

Species	Dia-classwise Volume of Conifers (Cum.)						Total
	DK	Upto 50	50-60	60-70	>70		
	FS	Upto 50	50-60	60-70	70-80	>80	
Chir		6539.70	7383.49	11826.85	4067.32		29817.36
Deodar		367596.91	303435.6	285862.70	358969.76		1315864.95
Kail		112821.90	92901.56	83689.28	56110.44		345523.18
Fir/ Spruce		8619.68	12403.09	4092.58	5721.19	8510.69	39347.23
Total		495578.19	416123.70	385471.40	424868.71	8510.69	1730552.72

Table 10.10. Summary of Statistics, calculated at Lower Confidence Limit of Mean Volume of Conifer in the Unallotted Block

Species	Dia-classwise Volume of Conifers (Cum.)						Total
	DK	Upto 50	50-60	60-70	>70		
	FS	Upto 50	50-60	60-70	70-80	>80	
Chir		2839.76	2648.15	6362.91	5835.74		17686.56
Deodar		125103.60	106949.08	167439.72	303286.20		702778.62
Kail		53642.31	50323.06	48028.16	64169.54		216163.07
Fir/ Spruce		14523.27	33810.24	11743.45	12312.63	40442.88	112832.47
Total		196108.90	193730.53	233574.24	385604.11	40442.88	1049460.70

Table 10.11. Summary of Statistics, calculated at Lower Confidence Limit of Mean Number of Stems of Conifer in the Working Circle

Species	Dia-classwise Volume of Conifers (Cum.)						Total
	DK	Upto 50	50-60	60-70	>70		
	FS	Upto 50	50-60	60-70	70-80	>80	
Chir		14768	4664	5441	2332		27205
Deodar		869665	231600	170202	176421		1447888
Kail		336519	72278	46630	33420		488847
Fir/ Spruce		45077	17875	4664	3886	6218	77720
Total		1266029	326417	226937	216059	6218	2041660

Table 10.12. Summary of Statistics, calculated at Lower Confidence Limit of Mean Volume of Conifer in the entire Working Circle

Species	Dia-classwise Volume of Conifers (Cum.)						Total
	DK	Upto 50	50-60	60-70	>70		
	FS	Upto 50	50-60	60-70	70-80	>80	
Chir		10034.50	10585.64	19781.20	11662.69		52064.00
Deodar		599094.00	499563.60	548945.80	895462.80		2543066.15
Kail		192744.00	168525.00	159975.30	161668.40		682912.98
Fir/ Spruce		29344.80	54530.24	23469.71	27341.34	56271.21	190957.30
Total		831217.00	733204.50	752172.00	1096135.00	56271.21	3469000.43

10.13. Yield Regulation

For computation of the total yield from Deodar-Kail working circle, three methods were tried out of which the one that gave minimum yield has been prescribed. These methods are as under:

Von Mental's Formula

Simmons Modification of Von Mental's formula

Availability coefficient percentage, based on past experience as provided under section 10.12 of this chapter.

The annual yield (m^3) computed using method 1 and 2 above is tabulated as under:

Formula		Deodar R = 150 yrs. X = 60 yrs	Kail R = 150 yrs. X = 58 yrs	Fir R= 225 yrs. X = 84 yrs.	Total
Von Mental's Formula					
AY=	2(GS) / R	33907.55	9105.51	1697.40	44710.46
Simmon's Formula					
AY=	2R(V) / (R2-X2)	40366.13	10706.20	1972.29	53044.62

Where:

AY = Annual Yield.

GS = Total volume of growing stock (at lower confidence limit).

V = Total volume of growing stock enumerated up to 30 cm diameter, at lower confidence limit.

R = Rotation.

X = age of Deodar, Kail and Fir respectively corresponding to 30 cm diameter.

Yeild calculated on the basis of availability coefficient.

$$\textit{Yield from the entire working Circle} = \frac{\textit{Total available Growing Stock above 50 cm in the entire working circle}}{\textit{Conversion period 30 years}}$$

The procedure for calculation of yield involves the following two steps:

The volume figures tabulated diameter class and species wise in Table 10.12 are multiplied with the corresponding availability coefficient listed under section 10.12 to get the total yield over remaining conversion period.

The total yield for each species obtained in step 1 above is divided by the conversion period remaining i.e. 30 to get the Annual yield.

The results of the steps listed above are tabulated as under:

Diameter class (cm)	Deodar (Cum)	Kail (Cum)	Fir (Cum)	Total (Cum)
50-60	149869.10	67409.99		217279.09
60-70	274472.90	95985.17	7040.91	377498.98
70-80 (and above for D-K)	805916.50	145501.6	16404.80	967822.90
Above 80 (for Fir)			50644.09	50644.09
Total Yield	**1230259**	**308896.8**	**74089.81**	**1613245.00**
Annual Yield	**41008.617**	**10296.55**	**2469.66**	**53774.83**

Rounding down to nearest multiple of 100, the total yield is estimated to be:

Deodar = 41,000 Cum
Kail = 10,200 Cum
Fir = 2,400 Cum
Total = 53,600 Cum

The yield calculated by Von Mental's formula was estimated to be lowest as given below.
Deodar = 33,900 m^3
Kail = 9,100 m^3
Fir = 1,600 m^3
Total = 44,600 m^3

The yield so estimated is reduced by 30% and further rounded down to the nearest multiple of 100, as recommended by the Working Plan Committee. As these forests are being put to commercial working after a lapse of more than 30 years, it need to be restarted in a conservative manner. Hence the recommended yield is as below:-
Deodar = 23,700 m^3
Kail = 6,300 m^3
Fir = 1,100 m^3
Total = 31,100 m^3

Given a commercial area of 9799.64 hectare, the yield per hectare per annum is 3.17m^3.

10.14. Yield from Conversion Block

In the case of conversion block, the yield is estimated by the method of availability coefficients.

$$\text{Yield from conversion block} = \frac{\text{Total available growing stock in conversion block}}{\text{Regeneration period}}$$

The procedure for calculation of yield involves the following two steps.

The volume figures tabulated diameter-class and species wise in Table 10.7 are multiplied with the corresponding availability coefficient listed under section 10.12 to obtain the total yield that can be extracted from conversion block.

The total yield for each species obtained in the step above, is divided by the regeneration period of 30 years to get the annual yield.

The results of the steps listed above are tabulated as under:

Diameter class (cm)	Deodar (Cum)	Kail (Cum)	Fir (Cum)	Total (Cum)
50-60	20379	5014		25393
60-70	28491	9487	2319	40297
70-80 (and above for D-K)	143909	20052	6485	170446
Above 80 (for Fir)			24356	24356
Total Yield	192779	34553	33160	**260492**
Annual Yield	6426	1151	1105	**8683**

The calculated yield is rounded down to nearest hundred and prescribed to be the annual yield of the conversion block as under:

Deodar = 6,400 m^3
Kail = 1,100 m^3
Fir = 1,600 m^3
Total = 8,600 m^3

10.15. Yield from Unallotted and Converted Block

The yield from unallotted block, together with the yield from converted block, has been calculated as the difference between the yields calculated for the entire working circle and the conversion block, and is tabulated as under:

Species	Total yield from the Working circle	Yield from Conversion block	Yield from Unallotted and Converted block
Deodar	23,700 m^3	6,400 m^3	17,300 m^3
Kail	6,300m^3	1,100 m^3	5,200 m^3
Fir/ Spruce	1,100 m^3	1,100 m^3	0 m^3
Total	31,100 m^3	8,600 m^3	22,500 m^3

Thus a total of 22,500 m^3 of conifer wood is prescribed to be removed from the unallotted and converted block per annum. The total commercial area in these two blocks being 8,133.39 ha, the intensity of cut works out to 2.77 m^3 per ha.

The yield from unallotted and converted blocks will comprise mainly of thinning and removal of left over wood in the converted block, and improvement-cum-selection fellings in unallotted block.

10.16. Realization of Yield

Yield shall be regulated by volume and all fit standing green and dry trees of over 30 cm d.b.h. marked for whatever purpose including concession marking, illicit damage etc. shall be included in the total yield. The volume yield shall be subject to area check. The yield from conversion block and converted plus unallotted blocks shall be regulated and controlled separately, mutual adjustment not being admissible. The annual yield prescribed shall be strictly adhered to and deviation, if any should not exceed plus minus 20 percent.

Deviations beyond permissible limit shall need prior approval in writing from the Chief Conservator of Forests. Cumulative deviations for the entire plan period of 10 years in any case should not be allowed to exceed the prescribed yield.

10.17. Sequence of Felling

In view of the prevailing ban on green fellings, the discretion of selecting annual coupes is left to the territorial D.F.O. who shall exercise his judgement, keeping in view the progress of regeneration.

10.18. Method of Executing Felling

Initially, the felling shall be restricted only to the areas where regeneration/ advance growth is already present. Subsequently, these foci shall be expanded in successive fellings depending upon the progress of regeneration. The aim shall be to secure regeneration, whether natural or artificial, below the shelter of over-wood before any further progress is made in respect of extraction of timber. Status of regeneration shall be the overriding constraint that will dictate the pace of fellings.

10.19. Marking and Felling Rules

The following rules for markings are laid down for the guidance of the Marking Officer

General

The marking officer, prior to conducting the marking, first of all, must acquaint himself thoroughly with the condition, composition of the crop in the compartment and its boundaries by traversing over the area of the compartment.

Marking should be 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 that case, the DFO/ACF should check at least 25 percent of these markings.

No marking, except the removal of dead and diseased trees not likely to survive, shall be done in areas near and around cultivation and *behaks* within a distance of 150 metres from their periphery.

No marking, except the removal of actually dead, diseased trees shall be done along nalla banks within a distance of at least 100 metres on either side.

On very steep and broken grounds, marking shall conform to selection principles.

The over-mature trees shall get preference over the relatively younger and healthier ones.

In the mixed crop, ecologically most suitable species to the locality should be favoured.

Within the same compartment, different types of regeneration fellings viz. Secondary, final etc. may be needed as per the condition and occurrence of regeneration. Over-wood of any size should not be retained over abundant advance growth.

All malformed, dead, diseased, drying and dried up trees should be marked in the first instance. *Armi* attacked Kail trees must necessarily be marked, even if these are likely to create gaps of permanent nature, which might require artificial stocking later on.

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, besides its topography, slope, aspect and geological formations.

No green Fir or Spruce trees shall be marked.

Extreme caution has to be exercised at the time of felling so as not to damage the regeneration below.

Conversion Block

Where adequate and established regeneration is present, final felling be carried out. Most of the overwood should be removed after keeping a few insurance trees ranging from 15 to 5 in number per hectare depending upon species and the aspect. Cooler the aspect, lesser the number of insurance trees.

Where regeneration is adequate but unestablished, only secondary type fellings be done to allow more light to enter, in order to help the establishment of young regeneration.

Where the regeneration is neither adequate nor established, no felling other than seeding felling be done retaining adequate number of standard seed bearers, spaced in accordance with the silvicultural requirement of the species concerned. The distance between the seed bearers ranges from 12-15 metres in case of Deodar, 15 to 20 metres in case of Kail and 10-15 metres in case of Fir.

Healthy, well grown, middle aged to mature trees, with well formed and developed crown and long clean boles (genetically superior trees) should be selected as standard seed bearers. These should be identified by giving a dry blaze at breast height. No seed bearer will be left in patches of well established dense advance growth. The seed bearer shall be marked for felling as soon the area get adequately and successfully regenerated.

Trees marked for felling should be lopped before the execution of the felling.

Malformed and wolf trees should be removed from groups of young trees to be retained as future crop.

Ordinary thinning of C grade in patches of advance growth and cleaning in young regeneration after removal of seed bearers will be done.

Trees occupying blanks without any regeneration shall not be removed until the area is regenerated adequately and successfully through artificial means.

Note: Regeneration should be considered established after it attains a height of 3 metres.

Converted Block

All the remaining over-wood, except in the pockets yet un-regenerated, should be removed along with the simultaneous, ordinary thinning of C grade.

Thinning should be conducted at a thinning cycle of 10 years in the advance growth which has completely been freed from the over-wood.

Only a few tall and healthy trees with well developed crown, and clean bole, may be retained as insurance and emergency reserve.

All the un-regenerated area is to be regenerated artificially and the over-wood removed there from in after regeneration has been secured.

Unallotted Block

Light grade crown thinning are prescribed for those patches of advance growth/ regeneration where over-wood is stagnating the regeneration.

In rest of the areas, improvement felling including removal of dead, diseased and malformed trees with frequent ordinary thinning of C-grade is prescribed.

10.20. Supplementary Marking

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 subsequent to the major markings shall be done. Due caution needs to be taken to avoid large scale supplementary marking which proves dangerous to the ultimate requirement of the crop and site. Preferably these markings should be conducted by the DFO himself. Past experience has shown that in certain cases the quantity of supplementary markings did exceed the original one. Judicious discretion of the marking officer is, therefore, needed so that the provision of supplementary marking is not misused, and only such trees, as are considered definitely unfit for retention, are marked.

10.21. Disposal of Debris

Felling refuse not only builds the potential reserve of combustible material but is equally bad for the hygiene of the crop. The felling refuse in Deodar- Kail forests is generally taken by the villagers for their domestic use as fuel wood etc. However, in remote areas, far away from human settlements, the felling refuse left in the forests should be collected at safer places and burnt during the safe season. This will not only clear the forest floor of felling debris but reduce the chances of fires in the forests.

10.22. Tending

Tending, including cleaning and thinning of young established regeneration, is primarily needed in case of artificially regenerated crops as well as in congested patches extending naturally over a sizeable area. Tending operations under the standard prescriptions will also be needed in the plantations envisaged under this plan, to be taken up artificially to regenerate the failed areas. There are many compartments in Neeru range and Kellar range having profuse regeneration of Deodar and Kail. Such regeneration has created congested patches. Thinning in such tracts is essential. The DFO shall exercise his full diligence while executing thinning in such areas.

10.23. Regeneration Programme

The success of any silvicultural system adopted for treating the crop depends largely upon the efforts put in to regenerate the forests in due course of time. It is not much of a problem to regeneration Deodar and Kail forests naturally except in the areas near and around human settlements under heavy pressure of grazing. Neeru range and Kellar range are bestowed with rich edaphic factor that provide a fertile medium for profuse natural regeneration of Deodar and Kail. These tracts need only protection from overgrazing and damages rest the area has a wonderful regeneration potential. Measures to induce regeneration need to be applied over such areas which are under severe biotic interference around human habitations. In the prevailing socio-economic set up, it is neither possible nor practical to close large areas for grazing. It is therefore suggested that the area for regeneration, at least equal to the size of the annual coupe, evenly distributed over the working circle should be effectively closed to grazing annually. In case regeneration is present partially, only that much area containing no regeneration, may be in several patches, should be closed and subsidiary measures such as uprooting and cutting of shrubs, raking of top soil be taken up. In the case of the area being too refractory to respond to natural seeding, artificial regeneration by way of sowing and planting of nursery raised seedlings be resorted to. For any regeneration activity, effective closure of the area in question to biotic interference is a must.

The restocking of areas can be broadly divided into two categories. One areas that are to be stocked after they have been worked and the other include area that have been degraded

and need external intervention for restocking. The restocking of the areas that are worked as per the prescriptions of the plan as a general rule are to be undertaken by naturally aided regeneration. But in areas that have good site quality and have been rendered degraded and under stocked either due to biotic factors like grazing and illegal felling or by abiotic factors like wind throw damage, snow demage or land slide, have to be restocked artificially. The plantation area should be 60% of the above given categories of restocking areas to be carried out in next 20 years.

10.24. Nursery and Plantation Techniques

10.24.1 *Cedrus deodara*

Found between 2000 to 2600 metres. Young plants suffer severely from browsing and insects especially cockchafer grubs and cutworms. It is somewhat susceptible to fungal attack.

10.24.1.1Seed:

Cones ripen in October – November, should be collected by hand and dried. Seeds are threshed out and can be stored until sowing. Since the seeds are oily they do not retain viability for more than a few months. An average sample of one kilogram contains 7,000 to 8,000 seeds. Germination percent is very high, around 90 percent. Germination starts in spring but may take four to five months to complete.

10.24.1.2 Nursery Technique

Direct sowing is successful in good situations. Sowing be done in November before snowfall, and if necessary re-sowing be done in April. Sowing may be done by broadcast also, in contour lines, elongated patches across the contour or dibbled in lines 3 m apart. Individual seed may be sown in drills 10-15 cm apart, and covered with thorns. Germination begins after 2-3 months.

10.24.1.3 Raising of Seedlings in Polybags

The polybags of 6”X9” is being used for raising of conifer seedlings. The potting mixture is prepared by mixing sieved soil, river sand, decomposed farmyard manure and forest soil in the ratio of 7:1:1:1. The farmyard manure is added to improve the fertility of soil. The forest soil is added to improve the microflora of the rooting medium. The pH of the rooting medium must be tested with litmus paper; if found acidic, lime can be added @ 15g per kg of

rooting medium. The Calcium ions improve the soil structure also. The potting mixture is filled in the polybags and seeds are sown. In the open areas, it is always recommended to create overhead thatching to allow diffused sunlight as the tender plants can not withstand the scorching sunlight in the first year.

10.24.1.4 Location of Conifer Nursery

As the transportation of polybag seedlings in the field is difficult, it is advisable to create a small temporary nursery near the proposed closures and a permanent water source. The seedlings raised in the temporary nurseries can be planted out in the field very easily and the higher rate of survival can be expected.

10.24.1.5 Pests in nurseries

Sometimes, the insect larvae are found to attack the tender conifer seedlings. The insect larvae are found to feed the tender leaves and shoots in the early morning hours and in the late evenings. The careful observation of the plants can reveal the pest damage. For ward off all the kind of insect larvae, it is recommended to spray 25 ml of malathion dissolved in 25 litres of water and sprayed in one kanal area of nursery.

10.24.1.6 Planting Technique

Seedlings be pricked out in July when 10-15 cm long, or in next July when 15 to 20 cm tall and planted out in the third year when 30 to 45 cm long. Less vigorous seedlings may be pricked out and kept in the nursery for one more year. Long (20cm) seedlings may be planted out directly from the nursery beds without pricking out. Seedlings with or without earth around the roots are put out in holes on a cloudy day. Usual spacing of 2 x 2 metres or in contour lines 3 x 3 metres be used. Thorough weeding and cleaning is required for 2-3 years, early and frequent thinning also needed.

10.24.2 Pinus wallichiana

It is found in temperate Himalayas at 2000 to 3000 metres height, but sometimes between 1000 to 4000 metres also. It is a strong light demander but grows well on cool aspects. On hot aspects and shallow soils, shading is necessary.

10.24.2.1Seed:

Cones ripen during September to November. They should be collected from the trees, dried in the sun or kiln and seeds be extracted by shaking or beating the cones. Seeds can be

stored after air drying for 12 to 18 months. A kilogram contains about 16,000 seeds. Germination capacity of the fresh seeds is upon 90 percent, which completes in one to four months.

10.24.2.2 Nursery Technique:

Seed may be sown or broadcast in prepared contour lines or patches from November to June. Spacing of patches should be 2 x 2 metres. Germination occurs in rains and the seedlings be pricked out in the following rains.

10.24.2.3 Raising of Seedlings in Polybags

The polybags of 6”X9” is being used for raising of conifer seedlings. The potting mixture is prepared by mixing sieved soil, river sand, decomposed farmyard manure and forest soil in the ratio of 7:1:1:1. The farmyard manure is added to improve the fertility of soil. The forest soil is added to improve the microflora of the rooting medium. The pH of the rooting medium must be tested with litmus paper; if found acidic, lime can be added @ 15g per kg of rooting medium. The Calcium ions improve the soil structure also. The potting mixture is filled in the polybags and seeds are sown. In the open areas, it is always recommended to create overhead thatching to allow diffused sunlight as the tender plants cannot withstand the scorching sunlight in the first year.

10.24.2.4 Location of Conifer Nursery

As the transportation of polybag seedlings in the field is difficult, it is advisable to create a small temporary nursery near the proposed closures and a permanent water source. The seedlings raised in the temporary nurseries can be planted out in the field very easily and the higher rate of survival can be expected.

10.24.2.5 Pests in nurseries

Sometimes, the insect larvae are found to attack the tender conifer seedlings. The insect larvae are found to feed the tender leaves and shoots in the early morning hours and in the late evenings. The careful observation of the plants can reveal the pest damage. For ward off all the kind of insect larvae, it is recommended to spray 25 ml of malathion dissolved in 25 litres of water and sprayed in one kanal area of nursery.

10.24.2.6 Planting Technique

Two or three year old seedlings are lifted with balls of earth and are transplanted during rains. They should be 20 to 35 cm in height. Usual spacing, of 1.5 x 1.5 metres or 2 x 2 metres be kept. Weeding and cleaning is required for 2-3 years. Early, frequent and light thinnings are necessary to prevent snow damage.

10.24.3 Quercus leucotrichophora.

Found between 1200 to 2400 metres.

10.24.3.1 Seed

They are normally attacked by insects but seed years are frequent. Seeds are large (on an average 550 per kg). They are collected in December- February and can be stored for a year in cool and dry place. Germination capacity is high, up to 95 percent but takes a month to complete germination.

10.24.3.2 Pre sown treatment of seeds

The hard impermeable seed coat must be made soft to accelerate germination. Also, the stratification treatment is required for uniform germination of seeds. The treatment is imparted to seeds in the month of January. For imparting the treatment to the seeds, a polythene sheet of size about 4' X 5' is laid down in the open area and all the sides are raised to 6" height to make it as a trough. The seeds are spread as a layer of about 1" height uniformly over the sheet and water column of about 3" is maintained over the seeds. The water will be bit warm during the day time due to exposure to direct sun light but it will be very cold during the night hours. The seeds must be kept in the same arrangement for about 20 days. If water evaporates, water must be added to maintain the level. The alternate cold and warm treatment will soften the seed coat and the seeds will imbibe water and start sprouting in 15-20 days. The imbibed, sprouted seed shall be sown in the raised beds for further germination.

10.24.3.3 Raised beds for germination of seeds

The raised beds are created and the partly sprouted seeds are sown with the care that the sprouted end is not damaged. The uniform germination of seeds is observed in next 20 days. Within three months the seedlings will attain a height of about 4" height. Then the seeds can

be carefully pricked out and transplanted in the polythene bags for further growth. The seedlings can be planted out in the forest on the third year.

10.24.3.4 Nursery Technique

Dibbling be done in winter at a spacing of 1.5 x 1.5 metres or 2 x 2 metres. Sowing drills 1-2 cm below the soil and 20-30 cm apart, can also be done during February- March. Pricking out of seedlings is not necessary but may be done in the second rains. Roots should be slightly trimmed. Seedlings be kept in the nursery for 3-4 years.

10.24.3.5 Planting Technique

Seedlings 30-40 cm tall be transplanted when 2-4 years old, in prepared pits at a spacing of 1.5 x 1.5 metres or 2 x 2 metres. Winter planting is not very successful. Weeding and cleaning is required for several years, however, thinning is not needed for a long time. It should also be protected against browsing. It is a slow growing species.

10.25. Control of Grazing

Grazing in Kail and Deodar forests is a major problem as it is in Fir and Spruce forests. However, unrestricted, uncontrolled and unregulated grazing does affect some of the pockets of these forests and has proved to be the major reason for failure of regeneration in these areas. The areas subjected to heavy pressure of grazing, are prescribed to be effectively closed to the exclusion of grazing on rotational basis and taken up for artificial regeneration by patch sowing and planting.

WORKING PLAN FOR

THE MIXED CONIFER SELECTION WORKING CIRCLE

11.1 General Constitution of the Working Circle

11.1.1 This working circle comprises of relatively well stocked commercial forests of Deodar, Kail and Fir with sprinklings of Spruce here and there in the higher reaches, occupying comparatively steep slopes and rugged ground. These forests are considered unfit to be managed under the system of concentrated regeneration felling because of the steepness of the terrain. Out of the total area of **14602.22** ha, 7664.07 ha is commercial and the remaining **6938.15** ha is uncommercial and non-wooded area. 1816.47 ha of the commercial area of this working circle falls in Neeru Range, 1504.27 ha in Kellar Range and the remaining 1113.29 ha and 3230.04 ha falls in Chiralla Range and Bhalesh Range respectively. In this plan, the constitution of this working circle is the same as in the previous plans with minor modifications.

11.2 General Character of the Vegetation

11.2.1 The forests constituting this working circle consist mostly of Deodar, Kail and Fir, with sprinklings of Spruce. A few stray trees of *Taxus baccata* (yew) are encountered here and there in this zone. The crop is largely middle-aged to mature with a fair proportion of mature and over mature stock. The distribution of stems over various diameter classes is actually quite different from the distribution ideally aimed at in a selection forest, as can be observed from Table 11.1 below:

Table 11.1 Normal and Actual Distribution of Stems over Diameter Classes

Diameter – class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	70 <
Normal Distribution in percentage	41%	25%	15%	9%	5%	3%	2%
Actual Distribution in percentage	14.7%	13.1%	13.2%	16.5%	17.9%	11.7%	12.9%

11.2.2 The table above shows that there is a preponderance of trees in the higher diameter classes whereas the number of stems in lower diameter classes is deficient, primarily because of the closed canopy.

11.2.3 The broad leaved miscellaneous species are occurring either mixed with conifer species or pure in patches, linear strips along the streams, moist depressions and sheltered slopes. Broad-leaved species are mostly confined to the lower most areas of the hill slopes and banks of the streams. Among the broad leaved species *Alnus nepalensis, Juglans regia, Aesculus indica, Quercus ilex, Quercus leucotrichophora* and *Quercus dilatata* are quite frequent.

11.2.4 A detail description of these forests has already been given in Chapter II of Part I of this plan. The forests allotted to this working circle conform to Champion and Seth's forest types $12/C_{1c}$, $12/C_{1d}$, $12/C_{1f}$, $12/DS_2$, $12/DS_3$, $12/1S_1$ and $11/2S_1$.

11.3 Area and Allotment

11.3.1 This working circle constitutes 16.66**%** percent of the total area of the division. Detailed statement of compartments and sub-compartments allotted to this working circle is provided under Appendix VII. The Range wise distribution of the area under commercial, uncommercial and non-wooded categories, as drawn from the said Appendix, is summarized in Table 11.2.

Table 11.2. Summary of Rangewise area under Mixed Conifer Selection Working Circle

S.No.	Range	Block	Compartments	Total Area (ha)	Commercial Area (ha)
1	B halesh	Jatota	1/Jt, 2/Jt, 3/Jt, 4/Jt, 5/Jt, 6/Jt, 7/Jt, 8/Jt, 9b/Jt, 11b/Jt & 13/Jt	3140.29	1879.08
2		Chilli	19/Bh,43/Bh,44/Bh,45/Bh & 46/Bh	1799.88	599.40
3		Kilhotran	85a/Bh, 85b/Bh and 94/Bh	457.31	176.75
4		Neeli	49/Bh, 50/Bh, 52/Bh, 53/Bh, 55/Bh, 56b/Bh, 60/Bh, 69/Bh, 76/Bh and 80/Bh	1624.67	574.81
5	Chiralla	Chiralla	5a/Ch	85.99	61.92
6		Jai	6/Jai, 7a/Jai, 8/Jai, 10/Jai, 11/Jai, 13b/Jai, 14a/Jai, 16a/Jai, 18/Jai, 21a/Jai, 21c/Jai, 22a/Jai and 34/Jai	1986.40	1051.37
7	Kellar	Malothi	28b/K, 29a/K, 34/K, 35/K, 36/K, 40/K, 42a/K, 44b/K, 47/K, 48/K and 57/K	2041.69	1355.42

8		Marmat	68/K and 8/M	265.40	148.85
9	Neeru	Dandi	53a/N, 60/N, 61/N and 63/N	762.37	524.49
10		Duggi	6a/N, 14/N, 16b/N and 17/N	470.30	294.08
11		Puneja	23a/N, 24/N, 25a/N, 25c/N, 26b/N, 34b/N, 37/N, 40a/N, 40d/N, 40e/N, 41a/N, 45b/N, 47/N, 49b/N, 50b/N	1967.92	997.90
Total				14602.22	7664.07

11.4 Silvicultural System Adopted

11.4.1 The forests allotted to this working circle are located on comparatively steeper slopes. As a result, they play a key role in the soil and moisture conservation, and ecological stability of the area. Keeping in view the composition and condition of the crop, and the environmental function that these forests perform, these forests shall be managed under selection system. The objective behind the application of this system is to distribute the regeneration evenly over the entire working circle. Secondly, because of the continuous presence of overwood, the regeneration of shade bearers like Fir and Spruce can be secured thereby maintaining the mixed composition of these forests. In this system, the fellings are directed towards silviculturally available trees above the exploitable diameter over a given felling cycle. Normally, it is expected that regeneration will come up in the gaps created by the trees removed. However, since the establishment of regeneration in this area is not assured, the removals will be restricted only to those areas where established regeneration is already present. In areas deficient or lacking regeneration only a conservative cut, avoiding creation of large gaps in the canopy is envisaged. In case large gaps are already present, no felling shall be carried out.

11.5 Exploitable Size

11.5.1 In order to achieve the objects of management and to fulfill the requirement of the area with regard to the protective functions of the forests, an exploitable size of 70 cm d.b.h. for Deodar and Kail and 80 cm d.b.h. for Fir and Spruce shall be adopted.

11.5.2 Although the concept of rotation is not relevant in selection system, yet for purely academic interests, the rotation of 150 and 225 years corresponding to exploitable diameter of 70 cm d.b.h. for Deodar and Kail and 80 cm for Fir and Spruce respectively is adopted.

11.6 Felling Cycle

11.6.1 Felling cycle is fixed and adopted at 20 years. It is considered adequate to regulate the desired intensity of the cut/ felling

11.7 Felling Series

11.7.1 There shall be only one felling series identical in its constitution to that of the working circle.

11.8 Analysis and Valuation of the Crop

11.8.1 For the assessment of the growing stock in this working circle, field data was collected from 75 sample plots of 0.1 ha The results of statistical analysis are presented in table 11.3. The diameter class and species wise distribution of growing stock assessed on the basis of mean values in terms of the total number of trees and volume of conifers 30 cm d.b.h. and above are summarized in Table 11.4 and 11.5 respectively.

Table 11.3. Results of Statistical analysis for Mixed Conifers Selection Working Circle

S.No		Statistical Attributes	
		No. of Stems	Volume (Cum.)
1	Attribute Total	17990.000	35574.600
2	No.of sample plots (n)	75	75
3	Mean (X)	239.867	474.328
4	Variance (S^2)	4206.739	26173.880
5	Standard Deviation S	64.859	161.783
6	Standard Error (S.E)	7.489	18.681
7	Coefficient of Variation %	27.040	34.108
8	95% Confidence Lower Limit	225.189	437.713
9	95% Confidence Upper Limit	254.545	510.943
10	Confidence Interval (CI)	29.356	73.230
11	Lower Limit as % of Mean	93.881	92.281

Row 6 : S.E. = S/ √n

Row 7 : C.O.V (%) = (S/X) x 100

Row 8 : Lower limit = X - 1.96 x S.E.

Row 9 : Upper Limit = X + 1.96 S.E.

Row 10 : C.I. = Upper limit - Lower limit

Table 11.4a. Summary of Conifer Stems in the Commercial area of the Mixed Conifer Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	0	0	0	0	0	0	0	0	0
Deodar	187003	91969	120581	125691	73575	62334	23503	10219	6131	701006
Kail	228900	111384	127735	137953	89925	36788	20438	8175	5110	766408
Fir/ Spruce	94012	38832	55181	65400	53137	26569	20438	12263	5110	370942
Total	509915	242185	303497	329044	216637	125691	64379	30657	16351	1838356

Table 11.4b. Summary of Conifer Stems in per hectare of Commercial area of the Mixed Conifer Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deodar	24.400	12.000	15.733	16.400	9.600	8.133	3.067	1.333	0.800	91.467
Kail	29.867	14.533	16.667	18.000	11.733	4.800	2.667	1.067	0.667	100.000
Fir/ Spruce	12.267	5.067	7.200	8.533	6.933	3.467	2.667	1.600	0.667	48.400
Total	66.533	31.600	39.600	42.933	28.267	16.400	8.400	4.000	2.133	239.867

Table 11.5a. Summary of Conifer Volume in the Commercial area of the Mixed Conifer Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deodar	24310.43	69896.32	160372.96	263950.57	231025.73	273647.92	133027.56	69998.25	46352.30	1272582.04
Kail	29757.29	84651.95	173719.18	313153.90	300349.54	162600.91	109340.99	50194.29	34436.97	1258205.02
Fir/ Spruce	12221.89	32618.28	86082.83	194238.19	260373.75	181996.37	169631.16	115267.61	52064.33	1104494.41
Total	66289.61	187166.55	420174.97	771342.66	791749.02	618245.20	411999.71	235460.15	132853.60	3635281.47

Table 11.5b. Summary of Conifer Volume per hectare of the Commercial area of the Mixed Conifer Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deodar	3.172	9.12	20.9253	34.44	30.144	35.7053	17.3573	9.1333	6.048	166.0452
Kail	3.8827	11.0453	22.6667	40.86	39.1893	21.216	14.2667	6.5493	4.4933	164.1693
Fir/ Spruce	1.5947	4.256	11.232	25.344	33.9733	23.7467	22.1333	15.04	6.7933	144.1133
Total	8.6494	24.4213	54.824	100.644	103.3066	80.668	53.7573	30.7226	17.3346	474.3278

11.9 Calculation of the Yield

11.9.1 The yield will be calculated in terms of number of trees and volume, which in turn shall be subject to area check. Modified Brandis Diameter-Class Method and Von Mental's formula have been applied for calculation of the yield. The following presumptions have been made in this regard.

- Only commercial area and its growing stock have been taken into account for the purpose of yield calculation.
- The growing stock over commercial area of this working circle is classified within 10 cm diameter classes indicated by Symbols I, II, III, IV, V, VI and VII. Class I stands for trees above the exploitable diameter and the other successively below it to the youngest.
- It takes 135, 115 and 194 years, on an average, for trees of Deodar, Kail and Fir/ Spruce respectively to attain exploitable diameter of 70 cm d.b.h. in case of Deodar and Kail, and 80 cm d.b.h. in case of Fir/ Spruce.
- It takes 25, 24 and 30 years respectively for an average Deodar, Kail and Fir and Spruce tree to pass from approach class (60-70 cm d.b.h) in case of Deodar and Kail and (70-80 cm d.b.h) in case of Fir and Spruce to exploitable classes i.e. above 70 cm d.b.h in case of Deodar, Kail and 80 cm in case of Fir and Spruce.

11.9.2 The following *survival coefficient percentages* based on the All India Volume Tables in respect of Deodar, Kail and Fir and Spruce have been used.

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

11.9.3 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 percent.

11.9.4 Based on these assumptions, the number of total potentially available trees, over the commercial area of this working circle, calculated at lower confidence limit of mean value after due deduction on account of mortality is tabulated under Table 11.6.

11.10 Yield Regulation

11.10.1 Modified Brandis Diameter Class Method and Von Mental's Formula have been applied for calculating yield. The stepwise yield calculations for one felling cycle on the basis of Modified Brandis Diameter- class method are tabulated under Table 11.7 overleaf.

Table 11.6.Species and diameter-class wise potential availability of trees from the commercial area of Mixed Conifers Selection Working Circle

DEODAR

Class	VI	V	IV	III	II	I	Total
Diameter-class	below 30	30-40	40-50	50-60	60-70	above 70	
Total No. of trees assessed at mean value	187003	91969	120581	125691	73575	102187	701006
Total No. of trees assessed at lower limit of confidence interval	175560	86341	113203	118000	69073	95935	658112
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		0.3	0.6	0.8	0.9	0.95	
No. of potentially available trees		25902	67922	94400	62166	91138	341528

KAIL

Class	VI	V	IV	III	II	I	Total
Diameter-class	< 30	30-40	40-50	50-60	60-70	>70	
Total No. of trees assessed at mean value	22890	111384	127735	137953	89925	70511	766408
Total No. of trees assessed at lower limit of confidence interval	21489	104568	119919	129512	84422	66196	719511
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	0.6	0.8	0.9	0.95	
No. of potentially available trees		47056	71951	10361	75980	62886	361483

FIR & SPRUCE

Class	VI	V	IV	III	II	I	Total
Diameter-class	30-40	40-50	50-60	60-70	70-80	>80	
Total No. of trees assessed at mean value	38832	55181	65400	53137	26569	37811	276930
Total No. of trees assessed at lower limit of confidence interval	36456	51804	61398	49886	24943	35497	259984
Age of entry in the class	73	96	118	139	164	194	
Years in class transition period	23	22	21	25	30		
Survival Coefficient of the class	0.2	0.4	0.5	0.6	0.85	0.95	
No. of potentially available trees	7291	20722	30699	29932	21202	33722	143568

Table 11.7. Yield Calculation for Mixed Conifers Selection Working Circle using Brandis Diameter-Class Method

		DEODAR	KAIL	FIR & SPRUCE
a)	Total number of trees in class I	91138	62886	33722
b)	Total number of trees likely to pass on to class I in the first felling cycle from Class II	49733	63317	14135
	Total number of trees likely to pass on to class I in the first felling cycle from Class III	0	0	0
c)	Total recruitment in class I from class II during first felling cycle	49733	63317	14135
d)	Annual recruitment from class II during the first felling cycle (c / 20)	2487	3166	707
e)	Stock required to be kept as reserve i.e. half of the total recruitment in 'c' above	24867	31659	7068
f)	Surplus stock of class I (a - e)	66271	31227	26654
g)	Total possibility of yield in first felling cycle if all surplus stock in 'f' above is removed (c + f)	116004	94544	40789
h)	Annual yield (g / 20) (If surplus is removed in one felling cycle)	5800	4727	2039
i)	Total possibility of yield if all surplus stock in 'f' above is removed in two felling cycles (c + f/2)	82869	78931	27462
j)	Annual yield (i / 20) (If surplus is removed in two felling cycle)	4143	3947	1373
k)	Weighted average volume of trees above exploitable diameter as per Kullu Volume Tables in cubic metres	5.031	4.9708	8.76
l)	Total annual volume yield (m3)	20843	19620	12027
m)	Deduct fifteen percent from 'l' above to account for mortality	17717	16677	10223
n)	Rounded off to lower multiple of hundred	17700	16600	10200
	TOTAL ANNUAL YIELD FROM THE WORKING CIRCLE		**44,500 cum**	

11.10.2 The yield calculated using Von Mental's Formula is as under:

	Deodar R = 150	Kail R = 150	Fir/Spruce R = 225	Total
Total commercial volume based on mean value (m^3)	1272582.04	1258205.02	1104494.41	**3635281.47**
Total commercial volume based on minimum availability value (m^3)	1174351.44	1161084.19	1019238.47	**3,354,674.10**
Annual Yield (m^3) = 2GS/R	15,658.02	15,481.12	9,059.90	**40,199.04**

11.10.3 The comparative statement of yield computed from the two methods is as under:

Method	Annual yield in m^3			
	Deodar	Kail	Fir and Spruce	Total
Brandis	17,700	16,600	10,200	**44,500**
Von Mental	15,658	15,481	9,059	**40,199**

11.10.4 The yield calculated by the Brandis Dia Class method is more than the yield estimation by Von Mental method. It is due to the fact that the stocking is abnormal as the proportion of volume above the exploitable dia class was found to be more than 40%. The forest soil is comparatively richer in nutrient content which facilitate good stocking of the forests. After the ban on green felling in 1990, green felling of trees was completely stopped. The prevalence of disturbed conditions in this terrain for last 30 years restricted the felling operation to the least possible extent. Also the local people do not prefer Fir and Spruce species for house building; hence Fir and Spruce was seldom issued to the concessionists. Because of above quoted reasons the volume of the trees above the exploitable dia meter is more than the normal. It ultimately leads to higher annual yield estimation by Brandis Method.

11.10.5 The yield calculated by the Von Mental's formula is recommended to be implemented. Accordingly, the annual yield estimation of the working circle is as follows.

Deodar	**=**	**15,600 m^3**
Kail	**=**	**15,400 m^3**
Fir and Spruce	**=**	**9,000 m^3**
Total	**=**	**40,000 m^3**

The yield so estimated is reduced by 30% and further rounded down to the nearest multiple of 100, as prescribed by the Working Plan Committee, to bring down the cut on the conservative side, hence the recommended annual yield is as below:-

Deodar	**=**	**10,900 m^3**
Kail	**=**	**10,700 m^3**
Fir and Spruce	**=**	**6,300 m^3**
Total	**=**	**27,900 m^3**

11.10.6 The intensity of cut on the basis of this volume (27,900 m^3) over the commercial area of 7664.07 hectare works out to 3.64 m^3 per hectare. The total annual yield prescribed constitutes 0.83% of the total commercial growing stock, based on minimum availability.

11.11 Size of the Annual Coupe

11.11.1 The yield calculated on volume basis shall be controlled by an area check. The size of the annual coupe is calculated as under:

$$\text{Annual Coupe (ha)} = \frac{\text{Total commercial area of working circle}}{\text{Felling cycle}} = \frac{7664.07}{20} = 383.20 \text{ ha}$$

11.12 Allowable Cut

10.12.1 Given the annual yield and the size of annual coupe, the allowable cut is computed as under:

Total annual yield (m^3)	Annual coupe (ha)	Allowable cut per ha (m^3)	Minimum available Growing stock per ha (m^3)	Allowable cut as % of minimum available Growing stock
29,900	383.20	72.81	437.71	16.63

11.13 Realization of the Yield

11.13.1 The yield prescribed shall include the volume of all trees of 30 cm d.b.h. and above marked for whatever purpose including concessions marking, illicit damage etc. The annual yield prescribed should be strictly adhered to. Deviations in annual yield to the extent of 20 percent are permissible for certain administrative or technical reasons. Deviations beyond the above limits shall require prior sanction of the Chief

Conservator of Forests. However, cumulative deviations over the entire working plan period should not exceed the prescribed yield.

11.14 Sequence of Felling

11.14.1 In view of the current ban on green felling, the sequence of fellings has been left to the discretion of the Divisional Forest Officer who shall exercise his judgment and due care keeping in view the progress of regeneration.

11.15 Method of Executing Felling

11.15.1 Removal of over-wood standing above the advance growth and regeneration, with the object of relieving it from shade and suppression, and very light opening up of the crop where regeneration is inadequate, will constitute the general guide lines in executing the fallings. The overwood above the regeneration must be gradually removed 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 who have to handle the crop properly. Accordingly, the following marking rules are laid down for guidance of the marking officer.

11.16 Marking and Felling Rules

- 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 the area of the compartment.
- Marking should be done by the DCF in charge of the Division or well trained and experienced ACF. The 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 and diseased trees shall be done in area near and around cultivation and *behaks* with in a distance of 100 metres from their periphery.
- No marking, except the removal of actually dead, diseased trees shall be done along nalla banks within a distance of at least 150 metres on either side.

- No healthy trees below the exploitable size 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 markings in all age classes should be done.
- Marking for improvement felling shall form an integral part of the major markings. All dead 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 and Spruce), standing over adequate advance growth should be removed. Selection marking of light to very light intensity shall be carried out in area 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 metres, depending upon the status and amount of regeneration present. Selection fellings of moderate intensity shall be carried out in such groups.
- In the mixed crop, ecologically most suitable species to the locality should be favoured.
- The intensity of felling over a particular compartment will largely depend upon the degree of biotic interference to which it is subject to, the amount and status of regeneration, and its topography, slope and aspect.
- Extreme care has to be exercised at the time of felling so as not to damage the regeneration below.
- Trees marked for felling should be lopped before execution of felling.

11.17 Supplementary Marking

11.17.1 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 markings 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 markings did exceed the original one. Judicious discretion of the marking officer is therefore needed so 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.

11.18 Cultural Operations

11.18.1 Felling refuse not only builds the potential reserve of combustible material but is equally bad for the hygiene of the crop. The felling refuse in Deodar- Kail forests is generally taken away by the villagers for their domestic use as firewood. However, in remote areas, far away from human settlements the felling refuse left in the forests should be collected at safer places and burnt during the safe season. This will not only clear the forest floor of felling debris but also reduce the chances or fires in the forests.

11.19 Regeneration Programme

11.19.1 The success of any silvicultural system adopted, and the treatment given to the crop there under, depends largely on the efforts made to regeneration the forests in due course of time. It is not much of a problem to regenerate these forests naturally except in areas near and around huge human habitations. Deodar- Kail forests are relatively saved from the menace of excessive grazing. However, it is extending over to Deodar- Kail belt also, with the result, the extent of the area deficient in regeneration are expanding every passing day. The measures to induce regeneration need to be applied over larger areas. However, it is neither practical not feasible to close large areas to grazing because of socio-economic constraints. It is therefore suggested, that area requiring regeneration equal to the size of the annual coupe,

evenly distributed over the total area of the working circle, should be effectively 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, racking up of humus and closure of such areas to grazing. In case the area is too refractory to respond to natural seeding, artificial regeneration by way of sowing and planting nursery raised seedlings should be resorted to.

11.19.2 The restocking of areas can be broadly divided into two categories. One areas that are to be stocked after they have been worked and the other include area that have been degraded and need external intervention for restocking. The restocking of the areas that are worked as per the prescriptions of the plan as a general rule are to be undertaken by naturally aided regeneration. But in areas that have good site quality and have been rendered degraded and under stocked either due to biotic factors like grazing and illegal felling or by abiotic factors like wind throw damage, snow damage or land slide, have to be restocked artificially. The plantation area should be 60% of the above given categories of restocking areas to be carried out in next 20 years.

11.20 Control of Grazing

11.20.1 Grazing in Deodar and Kail forests is not much of a problem except in the areas around the human habitation. However, unrestricted, uncontrolled and unregulated grazing does affect these forests adversely and is the main reason for failure of regeneration in areas subjected to heavy grazing. Large herds of migratory as well as local livestock graze these forests and trample the young seedlings and samplings. The areas highly subjected to grazing are prescribed to be effectively closed to the exclusion of grazing and taken up for artificial regeneration by patch sowing and planting.

WORKING PLAN FOR

THE FIR SELECTION WORKING CIRCLE

12.1 General Constitution of the Working Circle

12.1.1 This working circle contains relatively well stocked commercial forests of Deodar, Kail with good proportion of Fir and Spruce in the higher reaches and occupying comparatively steep slopes and rugged ground. These forests are considered unfit to be managed under the system of concentrated regeneration felling because of the steeper terrain. Out of the total area of 17860.66 ha, 8599.48 ha (48.15 %) is commercial, and the remaining 9261.18 ha is uncommercial and non-wooded area. 3544.25 ha (41.21 %) of the commercial area of this working circle falls in Bhalesh range, 1883.16 ha (21.90 %) falls in Chiralla range, 1735.02 ha (20.18%) of area falls in Neeru range and 1437.05 ha (16.71%) hectare area falls in Kellar range In this plan, the constitution of this working circle is almost similar to the previous plan, except few minor changes.

12.2 General Character of the Vegetation

12.2.1 The forests constituting this working circle consist mostly of Deodar, Kail and Fir, with sprinklings of Spruce. A few stray trees of *Taxus baccata* (yew) are encountered in the Bhalesh range, Neeru range and Kelar range. The crop is largely matured. The distribution of stems over various diameter classes is actually quite different from the distribution ideally aimed at in a selection forest, as can be observed from Table 12.1 below:

Table 12.1 Normal and Actual Distribution of Stems Over Diameter Classes

Diameter – class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Normal Distribution in percentage	41.00%	25.00%	15.00%	9.00%	5.00%	3.00%	2.00%
Actual Distribution in percentage	6.75%	9.67%	11.53%	12.93%	15.41%	15.80%	27.90%

12.2.2 The table above shows that there is a preponderance of trees in the higher diameter classes whereas the number of stems in lower diameter classes is deficient, primarily because of the closed canopy. This data is alarming skewed distribution of stems in undesirable ratio.

12.2.3 The broad leaved miscellaneous species occupy sizeable area of this working circle, occurring either mixed with conifer species or pure in patches, linear strips along the streams, moist depressions and sheltered slopes. Broad-leaved species are mostly confined to the lower most areas of the hill slopes and banks of the streams. Among the broad leaved species *Alnus nepalensis, Juglans regia, Aesculus indica, Quercus ilex, Quercus leucotrichophora and Quercus dilatata* are quite frequent.

12.2.4 A detail description of these forests has already been given in Chapter II of Part I of this plan. The forests allotted to this working circle conform to Champion and Seth's forest types $12/C_{1c}$, $12/C_{1d}$, $12/C_{1f}$, $12/2DS_1$, $12/DS_3$,and $12/1S_1$.

12.3 Area and Allotment

12.3.1 The total area of this working circle constitutes 20.39% of the total area of the division. On comparing the commercial area, it accounts for 21.90% of the Division. Detailed statement of compartments and sub-compartments allotted to this working circle is provided under Appendix VIII. The Range wise distribution of the area under commercial, uncommercial and non-wooded categories, as drawn from the said Appendix, is summarized in Table 12.2.

Table 12.2. Summary of Rangewise area under Fir Selection Working Circle

S.No.	Range	Block	Compartments	Total Area (ha)	Commercial Area (ha)
1	Bhalesh	Chilli	28/Bh, 29/Bh, 33/Bh, 35/Bh, 36/Bh, 37/Bh, 38/Bh, 39/Bh, 40/Bh and 41/Bh	2745.52	1025.77
2		Jatota	9a/Jt, 10/Jt and 11a/Jt	759.58	506.71
3		Kilhotran	88/Bh, 89/Bh, 90/Bh, 93/Bh, 95/Bh, 96/Bh, 97/Bh, 98/Bh, 101/Bh, 102/Bh,103/Bh and 104/Bh	3286.81	1442.18
4		Neeli	54/Bh, 59/Bh, 62/Bh, 64/Bh, 68/Bh, 70/Bh, 73/Bh and 74/Bh	2328.42	569.59
5	Chiralla	Chiralla	3c/Ch, 4b/Ch, 12a/Ch, 13a/Ch and 14b/Ch	441.97	257.73
6		Jai	7b/Jai, 14b/Jai, 15/Jai, 16b/Jai, 17b/Jai, 19b/Jai, 20/Jai, 21b/Jai, 22b/Jai, 23/Jai, 24/Jai, 25/Jai, 26/Jai, 27/Jai, 28/Jai, 29/Jai, 30/Jai, 32a/Jai and 32b/Jai	2790.73	1518.35
7		Jangalwar	8b/Jwr	140.63	107.08
8	Kellar	Guraka	16b/K and 17a/K	151.7	103.09
9		Malothi	29b/K, 30/K, 32/K, 33/K, 38b/K, 45a/K and 50b/K	1666.97	1059.46
10		Marmat	69/K	443.38	247.32
11		Trown	65b/K	60.93	27.18
12	Neeru	Dandi	53b/N, 55a/N and 55b/N	588.16	392.49
		Padri	1/P, 2/P,3/P, 6/P and 7/P	796.02	348.25
		Puneja	25b/N, 26a/N, 31a/N, 33b/N, 34a/N, 40b/N, 46/N and 50a/N	1659.84	994.28

Range wise abstract:

S.No.	Range	Total Area (ha)	Commercial Area (ha)
1	Bhalesh	9120.33	3544.25
2	Chiralla	3373.33	1883.16
3	Kellar	2322.98	1437.05
4	Neeru	3044.02	1735.02
Total		**17860.66**	**8599.48**

12.4 Silvicultural System Adopted

11.4.1 The forests allotted to this working circle are located on comparatively steeper slopes. As a result, they play a key role in the soil and moisture conservation, and ecological stability of the area. Keeping in view the composition and condition of the crop, and the environmental function that these forests perform, these forests shall be managed under selection system. The objective behind the application of this system is to distribute the regeneration evenly over the entire working circle. Secondly, because of the continuous presence of overwood, the regeneration of shade bearers like Fir and Spruce can be secured thereby maintaining the mixed composition of these forests. In this system, the fellings are directed towards silviculturally available trees above the exploitable diameter over a given felling cycle. Normally, it is expected that regeneration will come up in the gaps created by the trees removed. However, since the establishment of regeneration in this area is not assured, the removals will be restricted only to those areas where established regeneration is already present. In areas deficient or lacking regeneration only a conservative cut, avoiding creation of large gaps in the canopy is envisaged. In case large gaps are already present, no felling shall be carried out. From the stem distribution in various dia classes, it is observed that Fir forests lack natural regeneration and the volume in the mature and overmature stems is very large. it is therefore very necessary to remove the overmature stems so that spaces can be created for regeneration. Beside, dense shade and presence of litter is posing hindrances to the natural regeneration of Fir and Spruce. Such areas require prime attention for assisted regeneration.

12.5 Exploitable Size and Rotation

12.5.1 In order to achieve the objects of management and to fulfill the requirement of the area with regard to the protective functions of the forests, an exploitable size of 70 cm d.b.h. for Deodar and Kail and 80 cm d.b.h. for Fir and Spruce shall be adopted.

12.5.2 Although the concept of rotation is not relevant in selection system, yet for purely academic interests, the rotation of 150 and 225 years corresponding to exploitable diameter of 70 cm d.b.h. for Deodar and Kail and 80 cm for Fir respectively is adopted.

12.6 Felling Cycle

12.6.1 The felling cycle is fixed at 20 years. It is considered appropriate to regulate the desired intensity of the cut/felling.

12.7 Felling Series

12.7.1 There shall be only one felling series identical in its constitution to that of the working circle.

12.8 Analysis and Valuation of the Crop

12.8.1 For the assessment of the growing stock in this working circle, field data was collected from 94 sample plots. Mean and other Statistics values of two variables viz. number of stems and volume of conifers from 0.1 ha sample plots have been computed. Results obtained on the basis of statistical analysis have been summarized in Table 12.3. The diameter class and species wise distribution of growing stock assessed on the basis of mean values in terms of the total number of trees and volume of conifers 30 cm d.b.h. and above are summarized in Table 12.4 a/b and 12.5 a/b respectively.

Table 12.3. Summary of Statistics of Fir Selection Working Circle

S. No.	Item	Statistical Attributes	
		No. of Stems	Volume (Cum.)
1	Attribute Total	17780	61921.3
2	No.of sample plots (n)	94	94
3	Mean X	189.149	658.737
4	Variance S2	4689.59	56734.58
5	Standard Deviation S	68.481	238.19
6	Standard Error S.E	7.063	24.567
7	Coefficient of Variation %	36.205	36.159
8	95% Confidence Lower Limit	175.306	610.586
9	95% Confidence Upper Limit	202.992	706.888
10	Confidence Interval (CI)	27.686	96.302
11	Lower Limit as % of Mean	92.681	92.69

Row 6 : $S.E. = S/\sqrt{n}$

Row 7 : $C.O.V (\%) = (S/X) \times 100$

Row 8 : Lower limit = $X - 1.96 \times S.E.$

Row 9 : Upper Limit = $X + 1.96 \times S.E.$

Row 10 : C.I. = Upper limit - Lower limit

12.9 Calculation of the Yield

12.9.1 The yield will be calculated in terms of number of trees and volume, which in turn shall be subject to area check. Modified Brandis Diameter-Class Method and Von Mental's formula have been applied for calculation of the yield. The following presumptions have been made in this regard.

- Only commercial area and its growing stock have been taken into account for the purpose of yield calculation.
- The growing stock over commercial area of this working circle is classified within 10 cm diameter classes indicated by Symbols I, II, III, IV, V, VI and VII. Class I stands for trees above the exploitable diameter and the other successively below it to the youngest.
- The number of trees in all those classes being considered for the purpose of yield calculation have been computed at lower limit of confidence interval.
- It takes 135, 115 and 194 years, on an average, for trees of Deodar, Kail and Fir respectively to attain exploitable diameter of 70 cm d.b.h. in case of Deodar and Kail, and 80 cm d.b.h. in case of Fir.
- It takes 25, 24 and 30 years respectively for an average Deodar, Kail and Fir tree to pass from approach class (60-70 cm d.b.h) in case of Deodar and Kail and 70-80 cm d.b.h to Class I in case of Fir to exploitable classes. i.e. above 70 cm d.b.h in case of Deodar, Kail and 80 cm in case of Fir.

12.9.2 The following survival coefficient percentages based on the All India Volume Tables in respect of Deodar, Kail and Fir have been used.

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

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 percent.

Based on these assumptions, the number of total potentially available trees, over the commercial area of this working circle, calculated at lower confidence limit of mean value after due deduction on account of mortality is tabulated under Table 12.6.

12.10 Yield Regulation

12.10.1 Modified Brandis Diameter Class Method and Von Mental's Formula have been applied for calculating yield. The stepwise yield calculations for one felling cycle on the basis of Modified Brandis Diameter- class method are tabulated under Table 12.7 overleaf.

12.10.2 The yield calculated using Von Mental's Formula is as under:

	Deodar R = 150	**Kail R = 150**	**Fir/ Spruce R = 225**	**Total**
Total commercial volume based on mean value (m^3)	692917	692394	4279484	5664796
Total commercial volume based on minimum availability value (m^3)	642266	641780	3966655	5250701
Annual Yield (m^3) = 2GS/R	**8563.55**	**8557.07**	**35259.15**	**52379.77**

Table 12.4a. Summary of Conifer Stems in the Commercial area of the Fir Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	0	0	0	0	0	0	0	0	0
Deodar	52145	50316	52146	60380	54890	27445	15552	7319	2744	322937
Kail	73187	53975	52146	49401	54890	22871	17382	8233	4574	336659
Fir/ Spruce	141801	83251	106121	140885	147289	117099	107036	80506	42997	966985
Total	267133	187542	210413	250666	257069	167415	139970	96058	50315	1626581

Table 12.4b. Summary of Conifer Stems per hectare of the Commercial area of the Fir Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Deodar	6.064	5.851	6.064	7.021	6.383	3.192	1.809	0.851	0.319	37.553
Kail	8.511	6.277	6.064	5.745	6.383	2.660	2.021	0.957	0.532	39.149
Fir/ Spruce	16.489	9.681	12.340	16.383	17.128	13.617	12.447	9.362	5.000	112.447
Total	31.064	21.809	24.468	29.149	29.894	19.468	16.277	11.170	5.851	189.149

Table 12.5a. Summary of Conifer Volume in the Commercial area of the Fir Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	0	0	0	0	0	0	0	0	0
Deodar	6778.97	38240.17	69353.95	126796.80	172355.90	120483.90	88026.00	50133.25	20748.83	692917.72
Kail	9514.46	41021.24	70918.19	112140.70	183333.20	101089.50	92993.06	50553.76	30830.00	692394.01
Fir/ Spruce	18433.85	69930.11	165549.40	418428.30	721715.70	802130.30	888399.40	756754.20	438143.50	4279484.78
Total	34727.28	149191.5	305821.6	657365.7	1077405	1023704	1069418	857441.3	489722.3	5664796.52

Table 12.5b. Summary of Conifer Volume per hectare of the Commercial area of the Fir Selection Working Circle

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0
Deodar	0.7883	4.4468	8.0649	14.7447	20.0426	14.0106	10.2362	5.8298	2.4128	80.5767
Kail	1.1064	4.7702	8.2468	13.0404	21.3191	11.7553	10.8138	5.8787	3.5851	80.5158
Fir/ Spruce	2.1436	8.1319	19.2511	48.6574	83.9255	93.2766	103.3085	88.0000	50.9500	497.6446
Total	4.0383	17.3489	35.5628	76.4425	125.2872	119.0425	124.3585	99.7085	56.9479	658.7371

Table 12.6. Species and diameter-class wise potential availability of trees from the commercial area of Fir Selection Working Circle

Deodar

Class	VI	V	IV	III	II	I	Total
Diameter-class	**<30**	**30-40**	**40-50**	**50-60**	**60-70**	**> 70**	
Total No. of trees assessed at mean value	52145	50316	52146	60380	54890	53060	322937
Total No. of trees assessed at lower limit of confidence interval	48329	46633	48329	55961	50873	49176	299301
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		13990	28997	44769	45786	46717	180259

Kail

Class	VI	V	IV	III	II	I	Total
Diameter-class	**<30**	**30-40**	**40-50**	**50-60**	**60-70**	**> 70**	
Total No. of trees assessed at mean value	73187	5397	52146	49401	54890	53060	336659
Total No. of trees assessed at lower limit of confidence interval	67830	5002	48329	45785	50873	49176	312018
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		2251	28997	36628	45786	46717	180639

Fir & Spruce

Class	VI	V	IV	III	II	I	Total
Diameter-class	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**	**>80**	
Total No. of trees assessed at mean value	83251	106121	140885	147289	117099	230539	825184
Total No. of trees assessed at lower limit of confidence interval	77158	98354	130574	136509	108529	213666	764790
Age of entry in the class	73	96	118	139	164	194	
Years in class transition period	23	22	21	25	30		
Survival Coefficient of the class	0.20	0.40	0.50	0.60	0.85	0.95	
No. of potentially available trees	15432	39342	65287	81905	92250	202983	497199

Table 12.7. Yield Calculation of Fir Selection Working Circle as per Brandis Diameter Class Method

		DEODAR	KAIL	FIR & SPRUCE
a)	Total number of trees in class I	46717	46717	202983
b)	Total number of trees likely to pass on to class I in the first felling cycle from Class II	36629	38155	61500
	Total number of trees likely to pass on to class I in the first felling cycle from Class III	0	0	0
c)	Total recruitment in class I from class II and III during first felling cycle	36629	38155	61500
d)	Annual recruitment from class II and III during the first felling cycle (c /20)	1831	1908	3075
e)	Stock required to be kept as reserve i.e. half of the total recruitment in 'c' above	18315	19078	30750
f)	Surplus stock of class I (a - e)	28402	27639	172233
g)	Total possibility of yield in first felling cycle if all surplus stock in 'f' above is removed (c + f)	65031	65794	233733
h)	Annual yield (g /20)	3252	3290	11687
i)	Total possibility of yield if all surplus stock in 'f' above is removed in two felling cycles (c + f/2)	50830	51975	147617
j)	Annual yield (i /20)	2542	2599	7381
k)	Weighted average volume of trees above exploitable diameter as per Kullu Volume Tables in cubic metres	5.2662	5.1921	9.0375
l)	Total annual volume yield (m3)	13387	13494	66706
m)	Deduct fifteen percent from 'l' above to account for mortality	11379	11470	56700
n)	Rounded off to lower multiple of hundred	11300	11400	56700
	TOTAL ANNUAL YIELD FROM THE WORKING CIRCLE			**79,400 cum**

12.10.3 The comparative statement of yield computed from the two methods is as under:

Method	Annual yield in m^3			
	Deodar	Kail	Fir/ Spruce	Total
Brandis	13300	11400	56700	79,400
Von Mental	8563	8557	35259	52379

12.10.4 The yield calculated by the Brandis Dia Class method is much higher than the yield estimation by Von Mental method. It is due to the fact that the stocking is abnormal as

the proportion of volume above the exploitable Dia class was found to be more than 50%. The forest soil is comparatively richer in nutrient content which facilitate good stocking of the forests. The ban on green felling in 1990, completely stopped green felling of trees. The prevalence of disturbed conditions in this terrain for last 30 years restricted the felling operation to the least possible extent. Also the local people do not prefer Fir species for house building; hence fir was never issued to the concessionists. Because of above quoted reasons the volume of the trees above the exploitable dia meter is more than the normal. It ultimately leads to higher annual yield estimation by Brandis Method.

12.10.5 The yield calculated by the Von Mental's formula is recommended to be implemented.. Accordingly, the annual yield estimation of the working circle is as follows.

Deodar	**=**	**8,500m^3**
Kail	**=**	**8,500 m^3**
Fir	**=**	**35,200 m^3**
Total	**=**	**52,200 m^3**

The yield so estimated is reduced by 30% and further rounded down to the nearest multiple of 100, as prescribed by the Working Plan Committee, to bring down the cut on the conservative side, hence the recommended annual yield is as below:-

Deodar	**=**	**5,900 m^3**
Kail	**=**	**5,900 m^3**
Fir	**=**	**24,600 m^3**
Total	**=**	**36,400 m^3**

12.10.6 The intensity of cut on the basis of this volume (36,400 m^3) over the commercial area of 8599.48 hectare works out to 4.23 m^3 per hectare. The total annual yield prescribed constitutes 0.69% of the minimum available commercial growing stock.

12.11 Size of the Annual Coupe

12.11.1. The yield calculated on volume basis shall be controlled by an area check. The size of the annual coupe is calculated as under:

$$\textbf{Annual Coupe (ha)} = \frac{\textbf{Total commercial area of working circle}}{\textbf{Felling cycle}} = \frac{\textbf{8599.48}}{\textbf{20}} = \textbf{429.97 ha}$$

12.12 Allowable Cut

12.12.1 Given the annual yield and the size of annual coupe, the allowable cut is computed as under:

Total annual yield (m^3)	Annual coupe (ha)	Allowable cut per ha (m^3)	Minimum Available Growing stock per ha (m^3)	Allowable cut as % of Growing stock
36,400	429.97	84.66	610.58	13.87

12.13 Realization of the Yield

12.13.1 The yield prescribed shall include the volume of all trees of 30 cm d.b.h. and above marked for whatever purpose including concessions marking, illicit damage etc. The wood of Fir and Spruce is light and soft. The status of regeneration of Fir and Spruce in the tract is not uniform; deficient in some areas and adequate in some places. Therefore the Working Plan Committee suggested to open up the compartments carefully. The compartments 26a/N, 46/N, 1/Pd, 2/Pd and 3/Pd, which are having adequate regeneration (as mentioned in table 12.8 below) shall be taken up for felling at the first instance and the status of regeneration at the felling site must be reviewed carefully. If the results are positive, the felling operation may be continued in other parts of the working circle.

Table 12.8

Range	Block	Beat	Compt.	Total area as per GIS	Forest area as per GIS
Neeru	Puneja	Katyara	26a/N	180.02	111.45
Neeru	Puneja	Puneja	46/N	816.06	551.23
Neeru	Padri	Padri	1/Pd	148.05	56.73
Neeru	Padri	Padri	2/Pd	136.36	49.01
Neeru	Padri	Padri	3/Pd	164.81	114.85
		Subtotal	**5**	**1445.3**	**883.27**

12.14 Sequence of Felling

12.14.1 In view of the current ban on green felling, the sequence of fellings has been left to the discretion of the Divisional Forest Officer who shall exercise his judgment keeping in view the progress of regeneration

12.15 Method of Executing Felling

12.15.1 Removal of over-wood standing above the advance growth and regeneration, with the object of relieving it from shade and suppression, and very light opening up of the crop where regeneration is inadequate, will constitute the general guide lines in executing the fellings. The overwood above the regeneration must be gradually removed 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 who have to handle the crop properly. Accordingly, the following marking rules are laid down for guidance of the marking officer.

12.16 Marking and Felling Rules

- 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 the area of the compartment.
- Marking should be done by the DCF in charge of the Division or well trained and experienced ACF. The 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 and diseased trees shall be done in area near and around cultivation and behaks with in a distance of 100 metres from their periphery.
- No marking, except the removal of actually dead, diseased trees shall be done along nalla banks within a distance of at least 150 metres on either side.
- No healthy trees below the exploitable size 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 markings in all age classes should be done.
- Marking for improvement felling shall form an integral part of the major markings. All dead 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. Selection marking of light to very light intensity shall be carried out in area 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 metres, depending upon the status and amount of regeneration present. Selection fellings of moderate intensity shall be carried out in such groups.
- In the mixed crop, ecologically most suitable species to the locality should be favored.
- The intensity of felling over a particular compartment will largely depend upon the degree of biotic interference to which it is subject to, the amount and status of regeneration, and its topography, slope and aspect.
- Extreme care has to be exercised at the time of felling so as not to damage the regeneration below.
- Trees marked for felling should be lopped before execution of felling.

12.17 Supplementary Marking

12.17.1 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 markings 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 markings did exceed the original one. Judicious discretion of the marking officer is therefore needed so 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.

12.18 Cultural Operations

12.18.1 Felling refuse not only builds the potential reserve of combustible material but is equally bad for the hygiene of the crop. The felling refuse in Deodar- Kail forests is generally taken away by the villagers for their domestic use as firewood. The firewood of Fir and Spruce is known to have less calorific value therefore, it is collected on least priority. However, in remote areas, far away from human settlements the felling refuse left in the forests should be collected at safer places and burnt during the safe season . This will not only clear the forest floor of felling debris but also reduce the chances or fires in the forests.

12.19 Regeneration Programme

12.19.1 The success of any silvicultural system adopted, and the treatment given to the crop thereunder, depends largely on the efforts made to regenerate the forests in due course of time. By exclusion of biotic-interference from these forests, there is practically no difficulty in regenerating these forests naturally. But unfortunately, the extent of area deficient in regeneration is expanding continuously as a result of excessive biotic-interference, especially grazing. The measures to induce regeneration need to be applied over larger areas. However, it is neither practical nor possible to close larger areas to grazing because of socio-economic constraints. It is therefore suggested, that total area requiring 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 to grazing. In case the area is too refractory to respond to natural seeding, artificial regeneration by way of sowing and planting nursery raised seedlings should be resorted to.

12.19.2 The restocking of areas can be broadly divided into two categories. One areas that are to be stocked after they have been worked and the other include area that have been degraded and need external intervention for restocking. The restocking of the areas that are worked as per the prescriptions of the plan as a general rule are to be undertaken by naturally aided regeneration. But in areas that have good site quality and have been rendered degraded and under stocked either due to biotic factors like grazing and illegal felling or by abiotic factors like wind throw damage, snow damage or land slide, have to be restocked artificially. The plantation area should be 60% of the above given categories of restocking areas to be carried out in next 20 years.

12.20 Nursery and Plantation Techniques

Abies pindrow

Found at an altitude of 2200 to 3400 metres but sometimes extending between 2000 metres to 3500 metres. It is a slow growing species which requires cool and moist climate. It is sensitive to drought and frost and grows best in open sunlight.

Seed: Cones ripen in October- November, they should be collected in October before they break up. Should be sun/ kiln dried to split open. Seed extraction by shaking and winnowing be done. Should be stored in gunny bags or tins till sowing. Good seed year occurs normally in 6-7 years. About 25,000 seeds weight a kilogram. Germination percent normally ranges from 40 to 65. It starts after 4-5 months and completes in about one and a half months. Plant percent is about 1500 per kg of seeds.

Nursery Technique: Seeds be sown in November – December i.e. before snowfall, will start germination in April.

Planting Technique: One or one and a half year old seedlings with naked roots are transplanted at the beginning of rains or in March- April, when snow melts, spacing be kept 2 x 2 metres. Weeding and cleaning be done twice a year.

Picea smithiana

Found at 2100 to 3300 metres height but sometimes as less as 1500 metres.

Seed: Female cones ripen in October- November. They should be collected from trees, spread in the sun (or kiln) for drying and beaten to extract seeds. Seeds can be stored upto one year. They are small (50-55 thousand per kg). Germination is normally good (more than 50 percent), usually completes in 1-2 months. Good seed year is expected once in five years.

Nursery Technique: Fresh seeds be sown in October-November or more usually in February- March. Germination will begin in May- June, pricking out of seedlings be done every year from the second year.

Planting Technique: Planting out is done in 2^{nd}, 3^{rd} or 4^{th} year. Seedlings with naked roots protected by being bundled in damp moss are planted in prepared pits 1.5 x 1.5 metres or 2 x 2 metres apart. Roots should not be injured during transplanting. Initial growth is slow and requires tending for 3 – 4 years; subsequently faster. Needs protection from the sun in early youth. It is fire-tender, but not much browsed.

Quercus semecarpifolia

It is found at 2400 to 3600 metres altitude, occasionally descending up to 2000 metres.

Seed: Very large, only 125 per kg, collected in June to August when fresh, 95 to 100 percent seeds are fertile.

Nursery Technique: Dibbling be done in July-August as soon as acorns ripen. Spacing be kept 1.5 x 1.5 metres to 2 x 2 metres in fairly open places. Sowing in drills during July-August may also be done. Seedlings be kept in the nursery for 2 years.

Planting Technique: Entire plants put out in prepared pits during the rains, when they are 2 years old, spacing should be 2 x 2 metres. Weeding and cleaning be done for several years.

12.21 Control of Grazing

The unrestricted, uncontrolled and unregulated grazing in Fir forests of this division is the chief reason for the failure of regeneration to establish. Large herds of the migratory as well as local livestock graze in these forests and nibble the young seedlings as soon as they emerge in the spring, or early summer, after the snow melt. Unfortunately, there is not much grass available during that time and therefore, the livestock especially the goats and sheep, fall back upon the just sprouted seedlings. The ones those escape the spring wrath are consumed by the retreating livestock in autumn, when again unfortunately, grass is scanty. This cycle has been going on unfelt and unnoticed for past so many years and is mainly responsible for the degradation of forests.

Under the prevailing set of circumstances and provisions of law in hand, it is difficult to control and restrict the severity of grazing in these forests. Unless strict laws are enforced and suitable arrangements are made, for the rehabilitation of migratory graziers and fodder for their animals, this menance is likely to annihilate these forests in due course of time. It is therefore suggested that effective closures are made with efforts to encourage rotational grazing, restricted only to alpine/sub-alpine pastures. Micro planning for the improvement of pastures lands needs to be conceived and executed effectively on the ground.

The success of any silvicultural system adopted, and the treatment given to the crop thereunder, depends largely on the efforts made to regeneration the forests in due course of time. It is not much of a problem to regenerate these forests naturally except in areas near and around huge human habitations. Deodar- Kail forests are relatively saved from the menace of excessive grazing. However, it is extending over to Deodar-Kail belt also, with the result, the extent of the area deficient in regeneration are expanding every passing day. The measures to induce regeneration need to be applied over larger areas. However, it is neither practical not feasible to close large areas to grazing because of socio-economic constraints. It is therefore suggested, that area requiring regeneration equal to the size of the annual coupe, evenly distributed over the total area of the working circle, should be effectively 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, racking up of humus and closure

of such areas to grazing. In case the area is too refractory to respond to natural seeding, artificial regeneration by way of sowing and planting nursery raised seedlings should be resorted to.

WORKING PLAN FOR THE CHIR REHABILITATION WORKING CIRCLE

13.1 General Constitution of the Working Circle

13.1.1 This working circle is identical in constitution to the corresponding working circle of the plan under revision. Primarily, this working circle consists of Chir forests lying in the Chiralla and Kellar Ranges of this Division. Out of a total of 2955.5 hectares allotted to Chir Working Circle, 63.60% area fall in Chiralla Range and 36.40% in Kellar Range. 43.94% of the area is commercial, 56.06% percent uncommercial and non wooded.

13.2 General Character of the Vegetation

13.2.1 The forests constituting this working circle consist of more or less pure Chir forests throughout its area except at places in the higher reaches, where it is found intermixed with Deodar and Kail. These forests are generally poorly stocked, maltreated, malformed and subject to heavy biotic pressure of grazing and fire with poor status of regeneration. The crop is generally thin, open and patchy, except a few compartments where the crop consists of mature and over mature trees with varying status of regeneration. The distribution of stems over various diameter classes is far from ideal, as can be seen from Table 13.1.

Table 13.1. Normal and Actual distribution of Stems over Diameter Classes.

Diameter – class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	70 <
Normal Distribution in percentage	41%	25%	15%	9%	5%	3%	2%
Actual Distribution in percentage	13.3%	11.6%	18.0%	18.4%	16.5%	11.6%	10.4%

13.2.2 There is an acute deficiency of stems in lower diameter classes. Regeneration is conspicuous by its absence, and the majority of the crop is middle aged to mature and

over-mature. Excessive biotic pressure, frequent fires are the biggest threat to the Chir crop.

13.2.3 Most of the Chir forests occupy young and fragile/loose geological formations, and have been under excessive biotic pressure of grazing, encroachments, lopping, fire etc. Therefore, they have not responded favourably to the system to concentrated regeneration fellings in the past. The common associates of Chir like *Alnus nepalenses, Acacia modesta, Pistacia integerrima, Olea cuspidata, Punica granatum, Celtis australis* and *Rhus* are mostly confined to moist localities, depression and the banks of streams. The under growth is profuse on the cooler aspects, where as it is scanty to almost absent on southern aspects.

13.2.4 A description of these forests has been provided in detail in Chapter II of part I of this plan. The forests of this working circle, conform to Champion and Seth's $9/C_{1b}$ forest type.

13.3 Area and Allotment

13.3.1 The area statement of compartments/ sub-compartments allotted to this working circle is provided in Appendix IX. Table 12.2 gives the range wise abstract of the area under Conservation Working Circle. The area allotted to this working circle is 3.37% of the total area of this division.

Table 13.2. The abstract of Range wise area under Chir Rehabilitation working circle

S.No	Range	Block	Compartments	Total Area (ha)	Commercial Area (ha)
1	Chiralla	Chiralla	19/Ch, 24b/Ch, 25/Ch, 26a/Ch,26b/Ch, 30/Ch, 31a/Ch, 32a/Ch and 33/Ch	833.25	462.00
2		Jangalwar	2b/Jwr, 3/Jwr, 4a/Jwr, 6/Jwr, 12/Jwr, 13/Jwr and15/Jwr	1047.92	352.26
3	Kellar	Guraka	1/K, 4/K and 22b/K	274.83	120.01
4		Marmat	1a/M and 2/M	190.34	38.81
5		Trown	61/K, 63b/K and 64/K	609.16	325.48
Total				2955.50	1298.56

13.4 Special Objects of Management

- To rehabilitate and improve the existing forest crop by adopting strict forest protection and improvement measures.
- To stabilize land slip and land slide areas along the roads.

13.5 Analysis and Valuation of the Crop

13.5.1 For the assessment of the growing stock in this working circle, field data was collected from 26 sample plots. Mean and other Statistics values of two variables viz. number of stems and volume of conifers from 0.1 ha sample plots have been computed. Results obtained on the basis of statistical analysis have been summarized in Table 13.3

Table 13.3. Summary of Statistical tests of Conservation Working Circle

Data pertains to Forested area of the working circle

S. No.		Statistical Attributes*	
		No. of Stems	**Volume (Cum.)**
1	Attribute Total	4120	6821.800
2	No.of sample plots (n)	26	26
3	Mean X	158.462	262.377
4	Variance S2	12093.538	49356.200
5	Standard Deviation S	109.971	222.163
6	Standard Error S.E	21.567	43.570
7	Coefficient of Variation %	69.399	84.673
8	95% Confidence Lower Limit	116.191	176.980
9	95% Confidence Upper Limit	200.733	347.774
10	Confidence Interval (CI)	84.542	170.794
11	Lower Limit as % of Mean	73.324	67.453

Row 6 : S.E. = S/ √n

Row 7 : C.O.V (%) = (S/X) x 100

Row 8 : Lower limit = X – 1.96 x S.E.

Row 9 : Upper Limit = X + 1.96 x S.E.

Row 10 : C.I. = Upper limit - Lower limit

Table 13.4a. Summary of total No. of Conifer Stems in Chir Rehabilitation Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	41454.06	25471.77	23973.37	23473.94	17980.12	8490.63	1498.28	0.00	0.00	142342.17
Deodar	9489.49	8990.06	9988.91	7991.08	4994.52	4994.52	4494.97	1498.28	0.00	52441.83
Kail	499.43	2497.26	3496.11	2497.26	998.85	0.00	499.43	0.00	0.00	10488.34
Fir/ Spruce	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	51442.97	36959.10	37957.82	33962.28	23973.50	13485.16	6492.67	1498.28	0.00	205272.3477

Table 13.4b. Summary of Conifer Stems per hectare area of the Chir Rehabilitation Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	31.92	19.62	18.46	18.08	13.85	6.54	1.15	0.00	0.00	109.62
Deodar	7.31	6.92	7.69	6.15	3.85	3.85	3.46	1.15	0.00	40.38
Kail	0.38	1.92	2.69	1.92	0.77	0.00	0.38	0.00	0.00	8.08
Fir/ Spruce	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	39.62	28.46	29.23	26.15	18.46	10.38	5.00	1.15	0.00	158.46

Table 13.5a. Summary of Conifer Volume in Chir Rehabilitation Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	5389.02	12226.46	27089.91	51877.47	63649.44	41349.14	9289.64	0.00	0.00	210871.08
Deodar	1233.63	6832.37	13285.31	16781.42	15682.58	21925.67	25441.78	10263.56	0.00	111446.31
Kail	64.93	1897.85	4754.68	5668.73	3336.26	0.00	2672.05	0.00	0.00	18394.49
Fir/ Spruce	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	6687.58	20956.68	45129.89	74327.63	82668.28	63274.80	37403.46	10263.56	0.00	340711.89

Table 13.5b. Summary of Conifer Volume per hectare area of the Chir Rehabilitation Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	4.15	9.42	20.86	39.95	49.02	31.84	7.15	0.00	0.00	162.39
Deodar	0.95	5.26	10.23	12.92	12.08	16.88	19.59	7.90	0.00	85.82
Kail	0.05	1.46	3.66	4.37	2.57	0.00	2.06	0.00	0.00	14.17
Fir/ Spruce	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.15	16.14	34.75	57.24	63.66	48.73	28.80	7.90	0.00	262.38

13.6 Silvicultural System Adopted

13.6.1 Unfortunately little attempts were made to regenerate these forests under the proposed system of treatment of earlier plan. All attempts have met with utter failure expect very few closure plantation which though not satisfying but do represent some limited attempts to restock Chir forests. Excessive grazing, frequent fires and reduced seed production are primarily responsible for failure of regeneration establish. Heavy and unscientific resin tapping in the past has resulted in large number of trees either die, or break at the base creating large gaps in the canopy. Though resin tapping was banned

13.6.2 The total area under Chir in this working circle comes to about 2955.50 hectare of which 1656.94 area is uncommercial/blank. The plantation work should be carried 1881.17ha area of Chiralla range and 1074.33 ha area of Kellar range.

13.6.3 The condition of Chir crop, at present, is as following:

- The crop is very open and patchy with large gaps in the canopy.
- Regeneration is neither adequate, nor is showing any signs of coming up.
- Mortality among mature and over mature trees is high.

13.6.4 The canopy is already quite open and there are no sizable areas of mature and over-mature trees that can be utilised for resin tapping. Under such circumstances, felling of trees under any regular silvicultural system cannot be prescribed. All efforts have to be directed towards regenerating the failed areas. Resin tapping in such circumstances cannot be carried out. There shall be a complete moratorium on resin tapping for the currency of present plan. Removals will be directed to dead trees and those mature/ over mature trees that are actually standing over established regeneration/ advance growth and actively interfering with their growth and development. Other than that, no fellings are prescribed.

13.6.5 However, since the aim of management is to rehabilitate and improve the existing forest crop by adopting strict forest protection and improvement measures. This treatment shall be continued till such time the Chir forests rehabilitates to the extent where they can be brought under some kind of silvicultural system.

13.6.6 Subsidiary Silvicultural Operations

The subsidiary silvicultural operations constitute an integral and most important aspect of management of Chir forests covered under this working circle. These operations include disposal of debris, Protection against fires and control of grazing etc. discussed as follows:

1. Disposal of Debris

By and large, the Chir forests occupy area near and around the human populations. The forests are being opened more and more because of development of the net work of roads and foot paths. The debris left over after felling or after natural demage, being highly combustible, constitutes potential source of fire in these forests. Fortunately most of the felling refuse is taken off by the local concessionists for their domestic use as fuel-wood. However, if such is not the case, the debris should be burnt off in heaps at safer places during the safe period of the year.

2. Protection Against Fire

Frequent fires are one of the major causes responsible for failure of regeneration in these forests. Chir, though a fire hardy species, is badly damaged by frequent fires. Dry needles, resinous wood and resin channels render these forests more prone to fire. Hotter aspects and areas in the vicinity of habitation are more susceptible to fires. Most of these fires are intentional. Fire has many others harmful effects on the soil and the ground flora and fauna of these forests. The following measures are recommended for effective control and protection against fires:

i. Fire Lines

1. Most of the Chir forests are broken by *chaks* and cultivation and fire lines are not needed in such areas. The net work of foot paths already existing, if extended and maintained well over the area, will serve the purpose of fire lines. Fire lines, however, are recommended in areas having continuous, unbroken stretches and belts of Chir forests. These forests also need to be separated by means of adequate fire lines from other conifer and broad leaved patches in higher reaches.

2. The areas bearing young and unestablished regeneration, steep, with shallow soil cover, or where the artificial regeneration is being induced, need to be separated from rest of the area by providing internal fire lines all around the area.

3. Temporary fire lines of 20 metrrs to 30 metres width are recommended whenever required. In temporary fire lines felling of trees need not be done to clear up the area but should be controlled burnt every year.

ii. Control Burning

While carrying out controlled burning, the following points should be kept in consideration:

1. It should generally be done during the period 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 regeneration is 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 metre radius around each tree under tapping is cleared of chips and other inflammable material before control burning.

6. Small patches of unestablished regeneration should be strictly protected against any damage during the operation of control burning.

7. Inspection / observation posts should be located at vintage points to keep a close watch over any forest fires especially during the hot season.

8. Adequate number of fire watchers should be engaged to actively work for the protection of these forests from fires.

iii. Tending

Cleaning in congested patches of young regeneration above 2.5 metre height is beneficial to the crop. Cleaning and thinning in sapling stage of established regeneration is a must for artificially regenerated crops. There are only few compartments having congested young crop which need tending operations. Since artificial plantations are envisaged to be raised during this plan period, the follow up tending operations on the standard prescriptions are needed in the near future.

13.6.7 Regeneration Programme

The success of any treatment given to the crop, depends largely on the efforts put in to regenerate the forests in due course of time. It is very difficult to regenerate these forests naturally, except in a very limited area where biotic interference is either minimum or absent. Almost all the Chir forests are under heavy biotic pressure. The heavy uncontrolled and unrestricted grazing is one of the two main reasons for failure of Chir areas to regenerate. Every passing year, the areas deficient in young regeneration, are expanding.

Effective closure and strict fire protection, till the regeneration is established, are the two most important measures for the success of any regeneration programme. In most of the areas bearing scant crop of Chir, a mere effective closure along with adequate protection against fire will be sufficient to regenerate such area. The crop in such areas can be supplemented with artificial sowing and or planting. The areas which are unlikely to respond to the closure, should be taken up for direct sowing in patches and planting of seedling raised in polythene bags. Direct sowing is also prescribed to be done as soon as the coupe is vacated after felling.

In case of plantation in Chir Rehabilitation Working Circle, effective closure and strict fire protection, till the regeneration is established, are the two most important measures. In most of the areas bearing scant crop of Chir, a mere effective closure along with adequate protection against fire will be sufficient to regenerate such area. The crop in such areas can be supplemented with artificial sowing and or planting. The areas which are unlikely to respond to the closure, should be taken up for direct sowing in patches and planting of seedling raised in polythene bags. The plantation area should be

60% of the under stocked areas in this working circle to be restocked in next 20 years. Chir is quite conveniently raised by direct sowing in any of the following manners:

i. In patches about 2 meters apart with soil dug up to about 30 cm depth. This technique is quite suitable when there is enough moisture in the soil.

ii. In contour lines 30 cm wide and spaced 2 to 3 metre apart with the dug up earth mounded on the downhill side to conserve moisture. This is useful on slopes where there is some deficiency in the soil moisture.

iii. Contour trenches, preferably broken. This is useful on dry and hot aspects.

13.6.8 Nursery and Plantation Techniques

Pinus roxburghii

Found between 500 to 2300 metre height. It is a light demander, but requires protection from the sun on stiff soils on hot and dry aspects. It is a frost and drought hardy species, most fire-resistant of all the conifers. However, young seedlings are damaged by fire. It is not readily browsed except in heavily grazed areas.

Seed: Cones ripen in the cold weather. They should be collected in March-May, dried in sun and seeds be shaken out. Seeds can be stored in sealed tins up to 4 years. Approximately 10,000 seed weigh a kilogram. And on an average, 16 to 18 kg of cones yield 20 g of pure seed. Germination may be 70 to 100 percent, completes in a month after initiation.

Nursery Technique: Dibbled or broadcast sowing of seeds be done in shaded beds, during March-April at the rate of 100 g seeds per sq. metre bed area. Seedlings be pricked out 10 cm apart, in June-July.

Inoculation with Mycorrhizae: *Pinus* cannot grow without mycorrhizae. Mycorrhizae helps the development of roots and absorption of water and nutrients in *Pinus*. The potting mixture for raising *Pinus* seedling therefore, must be inoculated with mycorrhizae. This is done by collecting the soil around large Pinus trees. This soil should then be mixed with potting mixture/ nursery soil in the ratio of 1:9. The soil collected from pine forests for inoculation should not be kept under sun because the mycorrhizae may get killed.

Planting Technique: Seedlings be transplanted at 2 x 2 metre spacing in prepared pits during August when they are 10-15 cm in height. Much weeding and cleaning not required on dry sites. Young seedlings are damaged by grass-hoppers, birds, rats and porcupines etc.

(a) Oak (*Quercus leucotrichophora).*

Found between 1200 to 2400 meters. Seed: They are normally attacked by insects but seed years are frequent. Seeds are large (on an average 550 per kg). They are collected in December- February and can be stored for a year in cool and dry place. Germination capacity is high, up to 95 percent but takes a month to complete germination.Pre sown treatment of seeds*:*

The hard impermeable seed coat must be made soft to accelerate germination. Also, the stratification treatment is required for uniform germination of seeds. The treatment is imparted to seeds in the month of January. For imparting the treatment to the seeds, a poythene sheet of size about 4' X 5' is laid down in the open area and all the sides are raised to 6" height to make it as a trough. The seeds are spread as a layer of about 1" height uniformly over the sheet and water column of about 3" is maintained over the seeds. The water will be bit warm during the day time due to exposure to direct sun light but it will be very cold during the night hours. The seeds must be kept in the same arrangement for about 20 days. If water evaporates, water must be added to maintain the level. The alternate cold and warm treatment will soften the seed coat and the seeds will imbibe water and start sprouting in 15-20 days. The imbibed, sprouted seed shall be sown in the raised beds for further germination.

13.6.9 Control of Grazing

Grazing in Chir forests is a serious problem. Unrestricted, uncontrolled, unregulated and heavy grazing is responsible for the failure of Chir forests to regenerate naturally after the fellings. Large herds of migratory as well as local livestock graze these forests all

round the year. As a result of heavy grazing, young seedling and saplings are trampled and destroyed. The areas highly subject to grazing are prescribed to be effectively closed to the exclusion of grazing and taken up for artificial regeneration by planting and patchsowing

WORKING PLAN FOR

REBOISEMENT WORKING CIRCLE

14.1 General constitution of Working Circle

14.1.1. This Working Circle has been constituted to include the areas that, despite having good site quality, have been rendered unproductive and under stoked mainly due to excessive biotic interference. Certain areas that have become poorly stocked due to natural phenomenon like landslides, wind throw and fire are also included in this Working Circle. For protection and recouping of tract along the town and village boundaries, the compartment situated adjacent to the town and villages have also been included in this Working Circle. These areas have deteriorated due to the human pressure. To objectively identify such compartments the degree of degradation was ascertained by studying the crop stand by visiting those compartments as well as using Satellite imageries and accordingly the productive compartments having poor stand have been allotted to this Working Circle. These compartments when restocked shall become suitable for forest working.

14.2. General character of the Vegetation

14.2.1. The compartments included in the Working Circle generally have Conifer stand. These compartments have preponderance of Kail along with other principal conifer species of Deodar and Fir. The stocking in general is very poor with perceptible large opening in the stand often colonized by weeds.

Table 14.1 Normal and Actual Distribution of Stems Over Diameter Classes.

Diameter – class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Normal Distribution % age	41.00%	5.00%	5.00%	9.00%	5.00%	3.00%	2.00%
Actual Distribution % age	8.59%	0.66%	4.40%	16.48%	20.27%	14.21%	15.40%

14.2.2. The table above shows that there is a preponderance of trees in the higher diameter classes whereas the number of stems in lower diameter classes is deficient, primarily because of the heavy biotic pressures. This data is alarmingly skewed and the distribution of stems is in undesirable proportion. The density of these compartments on an average is between 0.3 to 0.4. This is suggestive of the fact that the creation of large openings has resulted in the establishment of advance growth. However, due to intense biotic pressure the areas have been excessively under stocked. The biotic interference can be categorized into two types (a) Grazing pressure (b) Illegal felling of trees. Such under stocking has reduced these compartments unfit for forest working unless sufficiently restocked. In these areas heavy lopping has resulted in the loss of lower and upper middle branches leaving only small apical foliage. As a result, these trees are unable to bear the seeds. Such trees are virtually pruned to death because even the biological need of such trees are not met because of deficient photosynthesis. Another major issue faced in these area is illicit girdling predominantly in forests around human habitation. Such illicit activities are carried out as an attempt to encroach the forest areas.

14.3. Objectives of Management

1. To recoup the depleted and open forests by intensive plantation operations.
2. Closure of areas undertaken for treatment to enable exclusion of all forms of biotic interference.

14.4. Block and compartments

14.4.1. The compartments included range wise in this Working Circle are as below:

Table-14.2

Range	Block	Compartment	Compartment Area (ha)	Forested Area (ha)
Bhalesh	Chilli	9/Bh, 11/Bh, 12/Bh, 17/Bh, 18/Bh, 20/Bh and 47/Bh	2822.22	333.53
	Jatota	15/Jt	75.94	14.85
	Kilohtran	106/Bh, 107/Bh and 109/Bh	610.12	133.81
	Neeli	51/Bh, 57/Bh and 79/Bh	364.97	77.03
	Pingal	1/BH, 2/Bh and 3/Bh	525.44	95.12
Chiralla	Chiralla	1a/Ch, 1b/Ch, 2/Ch, 3b/Ch and 9/Ch	368.23	122.99
	Jai	2/Jai, 3/Jai, 4a/Jai, 4b/Jai, 5a/Jai, 9/Jai, 31/Jai, 35/Jai, 36a/Jai, 36b/Jai and 37b/Jai	1460.54	531.13
	Jangalwar	14/Jwr	61.64	35.90
	Guraka	5/K, 9/K, 19/K and 20/K	676.25	300.19
	Malothi	23/K, 41/K,49b/K, 52/K,53/K and 60b/K	758.36	386.04
	Marmat	6b/M	71.45	24.29
	Trown	62a/K and 62b/K	182.13	98.26
Neeru	Duggi	11/N and 12/N	400.21	88.50
Total			**8377.5**	**2241.64**

14.5. Analysis and valuation of crop

13.5.1. The crop stand was estimated by laying 58 number of sample plots, purely to get a fair idea on the age class distribution and species composition. The forested area in compartment was then segregated into dense and open. From the analysis of the Satellite and onsite visits, it is observed that the compartments have almost 73.24% of its area with open forests. The assessment of stem distribution and Growing Stock was ascertained for academic purposes and for the purpose of future monitoring and ascertaining the improvement in stand after administration of treatment. Mean values of two variables viz. number of stems per hectare, and volume per hectare have been computed and tabulated diameter-class wise and species wise. Statistical tests have been applied to the sampling data and the results of statistical analysis are summarized in Table 14.3

Table-14.3. Results of Statistical analysis for Reboisement Working Circle

	Statistical Attributes	
	No. of Stems	**Volume (Cum.)**
Attribute total	10130	21718.8
No. of sample plots (n)	58	58
Mean X	174.655	374.462
Variance (S^2)	6611.28	41919.57
Standard Deviation S	81.31	204.743
Standard Error S.E	10.677	26.884
Coefficient of Variation %	46.555	54.677
95% Confidence Lower Limit	153.728	321.769
95% Confidence Upper Limit	195.582	427.155
Confidence Interval (CI)	41.854	105.386
Lower Limit as % of Mean	88.018	85.928

Row 5: S.E. = S/ √n

Row 6: C.O.V (%) = (S/X) x 100

Row 7: Lower limit = X - 2.100922 x S.E.

Row 8: Upper Limit = X + 2.100922 x S.E.

Row 9: C.I. = Upper limit - Lower limit

Table 14.4a. Summary of total No. of Conifer Stems in Reboisement Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	386.46	772.92	0.00	772.92	386.46	386.46	0.00	0.00	0.00	2705.21
Deodar	26281.21	22802.86	24735.38	37489.41	22802.86	19324.51	7729.85	772.92	772.92	162711.91
Kail	47538.24	28986.65	32465.22	32465.22	24348.92	13140.72	4251.49	2705.44	1932.52	187834.41
Fir/ Spruce	1159.38	3864.81	7343.39	8502.76	8116.31	5410.87	1546.06	1159.38	1159.38	38262.33
Total	75365.28	56427.23	64543.99	79230.32	55654.54	38262.55	13527.40	4637.73	3864.81	391513.86

Table 14.4b. Summary of Conifer Stems per hectare area of the Reboisement Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.17	0.34	0.00	0.34	0.17	0.17	0.00	0.00	0.00	1.21
Deodar	11.72	10.17	11.03	16.72	10.17	8.62	3.45	0.34	0.34	72.59
Kail	21.21	12.93	14.48	14.48	10.86	5.86	1.90	1.21	0.86	83.79
Fir/ Spruce	0.52	1.72	3.28	3.79	3.62	2.41	0.69	0.52	0.52	17.07
Total	33.62	25.17	28.79	35.34	24.83	17.07	6.03	2.07	1.72	174.66

Table 14.5a. Summary of Total Conifer Volume in Reboisement Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	50.21	370.99	0.00	1708.35	1368.07	1882.31	0.00	0.00	0.00	5379.94
Deodar	3416.48	17330.12	32898.08	78727.97	71601.12	84834.42	43750.54	5294.98	5843.73	343697.44
Kail	6179.98	22029.94	44152.69	73695.93	81325.13	58081.56	22745.02	16611.22	13024.60	337846.08
Fir/ Spruce	150.64	3246.57	11455.45	25253.20	39769.83	37064.40	12831.37	10899.08	11815.01	152485.54
Total	9797.31	42977.62	88506.22	179385.45	194064.15	181862.68	79326.93	32805.28	30683.34	839409.00

Table 14.5b. Summary of Conifer Volume per hectare area of the Reboisement Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.02	0.17	0.00	0.76	0.61	0.84	0.00	0.00	0.00	2.40
Deodar	1.52	7.73	14.68	35.12	31.94	37.84	19.52	2.36	2.61	153.32
Kail	2.76	9.83	19.70	32.88	36.28	25.91	10.15	7.41	5.81	150.71
Fir/ Spruce	0.07	1.45	5.11	11.27	17.74	16.53	5.72	4.86	5.27	68.02
Total	4.37	19.17	39.48	80.02	86.57	81.13	35.39	14.63	13.69	374.46

14.6. Methods of Treatment

14.6.1. In view of the discussion above, and in order to achieve the special objects of management, these forests require complete rest, and strict protection from biotic interference, the most important being grazing, fire, illicit damage, encroachments and lopping. The following treatment is prescribed to be given to these forests:

i. There is an urgent and immediate need to rehabilitate these forests through such measures as strict closure to grazing, assisted natural regeneration and artificial regeneration by planting and sowing of most suited species among conifers.

ii. The selected localities, which are too difficult to be planted with conifers, shall be planted with suitable and desirable broad leaved species.

iii. The degraded forests near and around the huge human settlements, shall be planted with fruit, fodder and firewood yielding and soil enriching species with a view to lessen the pressure on the commercial forests. Besides, these species will help in improving the rural economy.

iv. Intensive soil conservation measures, including closure, planting and engineering works are necessary in areas under the grip of soil erosion.

v. Highly degraded and dry sites may be planted with hardy and drought resistant species like *Robinia pseudoacacia*, *Ailanthus spp, Prunus armeniaca* and other broad leaved species.

vi. The areas of tourist attraction shall be treated suitably according to their requirement, in order to improve their sylvan beauty.

Regeneration Programme

The plantation works in the Reboisement Working Circle on the other hand shall be undertaken intensively by closure of area to be replanted or restocked. Functionally the regeneration of worked out forests should be restocked by the Forest department, on the other hand the compartment in Reboisement Working Circle which are very near to the town and villages can be planted by Social Forestry Department. It would be appropriate to recoupe these forests keeping in mind the requirements of the people and as such can be planted with fruit, nut and fodder crops. The plantation

should be protected by fencing. Barbed wire fencing by past practice has been found insufficient to secure the area due to the heavy intensity of grazing and browsing live stocks. The plantation should be taken up progressively from the top of the hill downwards and as far as possible in continuity. The area treated should be opened up after 5 years as a rule, unless extended by the permission of Conservator of Forests. The materials used in fencing whatever salvageable should be reused in the next year plantation.

Attempt should not be made to afforest natural blanks and pastures.

- Blanks created due to removal of trees in the past should be reforested with suitable conifer species. In case excessive degradation has occurred, only indigenous broad leaved species may be planted to arrest the process of degradation.
- In areas where the density of overhead canopy is sparse, only suitable conifers species should be planted.
- Planting should be done in pits not less than 45 x 45 cm in size and large sized planting stock should be used. Transplantation of wildlings from congested patches of regeneration can also be experimented.

In order to achieve the above targets, well conceived schemes needs to be drawn at micro level, taking into consideration all the factors likely to affect this programme, in due course of time. Honest and sincere efforts are required to be put in at all levels in achieving the objects with success. It is suggested that areas be selected on yearly basis in order of priority, keeping in view of the overall condition of the area.

14.7 Nursery and Plantation Techniques

Aesculus indica

Found at 1200 to 2700 metre height in moist, shady ravines and northern aspects.

Seed: Ripen in September-November, should be collected from the trees or ground. Can be stored in dry earth till spring. About 640 seeds weight a kilogram. Germination capacity is fairly high (70-90 percent).

Nursery Technique: Seed sowing be done in autumn immediately after seed collection. Patches be kept at a spacing of 2 x 2 metres in shady, cool beds. Sowing be done 5 cm below the soil in drills, 15-30 cm apart. Some watering is required.

Planting Technique: Seedlings (6,12 and 18 months old) with naked roots are transplanted during winter, in prepared pits at 2 x 2 metres spacing. Weeding and cleaning be done for 1-2 years. Dry exposed situations be avoided for planting work.

Ailanthus excelsa

Seed: Fruits ripen in May-June. They are winged and are disseminated by wind. They should be dried in sun, beaten mildly and winnowed. Seeds loose the viability quickly, and cannot be stored for use in the next year even in sealed containers. Approximately 9000 to 10,000 seeds weight a kilogram. Germination capacity varies from 60 to 80 percent.

Nursery Technique: Seeds be sown in raised seed beds in May-June. Germination commences in about 10-12 days and completes in approximately 30 days. Seedlings be pricked out in polythene bags for the use in next year.

Planting Technique: One year old polybag seedlings are planted in the field in July at a spacing of 2 x 2 metres in pits of 30 cm size. Good fertile soil and about 5 kg farm yard manure be added to each pit. By the end of the first growing season, seedling may reach an average height of 10 to 20 cm only. From the second season onwards, the growth is more rapid i.e. 50 to 60 cm per season. Seedlings are subject to insect attack, particularly in their early stages of development. They are also sensitive to frost. Protection against the above two calamities be applied in advance.

Alnus nepalensis

Found between 800 to 2700 metre. It is susceptible to snow-break, frost, grazing and insect attack. Fast growing.

Seed: Fruits ripen in February-March. They should be collected by lopping the branches. Seeds be extracted after sun drying by beating the cones. Seeds are very minute, about 8 lakhs per kg. They should be dried before storage. Germination is about 70 percent, 4 to 6 weeks after sowing.

Nursery Technique: Direct or broadcast sowing be done in February-March in shaded beds; should be covered by mulch. At low elevations i.e. below 1500 metre, transplanting in May and at higher elevation planting be done in the following rains.

Planting Technique: Seedlings 15 cm to 75 cm long, with or without the ball of earth around the roots be planted out in prepared pits, at the beginning of first or second rains. Autumn transplanting in September and winter transplanting be done in January. It is successful in moist and humid localities, requires no tending after the third year.

Juglans regia

Found between 1200 to 3300 metre. It is somewhat sensitive to frost and drought. Browsed by deer and damaged by stem and shoot borers. Grows beat in fairly moist localities and does not thrive in exposed windy situations. It avoids badly drained soils.

Seed: Fruits ripen in September-October, can be collected by beating and shaking the branches. Outer fleshy coats be removed or be rotten off and nuts be dried in the sun. Should be stored in a well ventilated room, in tins or jars or in a pit in dry ground, filled with dry earth until required for sowing. Nuts 90-100 per kg. Germination capacity is 70 to 80 percent. Gets completed in 5-7 weeks normally.

Nursery Technique: Nuts may be dibbled in pits 2 x2 metres apart, during autumn, before snowfall or in January-February. Two seeds per patch 5 cm deep be sown, should be covered with thorns. Seeds may also be sown in 25 cm deep drills, in lines 10 cm apart.

Planting Technique: Seedlings, without or with earth ball around the roots, be transplanted in the first winter. However, second winter transplants are better for difficult sites. Transplanting during the rainy season is not so successful. Thorough weeding and soil working be done for the first/second year. It is sensitive to weed competition.

Robinia pseudoacacia

It is a native of North America, and can grow at an elevation of 1500 to 2000 metres. It can grow on a variety of soils but not on very sandy, very acidic or wet soils. Drainage is an important factor affecting the growth of this species.

Seeds: They are dried in the sun, thrashed and winnowed to obtain clean seeds. About 33 to 77 seeds weigh a gram. They can be stored in airtight containers for one year at room temperature without any appreciable loss in their viability. But, in a dry place and at low temperature (0 ^{o}C to 4 ^{o}C) seeds can be kept viable for 5 years in sealed containers. Seeds require pre-sowing treatment (Sulphuric acid scarification of a short-while, or immersion in hot water).

Nursery Technique: Sowing be done in beds in lines 20 cm apart. Depth of sowing should be about 1.5 cm. Sowing in irrigated nurseries be done in March-April, but in rain-fed nurseries, in June-July. Germination starts in a week and continues up to 10 days. About 85 percent germination can be obtained if the seeds are pre-treated.

Planting Technique: Eight-nine month old seedlings can be planted in 30 cm^3 pits at a spacing of 2.5 x2.5 metres. In poor sites, 2 x 2 metres spacing can also be used. Naked rooted plants may also be used for planting. Plantation areas be closed for grazing.

WORKING PLAN FOR THE PROTECTION WORKING CIRCLE

15.1 General Constitution of the Working Circle

15.1.1 All those demarcated forests of Bhadarwah Forest Division that have not been covered under any of the working circles described heretofore shall be allotted to this working circle. This working circle to a greater extent is identical in constitution to the corresponding working circle of the plan under revision.

15.2 General Character of the Vegetation

15.2.1 This working circle includes the following categories of forest area, most of which, formed the Unregulated Working Circle and the Protection-cum-Improvement Working Circles of the earlier plans.

i. All the rocky and stony forests area, mostly consisting of the steep to precipitous hill slopes, which are devoid of vegetative covering.

ii. All the forest areas situated at high altitude, on steep to precipitous terrain, uneconomical for commercial exploitation because of their inaccessibility and poor stocking.

iii. The forest areas of any description, tough relatively better stocked, yet their protection and preservation is essential for soil and water conservation, preservation of wild life, and the maintenance of aesthetics of the tract.

iv. All the forests area as are inherently unproductive and incapable of reboisement under the prevailing set up of circumstances.

As the area allotted to this working circle is spread almost all over this division, the types of vegetation encountered varies from sub-tropical pine forests in the low lying areas to high level pasture land at higher elevation. By and large, all the forest types as discussed in detail in the Chapter II of Part I of this plan, are met with in this working circle.

Table 15.1 Normal and actual distribution of stems over diameter-classes

Diameter – class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Normal Distribution in percentage	41.00%	25.00%	15.00%	9.00%	5.00%	3.00%	2.00%
Actual Distribution in percentage	13.16%	11.31%	12.96&	14.29%	14.66%	12.49%	21.12%

The table above show the preponderance of stems of higher dia classes. It is due to complete protection and absence of biotic pressures.

15.3 Area and Allotment

15.3.1 The area statement of compartments/ sub-compartments allotted to this working circle is provided in Appendix IX. Table 15.2 gives the range wise abstract of the area under Protection Working Circle. The area allotted to this working circle is 31.44% of the total area of this division.

Table: 15.2

Range	Block	Compartment	Compartment Area (ha)	Forested Area (ha)
Bhalesh	Chilli	10/Bh, 13/Bh, 14/Bh, 15/Bh, 16/Bh, 21/Bh, 22/Bh, 23/Bh, 24/Bh, 25/Bh, 26/Bh, 27/Bh, 30/Bh, 31/Bh, 32/Bh, 34/Bh and 42/Bh	6591.72	1550.64
	Kilohtran	84/Bh, 86/Bh, 87/Bh, 91/Bh, 92/Bh, 99/Bh, 100/Bh, 105/Bh and 108/Bh	2187.24	816.69
	Neeli	56a/Bh, 58/Bh, 61/Bh, 63/Bh, 65/Bh, 66/Bh, 67/Bh, 71/Bh, 72/Bh, 75/Bh, 77/Bh, 78/Bh, 81/Bh, 82/Bh and 83/Bh	5026.74	1123.05
	Pingal	4/Bh, 5/Bh, 6/Bh, 7/Bh, 8/Bh and 48/Bh	1694.76	615.41
Chiralla	Jai	1a/Jai, 1b/Jai, 5b/Jai, 13a/Jai, 19a/Jai and 37a/Jai	594.44	240.57
	Jangalwar	1/Jwr, 9a/Jwr, 9b/Jwr, 10/Jwr, 11a/Jwr and 11b/Jwr	1184.31	508.67
Kellar	Guraka	11/K, 18/K and 22a/K	383.61	216.20
	Malothi	31/K, 37/K, 38a/K, 39a/K, 39b/K, 42b/K, 45b/K, 46/K, 51/K and 56/K	2746.59	1203.49
	Marmat	1b/M and 3/M	578.00	253.25
	Trown	66b/K	75.03	37.04

Neeru	Dandi	54/N, 56/N, 58a/N, 62/N and 65/N	1364.80	785.02
	Duggi	1a/N, 4a/N, 9/N, 10/N, 20/N, 21/N, 22a/N and 22b/N	688.93	168.94
	Padri	4/Pd and 5/Pd	690.93	324.37
	Puneja	27/N, 28/N, 29/N, 30a/N, 38/N, 39/N, 40c/N, 41b/N, 42a/N and 44/N	3733.57	1818.94
Total			**27,540.67**	**9662.60**

15.3.2 The area allotted to this working circle works out to be 31.44 percent of the total area of this division. Out of the total area of this working circle, 64.91 percent is non-forested, and 35.09 percent is under forest cover of varying density.

15.4 Special Objects of Management

- To protect and preserve the vegetative covering of the area from further deterioration and degradation in the interest of soil and water conservation, and the aesthetic value of the hill tops and slopes.
- To improve the conditions of the existing crop by protecting these areas till they become fit for working as whole or in parts, sometimes in the future.

15.5 Analysis and Valuation of the Crop

15.5.1 The quantitative assessment of the growing stock and preparation of its inventory, in this working circle, has been made on the basis of the data collected and analysed from 113 sample plots, selected at random, located, surveyed and studied in the field by means of 0.1 Ha sample plot Technique.

15.5.2 Mean values of two variables viz. number of stems per hectare, and volume of conifers 30 cm d.b.h and above, have been computed and tabulated diameter-class wise and species wise. Statistical tests have been applied to the sampling data and the results of statistical analysis are summarized in Table 15.3.

Table 15.3. Summary of Statistical tests of Protection Working Circle Data pertains to Forested area of the working circle

S. No.		Statistical Attributes*	
		No. of Stems	Volume (Cum.)
1	Attribute Total	29870	82957.8
2	No.of sample plots (n)	113	113
3	Mean X	264.336	734.14
4	Variance S2	10444.566	149575
5	Standard Deviation S	102.199	386.749
6	Standard Error S.E	9.614	36.382
7	Coefficient of Variation %	38.663	52.681
8	95% Confidence Lower Limit	245.493	662.831
9	95% Confidence Upper Limit	283.179	805.449
10	Confidence Interval (CI)	37.686	142.618
11	Lower Limit as % of Mean	92.872	90.287

Row 6 : S.E. = S/ √n

Row 7 : C.O.V (%) = (S/X) x 100

Row 8 : Lower limit = X – 1.96 x S.E.

Row 9 : Upper Limit = X + 1.96 x S.E.

Row 10 : C.I. = Upper limit - Lower limit

Table 15.4a. Summary of total No. of Conifer Stems in the forested area of Protection Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	0	0	0	0	0	0	0	0	0
Deodar	159048	105177	93205	82945	75248	55581	15392	10261	4276	601133
Kail	196673	92350	102612	99191	60712	40190	19667	11971	6841	630207
Fir/ Spruce	269356	133395	169309	192397	182991	162469	76104	74393	62422	1322836
Total	625077	330922	365126	374533	318951	258240	111163	96625	73539	2554176

Table 15.4b. Summary of Conifer Stems per hectare area of the forested area of Protection Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deodar	16.46	10.89	9.65	8.58	7.79	5.75	1.59	1.06	0.44	62.21
Kail	20.35	9.56	10.62	10.27	6.28	4.16	2.04	1.24	0.71	65.22
Fir/ Spruce	27.88	13.81	17.52	19.91	18.94	16.81	7.88	7.70	6.46	136.90
Total	64.69	34.25	37.79	38.76	33.01	26.73	11.50	10.00	7.61	264.34

Table 15.5a. Summary of Total Conifer Volume in the forested area of Protection Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0	79934.82	123963.4	174182.9	236280.5	244001.9	87117.04	70288.65	32322.36	1068768
Deodar	20676.03	70186.23	139552.1	225164.7	202777.4	177638.2	105219.9	73504.36	46107.03	1065717
Kail	25567.24	112052.3	264122.3	571419.1	896655.5	1112909	631660.6	699298.8	636081.2	4959215
Fir/ Spruce	35016.29	262173.4	527637.9	970766.6	1335713	1534549	823997.6	843091.8	714510.6	7093700
Total	81259.56	79934.82	123963.4	174182.9	236280.5	244001.9	87117.04	70288.65	32322.36	1068768

Table 15.5b. Summary of Conifer Volume per hectare area in the forested area of the Protection Working Circle:

Species	<30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deodar	2.14	8.27	12.83	18.03	24.45	25.25	9.02	7.27	3.35	110.61
Kail	2.65	7.26	14.44	23.30	20.99	18.38	10.89	7.61	4.77	110.29
Fir/ Spruce	3.62	11.60	27.33	59.14	92.80	115.18	65.37	72.37	65.83	513.24
Total	8.41	27.13	54.61	100.47	138.24	158.81	85.28	87.25	73.95	734.14

15.5.3 The average growing stock of this working circles, in terms of the woody forested area of the working circle works out to 29810 stems of conifer per hectare, corresponding to a volume of 826775 m^3 per hectare of conifers.

15.6 Exploitable Size

15.6.1 No regular fellings are prescribed in the area assigned to this working circle. However, if and when trees are to be marked for special reasons like meeting the petty genuine demands of the concessionists or otherwise, the exploitable diameter shall be adopted as 70 cm d.b.h for Deodar, Kail, Chir and 80 cm d.b.h for Fir and Spruce.

15.7 Method of Treatment Prescribed

- Afforestation in blank areas.
- No green felling, of what-so-ever nature, shall be allowed in these areas.
- There shall be strict control against fires illicit damage, encroachments and excessive grazing etc.
- Regeneration of vast blanks through aided natural regeneration and artificial regeneration.

WORKING PLAN FOR THE GRASSLAND DEVELOPMENT (OVERLAPPING) WORKING CIRCLE

16.1 General Description and Character of the Vegetation

16.1.1 The Bhadarwah forest division is considered to be the paradise of the graziers. There is a sizeable area under pasture land in the alpine and sub-alpine zones. These pastures lands are mostly devoid of tree growth and sustain a variety of medicinal herbs and shrubs, and palatable and unpalatable grasses. It will be pertinent here to define the difference between the alpine and sub-alpine blanks. The alpine blank is a tree less area occurring above the tree limit, generally beyond 2900 metres above the mean sea level. A vast stretch of area of this category occurs in this division.

16.1.2 The sub-alpine blank is a tree less blank within the woodland limit of 2000 metres to 2900 metres altitude. All the areas under these blanks cannot be considered as pasture land, as some of these includes rocky outcrops, snow bound area, glacial moraines etc. Only the area which has definite pastoral use at present can be classified as culturalable pasture land. In addition, in the low lying sub-tropical areas, many blanks and freshly exposed sites are covered with grasses.

16.1.3 With reference to the classification of Grassland Types of India by Dabadghao and Shankar Narayan (1973), grasslands of Bhadarwah Forest Division fall in the following categories.

16.2 *Themeda- Arundinella Type*

16.2.1 This type colonizes the sub-tropical regions of this division. The predominant perennial species characterizing the type are *Arundinella nepalensis*, *Cynodon dactylon, Eulaliopsis binata, Bothriochloa intermida, Heteropogon contortus* and *Chryopogon fulvus*. Important annual grass species are *Apluda mutica* and *Eragrostis unioloides*.

16.3 *Temperate Alpine Type*

16.3.1 This type occurs in the higher reaches of this division. The principal perennial species are *Agropyron canaliculatum, Chrysopogon gryllus, Phleum alpinum, Agrostis canning*

and *Poa pratensis*. The associated annual species include *Poa annua, Polypogon fugax, Oryzopsis lateralis* and *Poa swertiana.*

16.3.2 Due to large number of ever increasing grazing animals in the locality, most of the fir forests of this division have suffered heavily on account of unrestricted, uncontrolled and unregulated grazing. Since these grazing lands carry more than the optimum number of live stock, a pronounced depletion of the palatable grass species has taken place, accompanied by an invasion of unpalatable species and obnoxious weeds. The grazing lands, as result of over grazing, exhibit a depleted and degraded look. Such kind of grazing is not only inimical to the regeneration of conifers, but is also responsible for the deterioration of pasture lands.

16.4 Distribution of the Area

16.4.1 The compartment wise distribution of area under high pasture land, rocky stony waste land and other blanks has been indicated in area statement of the respective working circles. These areas having shall be taken up for grassland management.

16.5 Incidence of Grazing

16.5.1 The incidence of grazing in the forests of this division is roughly estimated on the basis of total number of animal units grazing in these forests vis-à-vis the area of the forests including pasture lands. For calculating the total number of animal units the following conversion factors have been applied:

1 cattle (cow- ox)	=	1 animal unit
1 Calf (less than a year old)	=	½ animal unit
1 Horse/ Pony	=	1 animal unit
1 Buffalo	=	2 animal units
1 Sheep	=	½ animal unit
1 Goat	=	½ animal unit
1 Others	=	1 animal unit

16.5.2 Roughly about 48,000 cattle units are the permanent residents of the division area. The migratory graziers are bringing about 100,000 cattle units to this division during

summer months every year. This figure is far beyond the carrying capacity of the existing grass lands and pastures.

16.6 Migratory Graziers

16.6.1 Routes of Migratory Graziers

The migratory graziers originate from the plain areas of the state Like Kathua and Samba Districts during the month of April and reaches the alpine pastures by end of May every year. All along the way, they come walking along with their livestock and move in a group. Those who originate from plains of Jammu province and destined to reach Bhadarwah division following the regular route to reach their respective destination. Those from Kathua region cross Kaplash ridge from Bani/Basoli side towards Neeru valley and then via Jai Valley to Bhalesh and Padder region.

16.6.2 Major Grazier's Destinations

There are many famous major destinations of nomadic graziers. They are named after the local villages and *nallahs* or ridges, such as Jai valley,Tibba ridge, Kansar ridge, Padri, Shankhoja Dhar, Seoj Dhar, Chinta valley, Dugban, Subardhar alpine pastures .

16.6.3 Sharing of Grazing lands

Traditionally the migratory graziers 'share' the grazing lands among themselves. They treat the common property resources as their own traditional property and treat it accordingly. They use to 'sell', 'mortgage' and 'transfer to their wards'. As there are many disputes among the people in using the grazing lands. Always there are quarrels among the nomadic and locals and between the groups as well.

16.6.4 Collection of Grazing fees

The Forest Department collects the grazing fees only from the nomadic graziers. The Block forest officer and the forest guards used to reach the alpine pastures and collect the grazing fee from the migratory graziers as per the rates announced by the Government for this purpose. The grazing fees is also collected and verified in the grazing check posts.

16.6.5 Duration of stay in the alpine pastures

The migratory graziers leave the plains on the onset of summer to avoid the scorching sun and reach the cool alpine meadows. Their stay in alpine pastures is determined by availability of forage in the alpine as well as in plains. During the good monsoon years in the plains, the graziers tend to scale down from the alpine pastures by early September and reach the plains by October. During drought years, they prolong their stay at alpine pastures upto mid October.

16.7 Grazing by Local People

16.7.1 The local people are also rearing livestocks sufficiently to meet the demands. They use the grazing lands located close to their hamlets. Mostly they restricted to sub alpine pastures. They used to cut the grasses from the blank areas of the forest during October and dump the grasses in their backyards to feed their animals during peak winter, as the entire area would be covered with thick blanket of snow. The grass cutting activity is causing the most deleterious effects to the regeneration of forest both directly as well as indirectly triggering soil erosion.

16.7.2 Excessive grazing has aggravated the problem of soil erosion, which has further degraded the grasslands. To supplement the inadequate supply of grass, leaf fodder from a number of tree species is procured by the local population for feeding their livestock. As a result, fodder trees are being mercilessly lopped for the said purpose.

16.8 Method of Treatment

16.8.1 Over grazing is a major, and very complicated problem, which is causing main hurdles in the successful regeneration of 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:

16.8.2 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.

16.8.3 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.

16.8.4 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.

16.8.5 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.

16.8.6 The pasture lands, at present, require much intensive management on scientific lines for the overall betterment of the forests.

16.9 Erosion Control in Grasslands

16.9.1 Overgrazing reduces vegetative cover and also causes compaction of soil. Both these factors contribute towards accelerated soil erosion. In Bhadarwah 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 downhill areas. Therefore, it is very important to initiate soil and water conservation measures in the high pasture lands. The following methods are hence prescribed..

16.10 Controlled Grazing:

The area available for grazing is limited. So as to reduce the pressure in these areas rotational grazing should be introduced as it is more beneficial; whereas some areas should be closed for grazing in one particular season in rotation so that they replenish themselves by the time they are opened for grazing. These areas should be closed for short duration i.e., 2 to 3 years. Research cum demonstration plots should also be introduced for rotational and regulated grazing.

16.11 Raising of Fodder Trees, Shrubs and Grasses on Private Land:

Local population at large need to be encouraged for raising fodder yielding trees, shrubs and grass species on their private lands in order to reduce the excessive grazing pressure on forests.

16.12 Alternative Means of Livelihood:

The nomadic grazers still follow their age old profession of cattle rearing, even after repeated efforts, they are still adamant in continuing their profession. With their increasing no together with the present condition it is difficult to sustain the balance. Hence they have to be diverted to some other profitable occupation in order to reduce the pressure on grazing.

16.13 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.

16.14 Pasture Improvement

Due to heavy grazing the more palatable grasses are getting extinct and they are being replaced by unpalatable hardy species. These areas should be given proper rest so that they replenish themselves. These pasture lands at present require much intensive management on scientific lines for the all over betterment of the forests.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 not 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 Bhadarwah Forest Division are listed below:-

Sub-tropical.

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

Temperate

Cocks foot	*Phalaris tuberose*
Bromus inermis	*Poa pratensis*
Lolium multiflorum	*Festuca elatior*

16.15 Method of Seeding

- The most economical and quickest method of 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 pelletized 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 pre-monsoon showers.

16.16 Vegetative Propagation

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.

WORKING PLAN FOR THE ECO- TOURISM (OVERLAPPING) WORKING CIRCLE

17.1 General Description of the area

The Bhadarwah forest division is considered to be the best destination for the adventure tourism and eco tourism activity. The terrain and the locality of the area is the most favorable for the kind of tourism activities such as mountaineering, trekking, skiing, river rafting, angling etc. Apart from this activities, religious tourism is also a major activity in this division.

17.2 Famous tourist destinations in Bhadarwah Division

- **Jai Valley**

Jai the everlasting Green Valley lies on the North East of Bhadarwah town about 32 Kms. away connected to the town by beautiful Bhadarwah-Jai Link Road. One feels in the lap of Nature on entering the Valley from "Jai Top". The Nature's Lap is surrounded with lush green coniferous trees, towards its east lies Bhalessa Valley to be connected through Jai-Bhalessa road with a distance of 46 Kms, the road encompasses the beautiful hunting grounds of Bachdhar. It is the ideal place for winter sports as it remains open to tourists even in peak summers when it remains covered under the blanket of snow .Visitors can also pitch their tents here for weeks together and enjoy horse-riding, trekking in the cool blue waters of mountainous stream. The valley is also known for Wild Herbs like *Digitalis, Purea, Aconitum, Podophyllum* etc. The religious temple of 'Subar Nag' and 'Roshera Mata ' are situated at a distance of 4 and 2 Kms respectively on the hillocks called Subar Dhar and Rosher Dhar.

- **Padri**

  One of the beatifull landscapes named Padri lies on upcoming Bhaderwah-Chamba National Highway at a distance of 41 Kms from Bhadarwah. The landscape runs in kilometers and is ideal for adventure sports like Snow-skiing in winters and Paragliding in summers. One feels extremely delighted reaching there. It is also highest Pass on Bhadarwah Chamba National Highway.

- **Gurdanda - Sonbain Glacier**

  One of the mighty ridge falls on Bhadarwah-Bani-Basohli Road where one gets lost in the beauty of forests and grasslands. Towards its left lies the mightly Sonbain Glacier which gives birth to Neeru River where one can feel and play with the snow just having a walk of five-ten minutes even in the peak summers. At Guldanda, the summer camps are being organised in colorfull tented accommodation, having a glimpse of the ridge and glacier one gets tempted to stay back.

- **Sarthal- Valley - Chatergalla Pass**

  Sarthal is one of the beautiful valleys enroute Bhaderwah-Bani-Basohli Road which has now become a tourist circuit wherein the tourists divert from Lakhanpur to Bhaderwah via Bani Basohli Road after having break journey at Sarthal Valley. The route via Sarthal used to be the ancient traditional route for Bhadarwah , Bani, Basohli areas as a vital connecting link, passing through Chatergalla Pass.

- **Seoj**

  Like Gulmarg and Pahalgam, Seoj is also one of the mighty meadows with mesmerizing natural landscape. It has all variety of natural attraction in its lap. Here the long stretches of green grass lands stretch into miles.

  The snow Glacier at Soej gives birth to the River Tawi which flows through Dudu Basantgarh and reaches Jammu. It remains snow clad during the winters and is ideal for snow games to be planned in the future .

- **Kailash Kund**

  It is a high altitude sacred lake for Hindus , where the Devotees have the holy dip during the Annual Kailash Yatra which initially was being celebrated for three days but

know has stretched to 1 month due to the huge influx of pilgrims from within and outside the State.

- **Chinta Valley**

  Chinta is a beautiful Valley, a lovely summer destination. This Valley is also popular with tourists in winters when its ski-slopes attract skiing enthusiasts. Chinta Valley is located 25 Kms from Bhadarwah. One can drive upto Chinta Valley and enjoy the scenic view along the way. The Valley is known as Green Bowl surrounded by Black Forests.

- **Hanga, Noorie, Devchater and Kellar**

  A place 10 Km. away from Bhaderwah town amidst the thick black forests of deodar, is a fine picturesque spot situated on the bank of Hanga Nallah characterize by crystal water flowing with murmuring rhythms that makes the ambience musical. The place came to lime light when in the 80's Hindi Film 'Noorie' was pasteurized at this place and first time the beauty and culture of Bhaderwah was depicted in its fine glory to world outside. This place is suitable for camping and attracting the adventure lovers who intend to spend 2/3 nights in wilderness enjoying an unexplored flora and fauna.

  The trekkers use to take the trek from village Noorie to Devchater (high altitude meadow) and descend into the Kellar Valley.

- **Nalthi-Basti**

  It is located 10 km from Bhadarwah which serves as a base camp for trekkers. It has come a junction point with the completion of Bhadarwah-Bani-Basholi road. Trekkers from Sarthal (Bani) and Bhadarwah take rest at this beautiful place after descending from or ascending to 10,500 feet high. Apart from dense deodar forests, it has been gifted with lush green patches of grasslands studded with blooming flowering plants of different colours. The cool breeze flowing across snow-clad mountains makes the place all the more fascinating in summer months.

- **Khani Top**

  It is situated 25 kms. from Bhadarwah town. It too has potential of becoming a good picnic spot.

- **Bhal Padri**

  It is yet another picturesque valley which has an intersection of rivulets and streams. A dreamland, not known to many, is 4kms. North-east of Padri, having unique landscape where many miniature valleys join hundreds of milky streams and rivulets traverse this composite valley down the length

- **Bhalessa**

  There are most famous mountain peaks/Dhars in Bhalessa like Mehlwar Pass, which rise to a height of 7705 ft. above sea level. The area is endowed with vast wealth of natural beauty and resources. Full with natural endowments, scenic splendour, places of tourist interest, Worship, round the year snowy mountain peaks and challenging tracks allure the adventurers and trekkers.

17.3 Important Activities Identified under Eco Tourism

17.3.1. Mountaineering

Mountaineering or mountain climbing is the sport or profession of hiking and climbing mountains. While mountaineering began as attempts to reach the highest point of unclimbed big mountains it has branched into specializations that address different aspects of the mountain and consists of three areas: rock-craft, snow-craft and skiing, depending on whether the route chosen is over rock, snow or ice. All require experience, athletic ability, and technical knowledge to maintain safety.

There are many tall peaks in Bhalesh range that remain snow bound throughout the year. For a brief time during winters such areas can be accessed. Neeru range is endowded with beauteous manifestation of nature in the form of alpine pasture lands, beautiful water gushing nallas and deictic mountains. These mountains promise a good mountaineering experience.

17.3.2.Trekking

The trekking is a long, adventurous journey undertaken on foot in areas where common means of transport are generally not available. Bhadarwah division is naturally gifted with beautiful alpine pasture lands and mountains. These trekking routes must be placed in the tourist map of the State to attract people. The identified routes are mentioned in the famous torist destinations in Bhadarwah division below.

17.3.3. River rafting

Rafting is the challenging recreational outdoor activity of using an inflatable raft to navigate a river or other bodies of water. This is usually done on white water or different degrees of rough water, in order to thrill and excite the raft passengers. Major parts of Neeru river and Neeli are suitable for rafting activity.

17.3.4. Angling

Angling means catching of fresh water fishes using fishing rods. It is widely followed as a recreational hobby in other countries. For angling activity the Neeru valley is famous as it is abode of good number of cold water fishes having very high cuisine value and is famous in the entire state. Beside it other nallas famous for good fresh water catch are Jai nalla, Chinta nalla, Neeli river etc. The Neeru nalla and Jai nallah are popular for Trout Fish Culture.

17.3.5.Bird Watching

Bhadarwah Forest Division is bestowed with rich and unique birdlife. This tract is heaven for bird lovers. All ecotourism sites mentioned above are suitable for this activity. Forest department in concurrence with Wildlife Department and other specialised institutions should develop a protocol on bird watching. This activity can also be outsourced to competent and trained people.

17.4 Infrastructures to be built

17.4.1 Huts

To launch the eco tourism projects in a major way certain basis facilities are required to be built in the area. The tourists require staying facilities and way side amenities in the form of huts and pitching grounds. The huts play a major role in protection of forest as well. There were chains of forest huts located in various places in this division. During the period of disturbance these huts were gutted. Also some wooden huts were rotten due to lack of maintenance. To improve the eco tourism activity these huts can be rebuild at strategic locations. For promoting the eco tourism activity the huts can be built at Chinta, Padri, Khellani, Subardhar etc.

17.4.2 Other facilities

Also the bridle paths in the forest areas have to be improved so that trekking can be under taken safely. Small bridges, *Trangdees* can be constructed as per the field requirements. Pitching grounds can be developed economically so that it will benefit the eco tourism. The pitching grounds can be developed in the river like Jai valley, Chinta Valley, Neeru Valley near Sartingal.

17.5 Identification of meadows and their development for aesthetic value

Meadows are of ecological importance because they are open, sunny areas that attract and support flora and fauna that may not thrive in other conditions. All the ecotourism sites mentioned above have beautiful meadows that can be developed for aesthetic purposes. For this purpose, it is necessary to fence meadows to avoid the ill-effects of trampling on the soil and grasses of the meadows. Therefore, restricted paths should be developed for the movement of tourists. Naturally occurring flowering species should be provided protection and their regeneration should be assisted by various means to enhance the beauty of the area in the closure.

WORKING PLAN FOR THE NTFP (OVERLAPPING) WORKING CIRCLE

18.1. General Description and Character of the Vegetation

The Bhadarwah Forest Division is rich reservoir of Non-Timber Forest Produces (NTFP), native to the Himalayan region. The description of important NTFPs are presented below.

18.2 Objectives of Management

1. Create gainful livelihood opportunities for the village communities living adjacent to forests.
2. Sustainable management and conservation of plant resources.

18.3. Important NTFPs

1. Patees

(*Aconitum heterophyllum*) Family : Ranunculaceae

It is a perennial herb, growing the sub-alpine meadows at an altitudinal range of 2600 to 3500 meters. The flowers are light blue in colour. Used by the local people for treatment against fever, cough and liver disorders. The plant is protected under J&K Wildlife Protection Act, 1978.

2. Sujanjado

(*Colchicum luteum*) Family : Liliaceae

It is a perennial herb with underground corms, growing in the temperate forests. The corms are traded and used in the treatment of gout. It is used in treatment of arthritis and diseases of liver and spleen. The plant is included in schedule VI of J&K Wildlife Protection Act, 1978.

3. Dhoop

(*Jurinea dolmiaea*) Family : Asteraceae

It is a perennial herb with leaves having white woolly texture at its beneath. Normally found in alpine pastures and slopes at higher elevation. The roots are used in ayuvedic treatment.

4. Bankakri

(*Podophyllum hexandrum*) Family: Podophyllaceae It is a herb with perennial root stock. Normally found in temperate forest and alpine slopes of about 2800 m elevation. The rhizomes and roots are traded. The fruits are edible. It is protected under J&K Wildlife Protection Act, 1978.

5. Kuth

(*Saussurea costus*) Family Asteraceae.

The plant is a Perennial herb found in temperate forests and alpine grasslands. The roots are the economic part. It is the constituent of Ashthavarga drugs used in preparation of Chyavanprash. Protected under J&K Wildlife Protection Act, 1978.

6. Banafsha

(*Viola odorata*) Family Violaceae

It is a small perennial herb with rooting stolons. Normally found in temperate woodlands. The flowers are characteristic blush purple coloured. It is traded in the market as medicinal herb.

7. Guchhies

(*Morchella spp.*)

The guchhies are the costliest edible 'mushroom' in the Indian market. It is naturally available in the western Himalayas. No artificial cultivation of this macro fungi is reported from India. It is collected during the month of May to July in this division.

8. Nag Chhatri

(*Trillium govanianum*)

It is a high value medicinal herb found in many parts of the Division between altitudes 2500 m to 4000 m. it has very high pharmaceutical value. Its rhizome is used for preparation of steroidal and sex hormones.

9. Elephant ears

(*Berginea ciliata*)

It has most important use in the treatment of urolithiasis or kidney stones.

18.4. Distribution of the Area

Depending upon the altitudinal zonation, aspect, associated vegetation, the NTFP are naturally available, throughout the tract.

18.5 Method of Collection

18.5.1. **Present model:** The NTFPs are extracted from forests by awarding contracts on the basis of auction. The divisional area is treated as a single unit for auction. The auctions are either bulk auction for an area or on per kilo gram cost basis. The regulation is limited to transportation by issuance of permission with emphasis on control on the movement of the produce. However, the protection of stock and extraction of NTFP on sustainable basis remained largely unfocused. The whole process of transaction of NTFP was trader specific, the margins were relatively high considering the cartelization and lack of fee market operations. Such a mechanism of operation removes the need for stake holders concern for the extraction of produce in a sustainable manner. The business chain becomes the exclusive domain of operators with ability to mobilize funds upfront. Hence the village dwellers of the forest fringe were devoid of any sizeable benefit which accentuated the indiscriminate extraction of resource without concern for sustainability.

18.5.2. **Proposed Model:** To ensure that NTFPs are extracted in a sustainable manner with accrual of benefits to the stakeholder i.e.; to both the forest department and the local communities living adjoining to forested areas, a self regulatory mechanism is appropriate with inbuilt checks and balances. The Forest policy enunciates the following in respect of NTFP.

"Package of practices for cultivation of medicinal plants will be developed and farmers will be encouraged to undertake cultivation of such medicinal plants and tree species on non-forest lands and private lands. Simultaneously, handling, processing, transportation and marketing of medicinal plants and related products will be facilitated.

Value addition and processing of non-timber forest produce within the State will be encouraged along with development of market linkages and trade related information so that these are not exported in raw form, and producers get remunerative price for their produce.

To facilitate conservation and development of medicinal plants in natural forests, including high and low level pasturelands, local communities will be encouraged to form cooperatives at village level for non-destructive harvesting, processing and marketing of medicinal plants and other species having commercial value with a view to augmenting their income".

18.5.3. The department is facing shortage of trained manpower and to conceive of a mechanism devoting more personnel man hours would be self defeating. It shall be prudent to activate the existing mechanism of VFC's under the aegis of FDA. Individual household or a group of households in the VFC's may be allotted a certain area. And then the VFC should act as the collection centers. The VFCs shall maintain an account of the quantity that was deposited by the individual member. From all the VFCs the FDA shall collect the produce, quality grade it and certify the product of sustainability and put them to auction. The FDA shall tie up with other FDAs in order to create viable marketable volume. If required the FDAs then should create forward marketing linkages with the companies involved in medicinal plant products like Himalaya, Dabur etc. The profit earned is shared 20:80 by Forest department & VFCs as per the quantity deposited.

18.5.4. The extraction of the NTFP by members should be linked to preservation of regenerative capacity of the wild stock. The VFC's shall also monitor the ecological impact by collection of plant information through field survey etc. The department staff shall check on the measures adopted for ensuring sustainability. If the resource depletion is found critical plantation of NTFP can be taken up to recoup the area. The funds from Centrally Sponsored Scheme under National Afforestation Programme can be used for initial capacity building and in course the FDAs should aim at promoting the cultivation of the NTFP on the private fields. The SFRI can associate with the operations to develop standardized package of practice for cultivation and enumerate the good collection practice for different species. The State Forest Corporation can tie

up with the FDAs for marketing of produce and help in collection of market intelligence, in ascertaining the marketing chain and facilitate value addition by availing institutional credit. Assuming that the collectors who deposit the NTFPs with the VFCs are poor and marginal, it is but natural for them to expect immediate pecuniary benefit from the produce deposited, than wait for the sale to happen and the profit to get redistributed. In this regard it would be desirable to maintain rotation fund of 3 Crores on returnable basis from the Forest Department to the FDA.

18.6. This model of operation has following advantages.

1. The benefit of the business directly impacts the forest communities without compromising on the ecological sustainability.
2. The available resource is put to optimum usage.
3. Reduces the options of malpractice and significantly reduces the operational costs and disincentives smuggling.
4. Sufficient quantity of marketing volume is ensured to make the operations economically viable.
5. The flow of NTFP would indirectly be suggestive of the stock and its sufficiency in the forest and hence act as a monitoring tool.

WORKING PLAN FOR THE FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

19.1 General Constitution of the Working Circle

The Bhadarwah Forest Division has the well stocked conifer forests. It is the collective responsibility of the society in general and the forest department in particular to protect and conserve the forest. All the physical protection measures will be described in this overlapping working circle. This working circle operates throughout the territory of the division.

19.2 Issues related to protection of the forests of Bhadarwah and measures adopted

19.2.1. Illicit felling

Bhadarwah Forest Division is notorious and infamous far illicit damages to the forests. People of Bhadarwah Forest Division have evolved a culture of construction of palatial houses that consume abnormal quantity of timber. Such huge requirement of timber is not possible to be obtained by legal means. Due to this reason people resort to heavy damages to forests. One common illegal practice that is prevalent in the division is the damage that lower forest staff inflicts to the forests by taking bribe and selling green wealth of the division. It has been complained by the locals that Ist the lower staff advises them to take sanction of timber as concessionist and in the garb of these sanctions, the lower staff take money from the concessionists and thereby allows concessionists to illegally remove as much as desired. The DFO has to take a strong cognisance and stern action against such staff to conserve the green gold of Bhadarwah.

Measures to be adopted:

1. There is need to increase the awareness with regard to usage of alternative to timber like utilisation of Composite wood, Chemically improved wood etc., in house construction.

2. Improving the co-ordination between law enforcing agencies by regularly conducting monthly meeting between these agencies at Division and at range level.
3. **Checkposts**: There are 4 checkposts established in various routes ,already. There is need for temporary chekpost at Padri and Chatargalla across Chamba road and Bani-Basoli road respectively, to check the movement of forest produces.
4. Improving the communication facilities like providing mobile phones to control room and making control room contact number public; vehicles for mobility to the team to reach the spot in time. Presently both the facilities are not made available to the field staff.
5. Providing training to the law enforcing agencies like forest department, Forest Protection Force and Police department in intelligence gathering, search operations, preparing seizure memo, prosecution of the case *etc.,* will definitely help in bringing the culprit under law. There is a need to increase the conviction rate which can act as a deterrent against forest offences.

19.2.2 Encroachment

In Bhadarwah forest division, the people tend to encroach upon the forest land for cultivation purposes. The severity of damage is one of the highest in the entire Chenab Circle. The menace of forest land encroachment is highest in Bhalesh range. Even in other ranges it is very severe.

Measures to be adopted/fine tuned

1. Consolidation of demarcation records and reconciliation of records between forest territorial division and demarcation division
2. Immediate replacing of damaged boundary pillars removed pillars etc. near to habitations
3. Digitization of forest boundary: It is not yet started in the state and it has to be the priority.
4. Immediate demarcation of forests which are near to towns, habitations etc.
5. There is no alternative other than regular patrolling of the forest area by the field staff particularly by the Forest Guard and Foresters.
6. Prosecution of offenders

19.2.3 Lopping and Girdling

Lopping and girdling are twin problem that are posing a serious threat to the forests of Bhadarwah. Lopping is done for duel purposes for fuel wood collection and removing shade from the agricultural fields. Mostly Deodar trees are lopped because its branches contain hard wood with a high calorific value which is most preferred by people during winters and for cooking purposes. Trees are lopped to peak height leaving only a small plume at the top. Thus it becomes difficult for a tree to sustain life owing to deficient photosynthesis and it finally starve to death. Girdling is another major problem faced in the division. Trees are girdled and starved to death. It is most common around the human habitation and agricultural lands. DFO has to ensure that no such kind of activities are illegally carried out. Strict action should be taken against the perpetrators to discourage such damages.

19.2.4 Fire wood collection

The fire wood collection is also a major threat to the forests. As the tract is situated in higher altitudes, without modern facilities like electricity, people tend to use the natural resources such as fire wood for preparing the food and warming their house during winter. The problem is aggravated by lack of road connectivity to majority of the areas. No modern fuel like LPG can reach these places. Hence, people forced to use the fire wood. Before the onset of winter season, people collect large quantity of firewood and dump it in their backyard for using it during winter. The issue can be visualized from the fact that an average household of about 6 souls require a minimum of one quintal of firewood in a day during winter months.

19.2.5 Grass cutting and Grazing

The grass cutting and grazing are observed to be the major threats to the health of forests in this tract. Both of these activities closely linked to the socio-economic behavior of the people of the State. The grass cutting activity severely impedes the regeneration of deodar-kail forests and NTFP's, the impact of grazing observed in the fir-spruce forests at higher altitudes. The department has to regulate the activities by way of creating fodder closures near to the habitation, so that people will not venture into the forests. The degraded forest lands are identified and annexed in the

Plantation Working Circle, which may be useful to create closures for the welfare of the people.

19.2.6. Torch wood cutting

The majority of the tract is not connected by electrical grid. To get adequate light, they resort to torch wood cutting. The conifer trees in the vicinity of the villages are bear the mark of torch wood extraction. People on their way in the bridle paths are uses torch wood during their journey in early morning and in late evening. The torch wood extraction weakens the trees and often attacked by fungus.

19.2.7.Fire protection

As the tract is located in the cooler, higher altitudinal zone, fire does not pose the threat at larger way. The fire incidences coincides with either sudden raise in ambient temperature or the prolonged dry weather. Hence, fire incidences are normally noticed during late April, late October and early November. Mostly the fire damages the dry grasses and never attain the proposition to damage the conifer trees. Fire incidences are very common along the tract that coincides with the Chir Working Circle of Chiralla range and Kellar range.

19.2.8 Patrolling

There is no alternative method discovered so far, to replace role of foot-patrolling in protection of the forests. The entire tract is located very remotely in higher altitudinal zone, devoid of any communication and transportation facility. The people have to suffer a lot to meet the DFO for obtaining sanctions. To help the people and to protect the forests, the DFO shall visit the entire division, at least once in a month during summer season. By the intensive touring, the DFO can address the issue of protection and well being of the people. The touring of the DFO and higher officials in this terrain, impact the morale of the field staff working in severe hostile weather conditions. The knowledge acquired by way of patrolling of the forests, will result in efficient and accurate planning for the betterment of the forests.

WORKING PLAN FOR THE JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

20.1. Description of the Programme and Area

20.1.1 The National Afforestation Programme was started by Government of India in the X five year plan by amalgamating the programme and schemes of similar objectives. The aim of the programme is afforestation of degraded forests with the active involvement of local people. It was implemented through the registered society called Forest Development Agency (FDA). The programme basically the contain components such as advance work, creation and maintenance of closures for next three years. The degraded forests can be treated under any one of the modes such as aided natural regeneration, artificial regeneration, regeneration of perennial herbs and shrubs, silvi-pasture development and development of bamboos etc. The programme studies the socio-economic conditions of the people living close to the forests, their aspirations, available resources in their vicinity and the ways to fulfill their demands. The programme has a component of entry point activity under which some of their felt needs and infrastructure bottlenecks can be fulfilled.

20.1.2 The programme right from its introduction was implemented in this division. Later, in 2010, State Forest Development Agency (SFDA) was created by confederation of the individual FDA's. The following table shows the physical and financial progress achieved during the X and XI five year plans in this division.

20.1. Table showing the Physical and Financial achievement of the FDA

Year	Fund released (in lac)	Funds utilized (in lac)	Advance Work (ha)	Creation Work (ha)	No. of plants planted (in lac)
2003-04	53.88	44.06	500	0	0
2004-05		3.10			
2005-06		4.675			
2006-07	69.00	1.29	-	-	-
2007-08	0	33.63	500 (Old Advance work repair)	500	200000
Total X Plan	**122.88**	**86.76**	**500**	**500**	**200000**
2008-09	0	33.76	500	500	100000
2009-10	50.00	46.48	400	0	104500
2010-11	20.813	23.69	0	400	174000
2011-12	20.87	20.72	Liability cleared 2010-11		
2012-13	20.36	20.36	126	126	174500
Total XI Plan	**112.04**	**145.01**	**1026**	**1026**	**553000**

20.2. Village Forest Committees

21.2.1 The Village Forest Committees (VFC) are the basic unit of the programme. All the households are the members of the General Body of the VFC. The VFC elects its Chairperson of the Executive Committee of the VFC. The Block officer is the Member Secretary. They collectively operate the consensus plan made by the public. The list of VFC's of this division is as follows.

20.2. Table showing the VFC's Rangewise

S. No	Neru Range Name of the VFC	S. No	Kellar Range Name of the VFC	S. No	Chiralla Range Name of the VFC	S. No	Bhalesh Range Name of the VFC
1	Mathola	1	Bhagatha	1	Gosti-Amritgarh	1	Gondo
2	Dalayan	2	Panjgrain			2	Chilli-Bhalesh
3	Sungli	3	Shangroo	2	Phigsoo-Jangalwar	3	Tipri Jugassar
4	Puneja	4	Khaloo-Chattra			4	Dramera
5	Sartingal	5	Gajoth	3	Malnoo-Gugara	5	Bhatyas
6	Manthla	6	Neota-Seri			6	Gureka
7	Dranga	7	Manwah	4	Joura-Hallaran	7	Champal
8	Dhara	8	Cheka-Draina			8	Manoo-Kutta
9	Bheja	9	Brasoo-Sindra	5	Sherema	9	Alni-Gangota
10	Hanga	10	Tainsna			10	Chanchloo
11	Rainda	11	Bhagota	6	Jagota	11	Changa-Soti
12	Chakka	12	Bhalla-Malnai			12	Pora-Paine
13	Kapra	13	Gurakha	7	Puneji Chiralla	13	Kandloo
14	Nalthi	14	Khellani			14	Dhonsa
15	Ramtund	15	Chilli Kellar	8	Badnoo Chiban	15	Dherwari
						16	Manoie
16	Linga	16	Gutasa-Tipri	9	Tanta Batograh	17	Bharthi
						18	Thaloran
17	Shankojha	17	Sarsi	10	Panthan	19	Sanwara

20.3. Entry Point Activity

The Entry Point Activity (EPA) made the programme very successful. The small requirements of the people are being met by the EPA of the NAP. As the people are residing in the remotest part of the State, they depend the Forest Department to fulfill their demands like construction of small bridges (*Trangdies*) and construction of bathroom and other basic amenities. The EPA is very useful in addressing their demands. The abstract of EPA is as given below.

20.3. Table showing the abstract of EPA

Year of Work Programme	Detail of Entry Point Activities							
	Bridal Paths		Wooden Crossing	Bath Rooms	Water Ponds	Cattle Pond	Misc.	Fin (in lac)
	No.	Length (Km)						
2003-04	30	90	4	9	3	10	12	16.99
2004-05	3	12	2	0	1	4	0	1.88
2005-06	0	0	0	0	0	0	0	0
2006-07	0	0	0	0	0	0	0	0
2007-08	0	0	0	0	0	0	0	0
Total X Plan	**33**	**102**	**6**	**9**	**4**	**14**	**12**	**18.87**
2008-09	6	24	2	9	4	0	1	10.00
2009-10	10	30	3	1	2	5	3	4.00
2010-11	0	0	0	0	0	0	0	0
2011-12	0	0	0	0	0	0	0	0
2012-13	0	0	0	0	0	0	6	1.55
Total XI Plan	**16**	**54**	**5**	**10**	**6**	**5**	**10**	**15.55**
G.Total	**49**	**156**	**11**	**19**	**10**	**19**	**22**	**34.42**

20.4. Future Proposals

20.4.1 The present JFM working circle is constituted by covering all the compartments under Reboisement Working Circle and NTFP Working Circle and with other working circles wherever plantation activity is taken up. New VFCs will be created as the present number is very less considering the proposed areas to be taken up for afforestation/reforestation activities. The existing VFCs shall be rejuvenated. Elections will be held in a time bound manner as the term of elected VFC members is expired..

20.4.2. Awareness programmes will be organized for VFC members and Forest Department Staff for the clear understanding of concept, micro plan preparation, financial management and activity management as capacity building measure. The Government of India has launched Green India Mission programme (GIM) as part of its commitment to the United Nations in reducing Carbon emission through increasing the sink. It will be implemented in FDA mode only. Presently landscapes are selected for treatment. The VFCs will be formed accordingly to implement the Green India Mission Programme.

20.4.3 It is assumed that the prime role of JFMCs is plantation work only. But in the prevailing situation of Bhadarwah Forest Division, the JFMCs need to be involved in the protection of the Forests from illegal damages, unlawful encroachment and injurious lopping and girdling beside it to keep vigil on illegal timber trade.

20.4.4 People of Bhadarwah Forest Division tract have evolved a culture of construction of palatial houses that consume abnormal quantity of timber. Such huge requirement of timber is not possible to be obtained by legal means. Due to this reason people resort to heavy damages to forests. A policy of minimum use of timber as per requirement is need of the hour. In this backdrop, it is proposed that, before granting the timber to the concessionists, it must be recommended by the JFMCs that will endorse the genuine utilisation certificate to beneficiary. It should subsequently surveyed by forest department staff and then concessions of timber should be issued. The problem of heavy use of timber is much accentuated in towns. Therefore, all designed must be approved by Municipal Committees with a certificate from the beneficiary that minimum timber required shall be utilised. This will discourage the illegal trade.

20.4.5 Sharing of usufructs from village fringes need to be regulated in consultation with JFMCs.

WORKING PLAN FOR WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

21.1. General Description and Present Condition of Wildlife

21.1.1. Bhadarwah Forest Division is one of the very important forest territory from Wildlife point of view. Because of huge altitudinal and climatic conditions from subtropical, temperate region to alpine region, a variety of wildlife is met with over the entire division. Bhadarwah forests are natural habitat of various endangered and threatened species of wild animals and birds.

21.1.2 The tract is endowed with rich heritage of animals like Himalayan Fox, Leopard, Himalayan Black Bear, Musk Deer, Goral, Yellow Throated Martin, Himaliyan Weasel, Eurasian Otter, Giant Squirrel, Civet, Chamba Langoor (andagered), *Rhesus Maquaque* etc. Beside it, Bhadarwah has a rich diveristy of birds and pheasants. All the four major pheasants like Monal, Western Tragopan, Koklas and Khaleej are found here. Chamba Langur as known as Kashmir Grey Langur is an endangered animal that is found along the tract abundant with Kharsu Oak. Kaplash Region and Padri region along Guldanda tract are known to have presence of Chamba Langur. 120 species of birds have been listed in Bhadarwah and there many remote areas which are have still not been worked. The important species of the wildlife found in this division have already been enlisted and described in detail in Chapter-IIB of Part I of this plan.

21.1.3.The man-animal conflict is one of the important aspect in wildlife management. As wildlife habitation and its corridors are fragmented by roads, human habitations etc., man-animal conflict is on the raise particularly with respect to bear and leopard. Since wildlife has no boundaries, managing wildlife is also an important aspect of territorial staff

21.1.4. Protection and control of wildlife was given importance in J&K even before independence. The Jammu and Kashmir Game Preservation Act, 1998 (1942 AD), Act No. XXIV of 1998 is an example to that. Thereafter, The Jammu and Kashmir Wildlife

(Protection) Act, 1978, was passed by the State Legislature with elaborate provision for the conservation of wildlife. This act is now being amended to incorporate changes that have been made in the wildlife related laws nationally and internationally, and to meet the challenges thrown up by the spurt in wildlife offences.

21.2. Wildlife Management Objectives:

- To preserve and protect the wildlife
- To reduce the Man-Animal Conflict
- To create awareness among the masses about the importance of wildlife

21.3. Methods of Treatment

21.3.1. Population Assessment

There is need to carryout census of wild animal population in the entire tract of the division by involving wildlife Department, students, NGOs, villagers etc.

21.3.2. Habitat Management

21.3.2.1. Habitat management is one of the important aspect of Wild Life Management. If the habitat is healthy, wildlife can prosper without interfering the human habitat. The primary requirement of habitat management is to study the habit and habitat of wildlife in a scientific manner. In case of Bhadarwah Division it is not possible to separate wildlife habitat from human interference. The wildlife habitats are heavily utilized by the humans both nomadic graziers and villagers in the vicinity of the forest. The cattle population of Bhadarwh is more than equal to human population. The major source of fodder for the cattle is ground flora of forest only. Hence the management of wildlife in Bhadarwah Division is a much complex one. The following measures need to be taken during the working plan period to keep the habitat healthy.

21.3.2.2.All the plantation programmes should include fruit and fodder species for wildlife to increase the food availability to herbivores.

21.3.2.3.There is need to create water-holes as during summer water availability in the forest except for streams is very limited. Creating waterholes can restrict wildlife movement to the forest area itself.

21.3.2.4. Salt licks: Where ever possible, salt licks need to be kept for wildlife as it is essential component of wildlife diet.

21.3.2.5. During breeding season of wild animals, no or only minimum disturbance alone can be allowed. This is not possible without the support of general public. So creation of awareness is very essential.

21.3.2.6. For all these activities, there is need to take support of Wildlife (Protection) Department as they have expertise in this field.

21.3.3. Training

There is a need for training territorial staff in all aspects of wildlife in general and management of man animal conflict in particular. Most of the time, the territorial staff gets the first hand information. Since their presence is there in every compartment, they can reach immediately as soon as man-animal conflict situation arises. Presently, the territorial staffs are neither trained nor well equipped. Considering the delay in response in man-animal conflict situation can lead to loss of precious human or wildlife life, the training and capacity building aspect need to be taken on priority.

There are various committees already constituted to protect the wildlife by including the members of Panchayat Raj Institutions and general public. These committees are also need to be empowered. They have to be trained and they should be provided with various equipments to handle the sudden crisis.

21.3.4. Awareness programme

There is need to create awareness among masses about the importance of wildlife. Massive awareness programmes are to be organized among general public, students, prominent citizens and others. The committees constituted for the protection of wildlife should be provided with funds for such activities. They also need to be provided with communication gadgets for real time response in case of conflict situations.

21.3.5. Management of Man-Animal conflict:

As mentioned in previous paragraphs, it is very essential to given due importance for habitat management. There is a need to create massive awareness on this front. The

compartments/areas in which man-animal conflict is noticed, people are to be trained to handle and live with wildlife without any loss to both human and wildlife. The following points/issues are to

1. Children should not be allowed to move alone
2. People should move in group particularly in the early morning and late evening
3. Sarpanch and Panch of the area should be provided with mobile numbers of field staff of wildlife department as well as territorial staff.
4. There is need to change crop composition. Suitable economic replacement need to be identified in co-operation with Horticulture/Agriculture department.
5. Creation of awareness through print media and by regularly organizing area specific awareness programme
6. Signage need to be placed on sensitive areas for the information to the general public
7. Regular joint patrolling by the territorial field staff and Wildlife (Protection) department staff
8. Regular co-ordination meeting between forest territorial staff, wildlife (Protection) Department and Police department and prompt response to distress call from public
9. Training of territorial staff and anti-poaching committees already created to handle man-animal conflict
10. Prompt reporting, and prompt disbursement of relief

21.3.6. Wildlife Research:

This is an area where lot of work needs to be done. Since this is not possible for the territorial staff, Scientists from Wildlife Institute of India, Dehradun, experts from WWF (World Wildlife Fund) and other NGOs can be called and they can be given project to study the wildlife of particular interest and based on the data management interventions can be considered.

21.4. Areas Indentified for Wildlife Conservation:

Gamgul-Siyabehi Wildlife Sanction is located in Chamba district of Himachal Pradesh. The nothern boundary of this Wildlife Sanctuary coincides with the boundary Bhadatwah Forest Division. This region is also a habitat of Leopard, Chamba Langur, Giant Squirrel, Civet, Jakal, Eurasian Otter, Himalian Weasel Musk Deer, Himalayan Black Bear etc. Beside it all the four peasants, Monal, Western Tragopan, Koklas and Khaleej peasants are found here. Therefore, the compartment falling along the tract are of vital wildlife importance and need special care viz-a-viz wildlife management. The detail of this Compartments comprising Wildlife (overlapping) Working Circle are as:

Table 21.1

S.No	Range	Compartments
1.	Bhalesh	67/Bh, 70Bh, 71/Bh,72/Bh, 73/Bh, 77/Bh, 78/Bh, 82/Bh, 83/Bh, 84/Bh, 89/Bh, 90/Bh, 91/Bh and 92/Bh
2.	Neeru	1/Pd, 2/Pd,3/Pd,4/Pd,5/Pd,6/Pd and 7/Pd 25a/N, 25b/N,26a/N, 26b/N, 27/N,28/N, 29/N, 30a/N, 38/N, 39/N, 40a/N, 40b, 40c/N, 40d/N and 40e

MISCELLANEOUS REGULATIONS

22.1 Buildings

22.1.1 The following buildings are proposed to be constructed during the present plan. from the previous plan are retained in this plan:

Priority	Range	Building	Location	Remarks
I	Neeru	DFO Residence	Bhadarwah town	Incomplete
II	Neeru	Chinta Forest Guard Hut	Chinta	
III	Neeru	Ballote Forest Guard Hut	Ballote	Building in dilapidated condition
IV	Kellar	Drattra Forest Hut	Malothi	Gutted during militancy period
V	Bhalesh	Forest Rest House	Jatota	Remote forest tract without any rest house

22.1.2 In addition to these buildings, Block Office, Guard huts and residential accommodation for Block foresters should also be constructed at each of the block and beat headquarters. The location of beat and block headquarters also needs to be fixed. Adequate accommodation is suggested to be built for clerical staff both, at Divisional and Range level.

22.2 Roads and Paths

- Kaplas Kund footpath: From Sartingal to Kaplas Kund.
- Ashapati-Sunbain track: From Sartingal to Chatargalla.
- Manimahesh track: From Nalthi to Padri.
- Drafra to Ishandhar.

22.3 Forest Demarcation and Consolidation

22.3.1 Bhadarwah Forests are highly vulnerable to encroachments owing to remoteness. It is therefore very urgent to consolidate forest boundary line by erecting of Boundary

Pillars with GPS locations. Out of total 18,311 BPs , 16,480 BPs need to be erected as per the latest designs approved by the department.

22.4 Management of Berun Line Forests and Uncultivated Wastelands

23.4.1 In addition to the blank scrub area, pastures, and stony wastelands of this division there is a sizeable area available outside the demarcated forests which is neither cultivated nor properly managed. Practically no investment is being made on these resources as compared to the intensity of use to which they are put. There are the compelling reasons to formulate policies for this category of land to realize its productive potential to the best possible extent. A multi-disciplinary approach is needed for its proper and comprehensive management.

22.4.2 In order to arrest their further deterioration, the Berun line forests, as ordered by the Government of Jammu and Kashmir, are to be taken over from the charge of the Revenue Department immediately, and managed on scientific lines.

22.5 Social Forestry

22.5.1 In order to lessen the ever increasing pressure of human and animal population on the conventional forests, an integrated use of non-forest land for agriculture and forestry in manner that maximizes production of goods and services, is the only answer. The term social forestry is used for various programmes of extending tree cover to the non-forests areas including agricultural lands, wastelands and strips along the roads etc. Social forestry schemes are already under implementation in this division and non-forest areas are being taken up for planting.

22.5.2 In order to realize the full benefit of social forestry, a comprehensive package of technology needs to be developed for various agro-climatic zones after taking into consideration the needs and customs of the local population. It requires a multi-disciplinary approach, and research efforts of specialists from various disciplines like agronomy, extension, soil science, forestry, horticulture, economics and social sciences. For improving the economic condition of the local population, watershed approach to development needs to be adopted.

22.6 Forest Nurseries

22.6.1 Forest nurseries are of paramount importance in any artificial regeneration programme. Unfortunately, for the want of adequate funds and planning, little attention has been paid towards the creation and maintenance of forest nurseries in this division.

22.6.2 In order to make concerted efforts towards the reforestation of conifer species, a comprehensive, long term effort is required. The temporary nurseries for conifer plants near the planting site are the best alternative in hilly terrains. Adoption of modern techniques like root trainers, glass houses, sprinkler irrigation etc. will go a long way in providing the necessary planting stock required for meeting the plantation targets set under this plan. Seeds from genetically superior trees should be used for raising good quality planting stock in the nurseries.

22.6.3 However, the nurseries should be established keeping in view the future availability of funds required for such plantations. Raising of planting stock in the nursery is of no use if it is not planted in time in the field for want of funds and proper planning.

22.7 Beats and Blocks

A statement showing compartment wise break up of Beats, Blocks and Ranges is provided in the Appendix II. A summary of the same is tabulated as under:

Range	Compartments
Bhalesh	1/Jt to 15/Jt
Chiralla	1/Ch to 33/Ch
	1/Jai to 37/Jai
	1/Jwr to 15/Jwr
Kellar	1/K to 69/K
	1/M to 8/M
Neeru	1/N to 66
	1/Pd to 7/Pd

The headquarters of, Bhalesh, Chiralla, Kellar and Neeru ranges are located at Gandoh, Thatri, Kellar and Bhadarwah respectively.

22.8 Maps

22.8.1 At the time of previous revision of the plan, stock maps on the scale of 1:50,000 for the entire Division and 1:12,500 scale for individual compartments/sub-compartments were prepared and submitted. Unfortunately, that has not been traced anywhere in the department. Now therefore, the following maps have been prepared and are being submitted along with the draft plan:

22.9 Stock maps

Stock Map for the entire division on the scale of 1:50,000.

Individual compartment/sub-compartment stock maps for Bhalesh, Chiralla, Kellar and Neeru ranges on the scale of 1:25,000 (two sets each).

22.10 Management map

Management map for the entire division on the scale of 1:50,000.

Management maps for individual ranges on the scale of 1:50,000.

22.11 Compartment Maps

Blank compartment maps for the division on the scale of 1:50,000.

Blank compartment maps for individual ranges on the scale of 1:50,000.

All the maps have been prepared on high quality printing paper.

22.12 Compartment Descriptions

23.12.1 As was the case with stock maps, the compartment descriptions too could not be traced anywhere in the concerned offices. The compartment descriptions, therefore, have been rewritten. Compartment history files have been prepared individually for all the compartments. Each file, complete with a stock map of the compartment, compartment description and four blank sheets is being submitted along with the draft plan.

22.13 Draft Plan

23.14.1 Copies of the Draft Working Plan for Bhadarwah Forest Division for the period 2016-2025 are being submitted in duplicate.

STAFF AND LABOUR SUPPLY

23.1 Establishment

23.1.1 The staff of Bhadarwah Forest Division has registered a negligible increase since the inception of the previous plan. There is a shortage of executive staff at the level of Range Officers and below. The present strength of the establishment is inadequate to cope with the ever increasing workload. The fact that a significant number of field functionaries are untrained, makes the matters even worse. Although the territorial Divisional Forest Officers have been conferred additional powers under the amended Forest Act, no corresponding effort has been made to augment the establishment and infrastructure of the division so that the DFO can effectively discharge his duties as Authorised Officer. The details of establishment are provided under Chapter V of Part I.

23.2 Labour Supply

23.2.1The availability of skilled and unskilled labour is variable in different ranges. Generally, it is easily available in Bhalesh and Chiralla where as less because of two reasons. Overall prosperity because of Govt. Jobs and except during the periods of sowing and harvesting of the agricultural crops, which of course do not last for more than two or three weeks owing to the small size of holdings. There has been a decline in the trend of importing labour from adjoining districts and other states because of a change in the Government policy, as well as a decrease in the volume of extraction. Due to the severe financial crunch that the State is facing, the requirement of labour for developmental activities is also on the decline.

CONTROL

24.1 Control Forms

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

24.1.1. Control Form A

It shall be maintained on the standard format in use, for recording the major markings (fellings) and other subsidiary markings (fellings) carried out in Deodar Kail Irregular Shelter Wood Working Circle (Conversion block), Mixed Conifers Selection Working Circle and Fir Selection Working Circle, separately for each of the three working circles. As usual, a deviation statement indicating species wise plus and minus account of the actual removal (fellings), vis-à-vis the prescribed yield, will be compiled at the close of every year and the same brought forward in the subsequent year and summed up (plus or minus) with the prescribed yield for that year. Control shall be exercised on the volume extracted with an *Area Check.*

24.1.2. Control Form B

This control form shall be maintained on the standard format in use for recording the yield realised from the converted and unallotted blocks of Deodar Kail Irregular Working Circle. It shall be maintained in the same way as Control Form – A, except that the excess removals, if any, during a year are to be adjusted in the subsequent year but the deficit shall lapse to the forest.

24.1.3. Control Form C

It will be maintained to record and monitor the progress of the regeneration works in the areas taken up for artificial regeneration. Such areas are to be written-off from this form only after they carry adequate and established regeneration.

24.1.4. Control Form D

This control form shall indicate the proposals of the territorial DFO for marking of coupes during the next three years. It is required to be submitted well in time, to the Conservator of Forests, Working Plan and Research Circle, through the concerned

territorial Conservator of Forests, who will convey his approval after due scrutiny of the proposals in consultation with the Chief Conservator of Forests. The arears in respects of Control Forms need to be completed at once and their future maintenance ensured and made purposeful.

24.2 Compartment Histories

These are in fact, the most important records of happenings in a forest. They must be objectively maintained and updated, both at range as well as Divisional level. Entries regarding marking, extraction, resin extraction, plantation and development works, fire, encroachments, land transfer and any other significant event that happens in a compartment, must be made in the compartment history file at the earliest possible dispatch. In addition, the touring officers should note their observations and instructions on compartment history files, for the purpose of control and record.

24.3 Divisional Journal

This document, although very important, has not been maintained in the division. It is of immense use to the DFO and must be maintained and updated regularly. It should contain detail information on subjects like regeneration, plantation, soil conservation works, seed years, disease/insect attacks, statistics of outturn of timber and fuel wood, abstract of information on past/current leases, contracts, roads, buildings and meteorological data. On the analogy of the Divisional Journal, record must be maintained at range and block levels.

24.4 Guard Books

By and large, the maintenance of Guard Books has remained neglected. In certain cases the Guard Books have been found lacking even the elementary data regarding description of boundaries of the beat, number and name of the compartments, beat maps, number of boundary pillars and *chaks*. The Guard book must be maintained properly and checked frequently by the Range Officers at least once in a month and by the DFO at least once in six months.

FINANCIAL FORECAST AND COST OF THE PLAN

In order to give effect to the proposed prescriptions in the Working Plan it is essential that the entire gamut of activities weigh up economically. As such, the allocation of funds to various activities mentioned in the Working Plan as well the financial viability of the operations is worked out in this chapter.

25.1 Anticipated expenditure

The expenditure anticipated to be incurred giving effect to the prescriptions of the Working Plan under various Working Circle is enumerated below and eventually summated to arrive at an estimate of total expenditure expected to be incurred during the Working Plan period.

25.1.1. Plan expenditures

(a) Deodar-Kail Irregular Working Circle

For Deodar-Kail Irregular Working Circle (60% of the total area of 16259.52 to be treated in 20 years)

Component	Area in hectares	Average expenditure per hectare (in Lacs)	Amount required (in Lacs)
Artificial Regeneration (AR) @ 20% of the working circle's area	3,251	1.00	3,251.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	3,251	0.45	1,462.95
Silvicultural Operation @ 20% of the working circle's area	3,251	0.25	812.75
Total (60% of the total area)	**9,753**		**5,526.70**

The anticipated annual expenditure would be **Rs 276 lacs.**

(b) Mixed Conifer Selection Working Circle

For Mixed Conifer Selection Working Circle (60% of total area of 14,602.22 ha to be treated in 20 years)

Component	Area in hectares	Average expenditure per hectare (in Lacs)	Amount required (in Lacs)
Artificial Regeneration (AR) @ 20% of the working circle's area	2,920	1.00	2,920.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	2,920	0.45	1,314.00
Silvicultural Operation @ 20% of the working circle's area	2,920	0.25	730.00
Total (60% of the total area)	**8,760**		**4,964.00**

The anticipated annual expenditure would be **Rs 248 lacs.**

(c) Fir Selection Working Circle

For Fir Working Circle (60% of the total 17860.66 area of ha to be treated in 20 years)

Component	Area in hectares	Average expenditure per hectare (in Lacs)	Amount required (in Lacs)
Artificial Regeneration (AR) @ 20% of the working circle's area	3,572	1.00	3,572.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	3,572	0.45	1,607.40
Silvicultural Operation @ 20% of the working circle's area	3.572	0.25	893.00
Total (60% of the total area)	10,716		**6,072.40**

The anticipated annual expenditure would be **Rs. 303 lacs.**

(d) Protection Working Circle

For Protection Working Circle (60% of the total area of 27,540.67 ha to be treated in 20 years)

Component	Area in hectares	Average expenditure per hectare (in Lacs)	Amount required (in Lacs)
Artificial Regeneration (AR) @ 20% of the working circle's area	5.508	1.00	5,508.00
Aided Natural Regeneration (ANR) @ 20% of the working	5,508	0.45	2,478.60

circle's area			
Silvicultural Operation @ 20% of the working circle's area	5,508	0.25	1,377.00
Total (60% of the total area)	**16,524**		**9,363.6**

The anticipated annual expenditure would be **Rs. 468.18 lacs.**

(e) Reboisement Working Circle

For Reboisment Working Circle (60% of the total area of 8377.50 ha to be treated in 20 years)

Component	Area in hectares	Average expenditure per hectare (in Lacs)	Amount required (in Lacs)
Artificial Regeneration (AR) @ 20% of the working circle's area	1675	1.00	1675.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	1675	0.45	753.75
Silvicultural Operation @ 20% of the working circle's area	1675	0.25	418.75
Total (60% of the total area)	**5052**		**2847.50**

The anticipated annual expenditure would be **Rs. 142 lacs.**

(f) Chir Rehablitation Working Circle

For Chir Working Circle (60% of the total area of 2,955.50 ha to be treated in 20 years)

Component	Area in hectares	Average expenditure per hectare (in Lacs)	Amount required (in Lacs)
Artificial Regeneration (AR) @ 20% of the working circle's area	591	1.00	591.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	591	0.45	265.95
Silvicultural Operation @ 20% of the working circle's area	591	0.25	147.75
Total (60% of the total area)	**1773**		**1004.70**

The anticipated annual expenditure would be **Rs. 50 lacs.**

(g) Forest Protection Working Circle

The protection works would involve the following activities.

S. No.	Activity	Annual fund requirement (in Lacs.)
01.	Construction and maintenance of Check Posts, engagement of fire watchers, purchase of fire fighting tools and gathering of intelligence.	10.00
02.	Erection of B.Ps. 8845 B.Ps. in mainline and 9466 B.Ps. in Chaks are found as per Form 1 details in Bhadarwah Forest Division. Demarcation Division-II Bhadarwah has completed the erection of approx. 10% of BP. Threfore, out of remaining 16,480 Boundary Pillar 1,648 BPs have to be erected annually at an average cost of Rs. 4,500 per Boundary Pillar.	74.20
03.	Construction of infrastructures for housing of field staff.	50.00
	Total:	**134.2**

(h) NTFP Working Circle

To give effect to the prescriptions of this Working Circle upfront payment by the FDA to the VFC's and the beneficiaries might be required. Also some funds would be needed for capacity building and training of VFC members. Revolving funds of **1 Crore** would need to be allocated as credit to the FDA on returnable basis.

(i) JFM Working Circle

An amount of **Rs. 10 lacs**.is to be allocated for training and capacity building of JFM members annually. Based on the availability of funds credit can be extended to the VFCs for establishment of revenue generating enterprises.

Hence the annual fund requirement for executing the plan works would be **Rs. 17.31 Crores**

25.1.2 Non-Plan expenditures

(j) Staff

The annual salary to staff of all the three wings i.e. Forest Department, SFC & F.P.F together would account for about **14.00 Crores** per annum.

(k) Over head

The over head cost is kept as **Rs. 1.00 Crore** lump sum per annum.

Hence the annual fund requirement for meeting the non-plan expenditure would be **Rs. 15.00 Crores.**

Based on the above proposed expenditure, the annual total expenditure works out to be **32.3 Crores** and for the next 10 years would be **Rs. 323 Crores**

25.2 Revenue

A) Timber

The revenue realizable in terms of royalty by handing over of the prescribed volume is worked out as below. The volume to be handed over is worked out after deduction of 10% prescribed yield for concessionists.

Species	DKIWC	MCSWC	Total annual Yield	Royalty (as per 1991 tentative rates) Rs/Cum	Revenue in Rs. Lac
Deodar	23,700	10,900	34,600	3327.70	1151.38
Kail	6,300	10,700	17,000	1581.04	268.77
Fir	11,00	6,300	7,400	1236.72	91.51
Total	**31,100**	**27,900**	**59,000**		**1511.66**

B) NTFP

i) Revenue of NTFP including Guchhies = 5.00 lacs

ii) Miscellaneous: (Grazing, Timber, concessions, firewood and compensation) = 50 lacs.

GRAND TOTAL Rs 15.66 Crores annually)

However, the figures above are mere projections because at this point in time, neither the prescribed yield will be extracted, nor will the suggested investment for the development of forests by way of plan expenditure be forthcoming. Nevertheless, these figures bring out very clearly, that if proper investment is made in the forestry sector in conjunction with the necessary legal and policy inputs, the state shall be in a position to regenerate the dwindling forest reserves, and, the tangible and intangible benefits that will accrue will far exceed the initial investment. Timely investment in forestry sector is also important from the point of view of sustainability of future returns, both material and environmental, because for the requirements of the future generations, action has to be initiated today.

25.3 Cost of the Plan

The expenditure incurred on the revision of the working plan for Bhadarwahh Forest Division is as under:

Unit of Appropriation	Amount (Rs.)
Plan (Utilised by Bhadarwah Forest Division)	24,00,000
XIII FC Award (WPD-III)	3,30,000
CAPEX (WPD-III)	50,000
Total	**27,80,000**

The expenditure above is inclusive of the amount spent on the purchase of computer and computer peripherals, paint, instruments, stationery and stock items. This is inclusive of the assets that have been created and retained by Bhadarwah Forest Division with only few items worth less than 1 lac handed over to Working Plan Division III.

SUMMARY OF PRESCRIPTIONS

26.1 A summary of the important prescriptions of the plan is given as under:

Prescription	Section	Page
Constitution of the Working Circles Deodar – Kail Irregular Working Circle Mixed Conifers Selection Working Circle Fir Selection Working Circle Chir Rehablitation Working Circle Reboisement Working Circle Protection Working Circle Grassland Development (overlapping) Working Circle Ecotourism (overlapping) Working Circle NTFP (Overlapping) Working Circle Forest Protection (overlapping) Working Circle JFM (overlapping) Working Circle Wildlife management (overlapping) Working Circle	9.3	93
Deodar – Kail Irregular Working Circle	**10**	**101-117**
Total area of the Working Circle =16,259.52 hectares	10.3	103
Commercial area of the Working Circle = 9,799.64 hectares	10.3	103
Silvicultural System : Indian Irregular Shelter wood System	10.4	104
Thinning Cycle = 10 years	10.5	105
Rotation = 150 years	10.6	105
Balance Conversion Period = 30 years	10.6	106
Regeneration Period = 30 years	10.6	106
Periodic Blocks : Floating, Conversion, Converted and Unallotted	10.7	106
Felling Series = One	10.8	106
Annual yield from the entire Working circle Deodar = 23,700m^3 Kail = 6,300 m^3 Fir/ Spruce = 1,100 m^3 Total = 31,100 m^3	10.15	117
Intensity of the annual cut per hectare of the commercial area = 5.46 m^3	10.15	118
Annual yield from the Conversion Block Deodar = 6,400 m^3 Kail = 1,100 m^3 Fir/ Spruce = 1,100 m^3 Total = 8,600 m^3	10.15	117

	10.15	117
Annual yield from the Unallotted and Converted Block		
Deodar = 17,300 m^3		
Kail = 5,200 m^3		
Fir/ Spruce = 0 m^3		
Total = 22,500 m^3		
Intensity of the annual cut per hectare of the commercial area = 2.77 m^3		
Mixed Conifers Selection Working Circle		
Total area of the Working Circle = 14,602.22 hectares	11.3	130
Commercial area of the Working circle = 7664.07 hectares	11.3	130
Silvicultural System: Selection System	11.4	130
Exploitable Size	11.5	130
Deodar and Kail = 70 cm d.b.h		
Fir and Spruce = 80 cm d.b.h		
Rotation	11.5	130
Deodar and Kail = 150 years		
Fir and Spruce = 225 years		
Felling Cycle = 20 years	11.6	131
Felling Series = One	11.7	131
Annual yield from the Working Circle	11.10	135
Deodar = 10,900 m^3		
Kail = 10,700 m^3		
Fir = 6,300 m^3		
Total = 27,900 m^3		
Intensity of cut per hectare of the commercial area of the working circle = 3.64 m^3 per annum	11.10	139
Size of the Annual Coupe = 383.20 hectares	11.11	139
Fir Selection Working Circle		
Total area of the Working Circle = 17,860.66 hectares	12.3	144
Commercial area of the working Circle = 8,599.48 hectares	12.3	146
Silvicultural System: Selection System	12.4	147
Exploitable Size	12.5	147
Deodar and Kail = 70 cm d.b.h		
Fir/ Spruce = 80 cm d.b.h		
Rotation	12.5	147
Deodar and Kail = 150 years		
Fir/ Spruce = 225 years		
Felling Cycle = 20 years	12.6	148
Felling Series = One	12.7	148
Annual yield from the Working Circle	12.9	149
Deodar = 5,900 m^3		
Kail = 5,900 m^3		

Fir/ Spruce = 24,600 m^3		
Total = 36,400m^3		
Intensity of cut per hectare of the commercial area of the working circle = 4.23 m^3 per annum	12.10	155
Size of the Annual Coupe = 429.97 hectares	12.11	155
Allowable cut per hectare of the Annual Coupe = 84.66 m^3 per annum	12.12	156
Chir Rehablitation Working Circle		
Total Area of the Working Circle = 2,955.50 hectares	13.3	165
Forested area of the Working Circle = 1,298.56 hectare	13.3	165
Special Objects of Management	13.4	166
Analysis and valuation of crop	13.5	166
Reboisement Working Circle		
Special Objects of Management	14.3	177
Total Area of the Working Circle = 8,377.50 hectares	14.4	178
Forested area of the Working Circle = 2,241.64 hectare	14.4	178
Analysis and valuation of crop	14.5	178
Protection Working Circle		
Total Area of the Working Circle = 27,540.67 hectares	15.3	189
Forested area of the Working Circle = 9,662.60 hectare	15.3	189
Special Objects of Management	15.4	189
Analysis and valuation of crop	15.5	189
Grassland Development (Overlapping) Working Circle	**16**	**194**
Ecotourism (overlapping) Working Circle	**17**	**202**
Famous tourist destinations	**17.2**	**202**
Important activities identified under Ecotourism	17.3	205
Infrastructure to be built	17.4	206
NTFP (overlapping) Working Circle	**18**	**208**
Forest Protection (over lapping) Working Circle	**19**	**213**
Issues related to protection of the forests of Bhadarwah Forest Division	19.2	213
Joint Forest Management (over lapping) Working Circle	**20**	**217**
Wildlife Management (over lapping) Working circle	**21**	**223**
Method of treatment	21.3	224
Miscellaneous regulations		**228**
Buildings	22.1	228
Paths	22.2	228
Forest demarcation and consolidation	22.3	228
Management of Berun line forests and uncultivated wastelands	22.4	229
Social forestry	22.5	229
Forest nurseries	22.6	230
Beats and Blocks	22.7	230
Maps	22.8	231
Compartment descriptions	22.12	231

Draft plan	22.13	231
Staff and Labour supply	**23**	**232**
Establishment	23.1	232
Labour Supply	23.2	232
Control Forms		**233**
Control forms	24.1	233
Compartment histories	24.2	234
Divisional Journal	24.3	234
Guard Books	24.4	234
Financial Forecast and cost of the plan	**25**	**235**
Projected Expenditure	25.1	239
Non-Plan = Rs 15 Crores		
Plan = 17.31 Rs. Crores		
Total = Rs. 32.3 Crores		
Projected Annual Revenue	25.2	239
Cost of Plan = Rs. 27.8 lacs	25.3	240
Summary of prescriptions	**25**	**241-244**

APPENDICES

LIST OF APPENDICES

Appendix	Title
I	Summary Abstract of Demarcated Forests as per Form-I
II	Estate Area Statement as per GIS and Working circle of Bhadarwah Forest Division
III	Comparison of Area Estimation in the Previous and Current Working Plans
IV	Area Statement of Compartments under Conversion Block in Bhadarwah Forest Division
V	Area Statement of Compartments under Converted Block in Bhadarwah Forest Division
VI	Area Statement of Compartments under Unallotted Block in Bhadarwah Forest Division
VII	Area Statement of Compartments under Mixed Conifer Selection Working Circle of Bhadarwah Forest Division
VIII	Area Statement of Compartments under Fir Selection Working Circle of Bhadarwah Forest Division
IX	Area Statement of Compartments under Chir Rehabilitation Working Circle of Bhadarwah Forest Division
X	Statement of Afforestation Works conducted in Bhadarwah Forest Division
XI	List of Nurseries of Bhadarwah Forest
XII	List of Check Posts of Bhadarwah Forest Division
XIII	List of Forest Roads of Bhadarwah Forest Division
XIV	Statement of Buildings of Bhadarwah Forest Division
XV	Statement showing marking handed over to SFC from 1989-90 to 2015-16 (ending 3/2016) of Forest Division Bhaderwah
XVI	Area diverted for Non-forestry purposes under J&K Forest (Conservation) Act, 1997 in Bhadarwah Forest Division
XVII	Volume of timber extracted by Forest Department and SFC during 1996-97 to 2015-16 from Bhaderwah Forest Division

Appendix I Summary Abstract of Demarcated Forests as per Form-I

S.No.	Name of Range	Area of Forest		No. of Boundary Pillars	Length of Main Line		Area of Chaks		No. of Boundary Pillars of Chaks	Length of Line of Chaks	
		Acres A.K.M.	Hectares		Miles M Karam	Kilometers	Acres A.K.M.	Hectares		Miles M. Karms	Kilometers
1.	Bhalesh	135609-0-0	54879.588	1275	205.477	330.610	2770-0-0	1120.991	536	44-322	71.395
2.	Kellar	36224-0-0	14659.087	3536	253.996	408.648	5161-0-0	2088.548	5274	197-940	319.569
3.	Neeru	37121-0-0	15022.486	2361	195.59	313.908	2755-0-0	1115.126	2504	104-45	167.455
4.	Chiralla	32119-0-0	12998.232	1673	188.447	303.248	1052-0-0	425.731	1152	49-93	78-790
	Grand Total	241073-0-0	97559.393	8845	842.979	1356.414	11738-0-0	4750.432	9466	395-44	637.209

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Bhalesh	Jatota	Gandoh	1/Jt	48.03	77.44	41.17	0.00	166.65	80.68	247.33	Mixed Coniferous
Bhalesh	Jatota	Gandoh	2/Jt	18.61	22.05	81.31	0.00	121.97	49.74	171.71	Mixed Coniferous
Bhalesh	Jatota	Gandoh	3/Jt	40.81	48.23	13.60	0.00	102.65	157.38	260.03	Mixed Coniferous
Bhalesh	Jatota	Gandoh	4/Jt	16.51	36.06	0.00	0.00	52.57	47.14	99.71	Mixed Coniferous
Bhalesh	Jatota	Gandoh	5/Jt	111.31	111.31	0.00	0.00	222.62	104.16	326.78	Mixed Coniferous
Bhalesh	Jatota	Kansar	6/Jt	116.03	53.31	251.92	0.00	421.26	141.36	562.62	Mixed Coniferous
Bhalesh	Jatota	Kansar	7/Jt	54.13	21.96	29.53	0.00	105.62	70.44	176.06	Mixed Coniferous
Bhalesh	Jatota	Kansar	8/Jt	103.95	49.45	135.98	0.00	289.37	237.21	526.58	Mixed Coniferous
Bhalesh	Jatota	Kansar	9a/Jt	74.49	101.87	93.11	0.00	269.47	107.92	377.39	Fir Selection
Bhalesh	Jatota	Kansar	9b/Jt	77.80	54.87	47.50	0.00	180.17	92.66	272.83	Mixed Coniferous
Bhalesh	Jatota	Kansar	10/Jt	74.22	20.19	81.32	0.00	175.73	82.69	258.42	Fir Selection
Bhalesh	Jatota	Kansar	11a/Jt	10.67	0.00	50.84	0.00	61.51	62.26	123.77	Fir Selection
Bhalesh	Jatota	Kansar	11b/Jt	17.45	57.86	23.88	0.00	99.18	173.92	273.10	Mixed Coniferous
Bhalesh	Jatota	Kansar	12/Jt	15.42	76.52	9.02	0.00	100.96	157.75	258.71	Deodar-Kail
Bhalesh	Jatota	Kansar	13/Jt	38.33	57.50	21.18	0.00	117.02	106.52	223.54	Mixed Coniferous
Bhalesh	Jatota	Kansar	14/Jt	21.34	56.45	0.00	0.00	77.79	199.58	277.37	Deodar-Kail
Bhalesh	Jatota	Gandoh	15/Jt	5.90	8.95	0.00	0.00	14.85	61.09	75.94	Reboisment
Bhalesh	Pingal	Dichhal	1/Bh	20.71	9.41	0.00	0.00	30.12	26.74	56.86	Reboisment
Bhalesh	Pingal	Pingal	2/Bh	6.40	23.23	1.49	0.00	31.12	164.90	196.02	Reboisment
Bhalesh	Pingal	Pingal	3/Bh	2.20	29.98	1.69	0.00	33.88	238.68	272.56	Reboisment
Bhalesh	Pingal	Champal	4/Bh	0.47	101.93	16.36	0.00	118.76	181.06	299.82	Protection
Bhalesh	Pingal	Champal	5/Bh	6.84	93.60	24.36	0.00	124.80	161.75	286.55	Protection
Bhalesh	Pingal	Champal	6/Bh	5.35	77.05	27.47	0.00	109.87	219.46	329.33	Protection
Bhalesh	Pingal	Champal	7/Bh	0.00	0.00	107.28	0.00	107.28	154.76	262.04	Protection
Bhalesh	Pingal	Champal	8/Bh	15.43	47.68	20.58	0.00	83.69	220.06	303.75	Protection
Bhalesh	Chilli	9/44/47	9/Bh	0.00	13.47	1.00	0.00	14.47	210.54	225.01	Reboisment
Bhalesh	Chilli	9/44/48	10/Bh	0.00	40.61	0.00	0.00	40.61	174.90	215.51	Protection
Bhalesh	Chilli	Balote	11/Bh	0.00	38.67	8.19	0.00	46.86	275.27	322.13	Reboisment
Bhalesh	Chilli	Balote	12/Bh	0.00	65.02	14.91	0.00	79.93	521.92	601.85	Reboisment
Bhalesh	Chilli	Balote	13/Bh	0.00	10.32	129.67	0.00	139.99	153.16	293.15	Protection
Bhalesh	Chilli	Balote	14/Bh	0.00	30.62	28.76	0.00	59.38	559.46	618.84	Protection
Bhalesh	Chilli	Balote	15/Bh	0.00	0.00	87.47	0.00	87.47	126.16	213.63	Protection
Bhalesh	Chilli	Balote	16/Bh	166.77	0.00	126.98	0.00	293.75	197.71	491.46	Protection
Bhalesh	Chilli	Mano	17/Bh	0.00	43.94	0.00	0.00	43.94	153.85	197.79	Reboisment

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Bhalesh	Chilli	Mano	18/Bh	0.00	8.53	5.37	0.00	13.90	685.69	699.59	Reboisment
Bhalesh	Chilli	Mano	19/Bh	0.00	23.95	122.29	0.00	146.24	571.46	717.70	Mixed Coniferous
Bhalesh	Chilli	Mano	20/Bh	0.00	28.85	0.00	0.00	28.85	446.17	475.02	Reboisment
Bhalesh	Chilli	Mano	21/Bh	0.00	0.00	41.80	0.00	41.80	478.61	520.41	Protection
Bhalesh	Chilli	Mano	22/Bh	0.00	0.00	71.47	0.00	71.47	555.04	626.51	Protection
Bhalesh	Chilli	Mano	23/Bh	0.00	0.00	31.45	0.00	31.45	376.28	407.73	Protection
Bhalesh	Chilli	Mano	24/Bh	0.00	0.00	52.41	0.00	52.41	188.94	241.35	Protection
Bhalesh	Chilli	Mano	25/Bh	0.00	0.00	156.76	0.00	156.76	415.55	572.31	Protection
Bhalesh	Chilli	Mano	26/Bh	0.00	0.00	115.81	0.00	115.81	219.82	335.63	Protection
Bhalesh	Chilli	Mano	27/Bh	0.00	0.00	68.52	0.00	68.52	338.66	407.18	Protection
Bhalesh	Chilli	Mano	28/Bh	8.18	2.17	49.83	0.00	60.18	193.91	254.09	Fir Selection
Bhalesh	Chilli	Mano	29/Bh	0.00	12.90	181.30	0.00	194.20	282.19	476.39	Fir Selection
Bhalesh	Chilli	Mano	30/Bh	0.00	9.98	109.83	0.00	119.81	353.20	473.01	Protection
Bhalesh	Chilli	Mano	31/Bh	5.48	1.46	45.08	0.00	52.02	483.82	535.84	Protection
Bhalesh	Chilli	Mano	32/Bh	0.00	3.26	39.95	0.00	43.21	177.05	220.26	Protection
Bhalesh	Chilli	Mano	33/Bh	0.00	13.89	137.11	0.00	151.00	317.56	468.56	Fir Selection
Bhalesh	Chilli	Mano	34/Bh	0.00	0.00	104.18	0.00	104.18	146.82	251.00	Protection
Bhalesh	Chilli	Mano	35/Bh	0.00	10.48	71.12	0.00	81.60	204.56	286.16	Fir Selection
Bhalesh	Chilli	Mano	36/Bh	0.00	6.61	67.70	0.00	74.31	96.39	170.70	Fir Selection
Bhalesh	Chilli	Mano	37/Bh	16.85	60.87	0.00	0.00	77.72	128.56	206.28	Fir Selection
Bhalesh	Chilli	Mano	38/Bh	14.82	0.00	77.13	0.00	91.95	101.73	193.68	Fir Selection
Bhalesh	Chilli	Mano	39/Bh	26.24	0.00	36.05	0.00	62.29	176.80	239.09	Fir Selection
Bhalesh	Chilli	Mano	40/Bh	0.00	7.77	132.62	0.00	140.39	99.95	240.34	Fir Selection
Bhalesh	Chilli	Mano	41/Bh	0.00	8.01	84.12	0.00	92.13	118.10	210.23	Fir Selection
Bhalesh	Chilli	Mano	42/Bh	11.77	23.54	36.69	0.00	72.00	95.90	167.90	Protection
Bhalesh	Chilli	Mano	43/Bh	60.67	14.04	7.52	0.00	82.23	50.55	132.78	Mixed Coniferous
Bhalesh	Chilli	9/44/47	44/Bh	34.92	0.00	127.33	0.00	162.25	118.16	280.41	Mixed Coniferous
Bhalesh	Chilli		45/Bh	16.27	22.15	9.49	0.00	47.91	198.01	245.92	Mixed Coniferous
Bhalesh	Chilli		46/Bh	46.43	32.24	82.10	0.00	160.77	262.30	423.07	Mixed Coniferous
Bhalesh	Chilli	9/44/47	47/Bh	32.30	40.98	32.30	0.00	105.58	195.25	300.83	Reboisment
Bhalesh	Pingal	Manoi	48/Bh	10.09	39.54	21.38	0.00	71.01	142.26	213.27	Protection
Bhalesh	Neeli	Dhansa	49/Bh	37.38	4.47	0.00	0.00	41.85	64.55	106.40	Mixed Coniferous
Bhalesh	Neeli	Dhansa	50/Bh	34.96	62.59	15.23	0.00	112.78	167.75	280.53	Mixed Coniferous
Bhalesh	Neeli	Dhansa	51/Bh	0.00	13.21	0.00	0.00	13.21	42.93	56.14	Reboisment

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Bhalesh	Neeli	Dhansa	52/Bh	0.00	66.04	0.00	0.00	66.04	94.10	160.14	Mixed Coniferous
Bhalesh	Neeli	Dhansa	53/Bh	0.00	29.40	11.83	0.00	41.23	84.46	125.69	Mixed Coniferous
Bhalesh	Neeli	Dhansa	54/Bh	0.00	5.28	82.22	0.00	87.50	180.10	267.60	Fir Selection
Bhalesh	Neeli	Dhansa	55/Bh	32.57	1.26	11.61	0.00	45.44	142.57	188.01	Mixed Coniferous
Bhalesh	Neeli	Dhansa	56a/Bh	7.62	5.98	26.66	0.00	40.26	119.53	159.79	Protection
Bhalesh	Neeli	Dhansa	56b/Bh	6.18	2.60	8.46	0.00	17.24	68.70	85.94	Mixed Coniferous
Bhalesh	Neeli	Chanti	57/Bh	8.49	25.76	0.00	0.00	34.25	134.49	168.74	Reboisment
Bhalesh	Neeli	Chanti	58/Bh	0.00	21.79	9.60	0.00	31.39	304.54	335.93	Protection
Bhalesh	Neeli	Chanti	59/Bh	6.27	0.00	122.30	0.00	128.57	157.82	286.39	Fir Selection
Bhalesh	Neeli	Chanti	60/Bh	14.22	0.00	86.51	0.00	100.73	80.14	180.87	Mixed Coniferous
Bhalesh	Neeli	Chanti	61/Bh	21.17	3.85	70.23	0.00	95.25	92.65	187.90	Protection
Bhalesh	Neeli	Jugassar	62/Bh	0.00	0.00	45.21	0.00	45.21	175.79	221.00	Fir Selection
Bhalesh	Neeli	Jugassar	63/Bh	5.11	26.92	0.00	0.00	32.03	282.29	314.32	Protection
Bhalesh	Neeli	Jugassar	64/Bh	0.00	0.00	67.20	0.00	67.20	326.38	393.58	Fir Selection
Bhalesh	Neeli	Jugassar	65/Bh	0.00	0.00	15.90	0.00	15.90	423.38	439.28	Protection
Bhalesh	Neeli	Jugassar	66/Bh	0.00	0.00	101.28	0.00	101.28	420.98	522.26	Protection
Bhalesh	Neeli	Jugassar	67/Bh	0.00	0.00	129.96	0.00	129.96	250.55	380.51	Protection
Bhalesh	Neeli	Jugassar	68/Bh	3.37	8.25	71.61	0.00	83.23	162.33	245.56	Fir Selection
Bhalesh	Neeli	Jugassar	69/Bh	16.60	6.94	31.99	0.00	55.53	135.05	190.58	Mixed Coniferous
Bhalesh	Neeli	Jugassar	70/Bh	0.00	7.57	40.73	0.00	48.30	301.64	349.94	Fir Selection
Bhalesh	Neeli	Jugassar	71/Bh	0.00	0.00	98.46	0.00	98.46	397.82	496.28	Protection
Bhalesh	Neeli	Jugassar	72/Bh	0.00	0.00	145.81	0.00	145.81	539.92	685.73	Protection
Bhalesh	Neeli	Jugassar	73/Bh	5.92	2.37	58.27	0.00	66.56	342.28	408.84	Fir Selection
Bhalesh	Neeli	Jugassar	74/Bh	0.00	0.00	43.02	0.00	43.02	112.49	155.51	Fir Selection
Bhalesh	Neeli	Jugassar	75/Bh	6.89	12.86	31.68	0.00	51.42	94.37	145.79	Protection
Bhalesh	Neeli	Jugassar	76/Bh	9.46	10.46	26.64	0.00	46.55	113.55	160.10	Mixed Coniferous
Bhalesh	Neeli	Jugassar	77/Bh	0.00	0.00	48.59	0.00	48.59	400.55	449.14	Protection
Bhalesh	Neeli	Jugassar	78/Bh	8.49	0.00	13.01	0.00	21.50	110.48	131.98	Protection
Bhalesh	Neeli	Jugassar	79/Bh	0.00	0.00	29.57	0.00	29.57	110.52	140.09	Reboisment
Bhalesh	Neeli	Jugassar	80/Bh	15.61	17.11	14.71	0.00	47.42	98.99	146.41	Mixed Coniferous
Bhalesh	Neeli	Jugassar	81/Bh	15.59	17.00	43.45	0.00	76.04	86.83	162.87	Protection
Bhalesh	Neeli	Jugassar	82/Bh	0.00	22.36	51.65	0.00	74.01	158.89	232.90	Protection
Bhalesh	Neeli	Jugassar	83/Bh	0.00	0.00	161.15	0.00	161.15	220.91	382.06	Protection
Bhalesh	Kilhotran	Soti	84/Bh	0.00	0.00	90.21	0.00	90.21	204.41	294.62	Protection

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Bhalesh	Kilhotran	Soti	85a/Bh	0.00	45.75	0.00	0.00	45.75	33.49	79.24	Mixed Coniferous
Bhalesh	Kilhotran	Soti	85b/Bh	4.85	10.08	12.32	0.00	27.26	91.39	118.65	Mixed Coniferous
Bhalesh	Kilhotran	Soti	86/Bh	3.04	4.47	5.60	0.00	13.11	90.74	103.85	Protection
Bhalesh	Kilhotran	Soti	87/Bh	0.00	0.00	81.59	0.00	81.59	137.45	219.04	Protection
Bhalesh	Kilhotran	Soti	88/Bh	1.89	5.67	102.75	0.00	110.31	135.53	245.84	Fir Selection
Bhalesh	Kilhotran	Soti	89/Bh	7.73	0.00	93.27	0.00	101.00	292.91	393.91	Fir Selection
Bhalesh	Kilhotran	Soti	90/Bh	4.38	8.13	124.47	0.00	136.98	238.92	375.90	Fir Selection
Bhalesh	Kilhotran	Soti	91/Bh	0.00	0.00	77.62	0.00	77.62	152.48	230.10	Protection
Bhalesh	Kilhotran	Soti	92/Bh	0.00	7.01	121.85	0.00	128.86	214.05	342.91	Protection
Bhalesh	Kilhotran	Soti	93/Bh	0.00	0.00	58.58	0.00	58.58	259.74	318.32	Fir Selection
Bhalesh	Kilhotran	Thiloran	94/Bh	18.44	35.73	49.56	0.00	103.74	155.68	259.42	Mixed Coniferous
Bhalesh	Kilhotran	Thiloran	95/Bh	10.90	130.80	0.00	0.00	141.70	98.50	240.20	Fir Selection
Bhalesh	Kilhotran	Thiloran	96/Bh	0.00	6.93	107.10	0.00	114.03	80.65	194.68	Fir Selection
Bhalesh	Kilhotran	Thiloran	97/Bh	0.00	0.00	123.53	0.00	123.53	206.54	330.07	Fir Selection
Bhalesh	Kilhotran	Thiloran	98/Bh	0.00	16.31	125.47	0.00	141.78	177.75	319.53	Fir Selection
Bhalesh	Kilhotran	Thiloran	99/Bh	7.81	2.47	92.91	0.00	103.19	106.05	209.24	Protection
Bhalesh	Kilhotran	Thiloran	100/Bh	16.43	0.00	155.31	0.00	171.74	221.72	393.46	Protection
Bhalesh	Kilhotran	Thiloran	101/Bh	22.06	10.18	147.62	0.00	179.86	72.75	252.61	Fir Selection
Bhalesh	Kilhotran	Thiloran	102/Bh	0.00	0.00	157.45	0.00	157.45	82.37	239.82	Fir Selection
Bhalesh	Kilhotran	Thiloran	103/Bh	0.00	0.00	102.24	0.00	102.24	84.98	187.22	Fir Selection
Bhalesh	Kilhotran	Thiloran	104/Bh	0.00	24.91	49.81	0.00	74.72	113.99	188.71	Fir Selection
Bhalesh	Kilhotran	Thiloran	105/Bh	0.00	48.07	32.85	0.00	80.92	165.07	245.99	Protection
Bhalesh	Kilhotran	Thiloran	106/Bh	0.00	14.73	62.06	0.00	76.79	322.34	399.13	Reboisment
Bhalesh	Kilhotran	Kilotran	107/Bh	7.37	0.57	0.00	0.00	7.94	31.46	39.40	Reboisment
Bhalesh	Kilhotran	Kilotran	108/Bh	0.00	52.66	16.79	0.00	69.45	78.58	148.03	Protection
Bhalesh	Kilhotran	Kilotran	109/Bh	0.00	49.08	0.00	0.00	49.08	122.51	171.59	Reboisment
Chiralla	Chiralla	Chiralla	1a/Ch	8.87	3.88	0.00	0.00	12.75	73.90	86.65	Reboisment
Chiralla	Chiralla	Chiralla	1b/Ch	0.97	1.66	0.00	0.00	2.63	5.60	8.23	Reboisment
Chiralla	Chiralla	Chiralla	2/Ch	9.39	15.14	0.00	0.00	24.53	94.66	119.19	Reboisment
Chiralla	Chiralla	Chiralla	3a/Ch	11.23	0.00	2.29	0.00	13.52	36.23	49.75	Deodar-Kail
Chiralla	Chiralla	Chiralla	3b/Ch	0.00	56.04	0.00	0.00	56.04	40.86	96.90	Reboisment
Chiralla	Chiralla	Chiralla	3c/Ch	0.00	0.00	82.89	0.00	82.89	33.96	116.85	Fir Selection
Chiralla	Chiralla	Chiralla	3d/Ch	35.29	0.00	0.00	0.00	35.29	24.27	59.56	Deodar-Kail
Chiralla	Chiralla	Chiralla	4a/Ch	55.76	0.00	30.07	0.00	85.83	30.44	116.27	Deodar-Kail

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Chiralla	Chiralla	Chiralla	4b/Ch	9.90	8.49	42.45	0.00	60.84	17.71	78.55	Fir Selection
Chiralla	Chiralla	Chiralla	5a/Ch	17.59	33.07	11.26	0.00	61.92	24.07	85.99	Mixed Coniferous
Chiralla	Chiralla	Chiralla	5b/Ch	0.00	76.15	0.00	0.00	76.15	10.50	86.65	Deodar-Kail
Chiralla	Chiralla	Chiralla	6a/Ch	71.20	0.00	0.00	0.00	71.20	29.08	100.28	Deodar-Kail
Chiralla	Chiralla	Chiralla	6b/Ch	23.21	11.60	0.00	0.00	34.81	13.28	48.09	Deodar-Kail
Chiralla	Chiralla	Chiralla	7/Ch	17.12	38.90	0.00	0.00	56.02	12.28	68.30	Deodar-Kail
Chiralla	Chiralla	Chiralla	8/Ch	42.83	56.36	0.00	0.00	99.19	62.67	161.86	Deodar-Kail
Chiralla	Chiralla	Bhalara	9/Ch	0.00	27.04	0.00	0.00	27.04	30.22	57.26	Reboisment
Chiralla	Chiralla	Bhalara	10/Ch	118.47	0.00	0.00	0.00	118.47	82.07	200.54	Deodar-Kail
Chiralla	Chiralla	Bhalara	11/Ch	56.31	56.31	0.00	0.00	112.61	52.03	164.64	Deodar-Kail
Chiralla	Chiralla	Bhalara	12a/Ch	16.74	12.09	46.51	0.00	75.34	91.21	166.55	Fir Selection
Chiralla	Chiralla	Bhalara	12b/Ch	5.04	7.56	69.30	0.00	81.90	17.89	99.79	Deodar-Kail
Chiralla	Chiralla	Bhalara	13a/Ch	0.00	0.00	16.12	0.00	16.12	9.59	25.71	Fir Selection
Chiralla	Chiralla	Bhalara	13b/Ch	107.63	0.00	0.00	0.00	107.63	38.53	146.16	Deodar-Kail
Chiralla	Chiralla	Bhalara	14a/Ch	34.74	34.08	6.55	0.00	75.37	40.46	115.83	Deodar-Kail
Chiralla	Chiralla	Bhalara	14b/Ch	4.14	0.00	18.40	0.00	22.54	31.77	54.31	Fir Selection
Chiralla	Chiralla	Bhalara	15/Ch	115.75	0.00	0.00	0.00	115.75	52.74	168.49	Deodar-Kail
Chiralla	Chiralla	Bhalara	16/Ch	136.63	0.00	0.00	0.00	136.63	44.42	181.05	Deodar-Kail
Chiralla	Chiralla	Bhalara	17/Ch	69.81	18.95	0.00	0.00	88.76	93.35	182.11	Deodar-Kail
Chiralla	Chiralla	Bhalara	18/Ch	0.00	33.59	0.00	0.00	33.59	14.97	48.56	Deodar-Kail
Chiralla	Chiralla	Jagota I	19/Ch	0.00	0.00	0.00	15.59	15.59	9.32	24.91	Chir Rehablitation
Chiralla	Chiralla	Jagota I	20/Ch	72.42	68.97	2.76	0.00	144.15	85.96	230.11	Deodar-Kail
Chiralla	Chiralla	Jagota I	21/Ch	96.02	15.25	0.00	0.00	111.27	21.32	132.59	Deodar-Kail
Chiralla	Chiralla	Jagota I	22/Ch	59.71	44.13	0.00	0.00	103.84	22.42	126.26	Deodar-Kail
Chiralla	Chiralla	Jagota I	23a/Ch	61.10	44.18	0.00	0.00	105.28	49.16	154.44	Deodar-Kail
Chiralla	Chiralla	Jagota I	23b/Ch	9.52	1.90	0.00	0.00	11.42	18.77	30.19	Deodar-Kail
Chiralla	Chiralla	Jagota I	24a/Ch	16.48	0.00	0.00	0.00	16.48	6.39	22.87	Deodar-Kail
Chiralla	Chiralla	Jagota I	24b/Ch	3.80	15.21	0.00	29.88	48.89	8.62	57.51	Chir Rehablitation
Chiralla	Chiralla	Jagota I	25/Ch	21.72	21.02	0.00	0.00	42.74	28.15	70.89	Chir Rehablitation
Chiralla	Chiralla	Jagota I	26a/Ch	12.29	3.07	0.00	0.00	15.36	32.71	48.07	Chir Rehablitation
Chiralla	Chiralla	Jagota I	26b/Ch	0.00	0.00	0.00	31.75	31.75	30.15	61.90	Chir Rehablitation
Chiralla	Chiralla	Jagota II	27/Ch	105.57	45.24	0.00	0.00	150.81	51.00	201.81	Deodar-Kail
Chiralla	Chiralla	Jagota II	28/Ch	20.65	61.94	0.00	0.00	82.58	55.88	138.46	Deodar-Kail
Chiralla	Chiralla	Jagota II	29/Ch	32.34	32.34	32.34	0.00	97.02	25.97	122.99	Deodar-Kail

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Chiralla	Chiralla	Jagota II	30/Ch	12.73	7.64	0.00	15.28	35.65	13.91	49.56	Chir Rehablitation
Chiralla	Chiralla	Jagota II	31a/Ch	15.01	9.06	0.00	23.80	47.87	26.92	74.79	Chir Rehablitation
Chiralla	Chiralla	Jagota II	31b/Ch	27.76	17.35	0.00	0.00	45.11	8.96	54.07	Deodar-Kail
Chiralla	Chiralla	Jagota II	32a/Ch	30.36	18.97	0.00	75.90	125.23	99.01	224.24	Chir Rehablitation
Chiralla	Chiralla	Jagota II	32b/Ch	18.35	32.52	16.68	0.00	67.55	61.65	129.20	Deodar-Kail
Chiralla	Chiralla	Jagota II	33/Ch	0.00	0.00	0.00	98.92	98.92	122.46	221.38	Chir Rehablitation
Chiralla	Jai	Tanta I	1a/Jai	0.00	30.44	0.00	0.00	30.44	73.87	104.31	Protection
Chiralla	Jai	Tanta I	1b/Jai	0.00	31.74	0.00	0.00	31.74	68.82	100.56	Protection
Chiralla	Jai	Tanta I	2/Jai	0.00	83.37	0.00	0.00	83.37	95.41	178.78	Reboisment
Chiralla	Jai	Tanta I	3/Jai	0.00	59.30	72.14	0.00	131.44	140.42	271.86	Reboisment
Chiralla	Jai	Tanta I	4a/Jai	0.00	16.68	0.00	0.00	16.68	55.89	72.57	Reboisment
Chiralla	Jai	Tanta I	4b/Jai	0.00	16.06	0.00	0.00	16.06	62.97	79.03	Reboisment
Chiralla	Jai	Tanta I	5a/Jai	0.00	17.81	0.00	0.00	17.81	55.55	73.36	Reboisment
Chiralla	Jai	Tanta I	5b/Jai	0.00	0.00	46.23	0.00	46.23	61.99	108.22	Protection
Chiralla	Jai	Tanta I	6/Jai	21.28	11.56	8.33	0.00	41.17	44.72	85.89	Mixed Coniferous
Chiralla	Jai	Tanta II	7a/Jai	19.98	61.67	0.00	0.00	81.65	54.60	136.25	Mixed Coniferous
Chiralla	Jai	Tanta II	7b/Jai	0.00	19.07	8.97	0.00	28.04	22.39	50.43	Fir Selection
Chiralla	Jai	Tanta II	8/Jai	38.17	23.32	36.75	0.00	98.24	50.56	148.80	Mixed Coniferous
Chiralla	Jai	Tanta II	9/Jai	4.83	20.13	0.00	0.00	24.96	72.15	97.11	Reboisment
Chiralla	Jai	Tanta II	10/Jai	0.00	64.35	13.79	0.00	78.14	119.33	197.47	Mixed Coniferous
Chiralla	Jai	Tanta II	11/Jai	0.00	63.18	21.50	0.00	84.68	80.48	165.16	Mixed Coniferous
Chiralla	Jai	Tanta II	12/Jai	106.24	88.75	0.00	0.00	74.88	107.83	182.71	Deodar-Kail
Chiralla	Jai	Jai	13a/Jai	0.00	74.37	0.00	0.00	74.37	68.10	142.47	Protection
Chiralla	Jai	Jai	13b/Jai	59.37	31.97	0.00	0.00	91.34	46.51	137.85	Mixed Coniferous
Chiralla	Jai	Jai	14a/Jai	6.15	14.21	1.92	0.00	22.28	31.73	54.01	Mixed Coniferous
Chiralla	Jai	Jai	14b/Jai	12.86	0.00	35.07	0.00	47.93	37.03	84.96	Fir Selection
Chiralla	Jai	Jai	15/Jai	12.85	6.42	98.91	0.00	118.18	65.46	183.64	Fir Selection
Chiralla	Jai	Jai	16a/Jai	84.92	0.00	0.00	0.00	84.92	73.02	157.94	Mixed Coniferous
Chiralla	Jai	Jai	16b/Jai	0.00	0.00	8.67	0.00	8.67	15.95	24.62	Fir Selection
Chiralla	Jai	Jai	16c/Jai	37.96	5.52	6.21	0.00	49.69	34.25	83.94	Deodar-Kail
Chiralla	Jai	Jai	17a/Jai	12.88	112.70	0.00	0.00	125.58	82.53	208.11	Deodar-Kail
Chiralla	Jai	Jai	17b/Jai	0.00	0.00	36.18	0.00	36.18	21.98	58.16	Fir Selection
Chiralla	Jai	Jai	18/Jai	25.14	15.26	127.48	0.00	167.88	46.79	214.67	Mixed Coniferous
Chiralla	Jai	Jai	19a/Jai	0.00	20.46	13.34	0.00	33.80	22.22	56.02	Protection

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Chiralla	Jai	Jai	19b/Jai	44.39	65.03	57.52	0.00	166.94	84.29	251.23	Fir Selection
Chiralla	Jai	Jai	20/Jai	14.09	18.79	37.57	0.00	70.45	70.95	141.40	Fir Selection
Chiralla	Jai	Jai	21a/Jai	23.64	47.27	26.00	0.00	96.91	91.75	188.66	Mixed Coniferous
Chiralla	Jai	Jai	21b/Jai	5.56	18.33	7.22	0.00	31.11	25.20	56.31	Fir Selection
Chiralla	Jai	Jai	21c/Jai	4.43	19.95	5.32	0.00	29.71	39.75	69.46	Mixed Coniferous
Chiralla	Jai	Jai	22a/Jai	5.92	14.26	8.07	0.00	28.26	99.47	127.73	Mixed Coniferous
Chiralla	Jai	Jai	22b/Jai	0.00	26.19	105.32	0.00	131.51	142.61	274.12	Fir Selection
Chiralla	Jai	Jai	23/Jai	20.04	16.20	57.98	0.00	94.22	187.51	281.73	Fir Selection
Chiralla	Jai	Jai	24/Jai	0.00	10.84	81.27	0.00	92.11	68.04	160.15	Fir Selection
Chiralla	Jai	Jai	25/Jai	24.70	15.44	121.20	0.00	161.34	110.37	271.71	Fir Selection
Chiralla	Jai	Jai	26/Jai	0.00	8.11	51.52	0.00	59.63	65.93	125.56	Fir Selection
Chiralla	Jai	Jai	27/Jai	0.00	7.66	47.38	0.00	55.04	25.55	80.59	Fir Selection
Chiralla	Jai	Jai	28/Jai	0.00	17.99	154.71	0.00	172.70	61.97	234.67	Fir Selection
Chiralla	Jai	Jai	29/Jai	9.71	15.38	64.76	0.00	89.85	32.62	122.47	Fir Selection
Chiralla	Jai	Jai	30/Jai	41.81	26.61	17.74	0.00	86.16	143.49	229.65	Fir Selection
Chiralla	Jai	Jai	31/Jai	0.00	23.96	76.80	0.00	100.76	90.24	191.00	Reboisment
Chiralla	Jai	Jai	32a/Jai	10.70	4.20	25.01	0.00	39.91	68.77	108.68	Fir Selection
Chiralla	Jai	Jai	32b/Jai	0.00	0.00	28.38	0.00	28.38	22.27	50.65	Fir Selection
Chiralla	Jai	Jai	33/Jai	6.65	42.54	5.32	0.00	54.51	228.62	283.13	Deodar-Kail
Chiralla	Jai	Jai	34/Jai	49.92	81.30	14.98	0.00	146.19	156.32	302.51	Mixed Coniferous
Chiralla	Jai	Jai	35/Jai	32.35	0.00	29.83	0.00	62.18	71.69	133.87	Reboisment
Chiralla	Jai	Jai	36a/Jai	0.00	44.15	0.00	0.00	44.15	115.34	159.49	Reboisment
Chiralla	Jai	Jai	36b/Jai	0.00	10.07	0.00	0.00	10.07	66.02	76.09	Reboisment
Chiralla	Jai	Jai	37a/Jai	23.99	0.00	0.00	0.00	23.99	58.87	82.86	Protection
Chiralla	Jai	Jai	37b/Jai	5.29	16.59	1.76	0.00	23.65	103.73	127.38	Reboisment
Chiralla	Jangalwar	Mahari	1/Jwr	29.28	80.95	0.00	0.00	110.23	407.71	517.94	Protection
Chiralla	Jangalwar	Mahari	2a/Jwr	98.03	46.06	1.04	0.00	145.13	68.12	213.25	Deodar-Kail
Chiralla	Jangalwar	Mahari	2b/Jwr	0.00	47.38	0.00	62.77	110.15	143.27	253.42	Chir Rehablitation
Chiralla	Jangalwar	Mahari	3/Jwr	20.03	14.07	0.00	36.40	70.50	114.35	184.85	Chir Rehablitation
Chiralla	Jangalwar	Mahari	4a/Jwr	8.08	19.46	0.00	13.47	41.01	46.44	87.45	Chir Rehablitation
Chiralla	Jangalwar	Mahari	4b/Jwr	29.04	1.43	7.89	0.00	38.36	168.68	207.04	Deodar-Kail
Chiralla	Jangalwar	Mahari	5/Jwr	120.26	6.14	35.11	0.00	161.52	92.86	254.38	Deodar-Kail
Chiralla	Jangalwar	Mahari	6/Jwr	2.81	1.23	0.00	15.82	19.86	71.07	90.93	Chir Rehablitation
Chiralla	Jangalwar	Jangalwar	7/Jwr	125.22	5.78	24.08	0.00	155.08	65.65	220.73	Deodar-Kail

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Chiralla	Jangalwar	Jangalwar	8a/Jwr	73.17	0.00	37.21	0.00	110.38	32.73	143.11	Deodar-Kail
Chiralla	Jangalwar	Jangalwar	8b/Jwr	90.86	0.00	16.22	0.00	107.08	33.55	140.63	Fir Selection
Chiralla	Jangalwar	Jangalwar	9a/Jwr	80.17	0.00	0.00	0.00	80.17	96.44	176.61	Protection
Chiralla	Jangalwar	Jangalwar	9b/Jwr	0.00	0.00	62.97	0.00	62.97	28.97	91.94	Protection
Chiralla	Jangalwar	Jangalwar	10/Jwr	68.49	0.00	0.00	0.00	68.49	27.47	95.96	Protection
Chiralla	Jangalwar	Jangalwar	11a/Jwr	22.55	13.64	0.00	6.29	42.48	22.07	64.55	Protection
Chiralla	Jangalwar	Jangalwar	11b/Jwr	46.96	0.00	97.37	0.00	144.33	92.98	237.31	Protection
Chiralla	Jangalwar	Bhella II	12/Jwr	0.00	0.00	0.00	48.89	48.89	142.34	191.23	Chir Rehablitation
Chiralla	Jangalwar	Bhella II	13/Jwr	0.00	36.02	0.00	6.64	42.66	129.56	172.22	Chir Rehablitation
Chiralla	Jangalwar	Bhella I	14/Jwr	0.00	35.90	0.00	0.00	35.90	25.74	61.64	Reboisment
Chiralla	Jangalwar	Bhella I	15/Jwr	0.00	0.00	0.00	19.19	19.19	48.63	67.82	Chir Rehablitation
Kellar	Guraka	Guraka	1/K	0.00	0.00	0.00	26.06	26.06	19.03	45.09	Chir Rehablitation
Kellar	Guraka	Guraka	2/K	59.55	43.41	0.00	0.00	102.96	49.72	152.68	Deodar-Kail
Kellar	Guraka	Guraka	3/K	63.59	18.41	0.00	0.00	82.00	60.84	142.84	Deodar-Kail
Kellar	Guraka	Guraka	4/K	2.19	0.00	0.00	72.28	74.47	103.74	178.21	Chir Rehablitation
Kellar	Guraka	Guraka	5/K	60.43	23.54	0.00	0.00	83.97	87.31	171.28	Reboisment
Kellar	Guraka	Guraka	6/K	82.47	47.12	0.00	0.00	129.59	73.80	203.39	Deodar-Kail
Kellar	Guraka	Guraka	7/K	67.67	19.34	0.00	0.00	87.01	16.43	103.44	Deodar-Kail
Kellar	Guraka	Guraka	8/K	171.28	32.58	0.00	0.00	203.86	175.28	379.14	Deodar-Kail
Kellar	Guraka	Sharora	9/K	24.31	10.27	0.00	0.00	34.58	112.28	146.86	Reboisment
Kellar	Guraka	Sharora	10/K	27.00	43.96	0.00	0.00	70.96	26.87	97.83	Deodar-Kail
Kellar	Guraka	Sharora	11/K	56.26	28.13	10.36	0.00	94.75	72.04	166.79	Protection
Kellar	Guraka	Sharora	12/K	42.43	47.09	0.00	0.00	114.54	95.68	210.22	Deodar-Kail
Kellar	Guraka	Sharora	13/K	39.91	18.86	0.00	0.00	78.98	38.10	117.08	Deodar-Kail
Kellar	Guraka	Sharora	14/K	27.85	12.86	0.00	0.00	40.71	64.80	105.51	Deodar-Kail
Kellar	Guraka	Gutassa	15/K	104.54	67.31	0.00	0.00	171.85	56.73	228.58	Deodar-Kail
Kellar	Guraka	Gutassa	16a/K	42.61	4.06	6.09	0.00	52.75	23.13	75.88	Deodar-Kail
Kellar	Guraka	Gutassa	16b/K	38.19	7.77	9.71	0.00	55.66	29.17	84.83	Fir Selection
Kellar	Guraka	Gutassa	17a/K	24.18	9.30	13.95	0.00	47.43	19.44	66.87	Fir Selection
Kellar	Guraka	Gutassa	17b/K	76.50	42.08	0.00	0.00	118.58	39.36	157.94	Deodar-Kail
Kellar	Guraka	Gutassa	18/K	74.04	11.47	0.00	0.00	85.51	82.88	168.39	Protection
Kellar	Guraka	Gutassa	19/K	51.47	6.35	28.59	0.00	86.42	81.49	167.91	Reboisment
Kellar	Guraka	Gutassa	20/K	69.48	22.30	3.43	0.00	95.22	94.98	190.20	Reboisment
Kellar	Guraka	Gutessa	21/K	146.83	0.00	0.00	0.00	146.83	39.32	186.15	Deodar-Kail

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Kellar	Guraka	Khellani	22a/K	36.26	0.00	0.00	0.00	36.26	12.17	48.43	Protection
Kellar	Guraka	Khellani	22b/K	0.00	0.00	0.00	19.48	19.48	32.05	51.53	Chir Rehablitation
Kellar	Malothi	Duggli	23/K	108.01	47.61	0.00	0.00	155.62	93.90	249.52	Reboisment
Kellar	Malothi	Duggli	24/K	75.71	0.00	0.00	0.00	75.71	61.18	136.89	Deodar-Kail
Kellar	Malothi	Duggli	25a/K	40.30	4.48	0.00	0.00	44.78	11.86	56.64	Deodar-Kail
Kellar	Malothi	Duggli	25b/K	38.90	9.72	0.00	0.00	48.62	6.20	54.82	Deodar-Kail
Kellar	Malothi	Duggli	26/K	115.54	13.59	15.29	0.00	144.42	49.54	193.96	Deodar-Kail
Kellar	Malothi	Duggli	27/K	126.87	9.88	3.80	0.00	140.55	73.64	214.19	Deodar-Kail
Kellar	Malothi	Duggli	28a/K	57.49	5.88	8.49	0.00	71.86	27.92	99.78	Deodar-Kail
Kellar	Malothi	Duggli	28b/K	65.80	14.10	17.63	0.00	97.53	23.56	121.09	Mixed Coniferous
Kellar	Malothi	Duggli	29a/K	49.58	0.00	75.49	0.00	125.07	33.42	158.49	Mixed Coniferous
Kellar	Malothi	Duggli	29b/K	12.94	12.94	172.10	0.00	197.98	54.14	252.12	Fir Selection
Kellar	Malothi	Chilli	30/K	0.00	7.38	155.77	0.00	163.15	128.56	291.71	Fir Selection
Kellar	Malothi	Chilli	31/K	294.02	0.00	0.00	0.00	294.02	432.25	726.27	Protection
Kellar	Malothi	Chilli	32/K	0.00	0.00	144.87	0.00	144.87	87.83	232.70	Fir Selection
Kellar	Malothi	Chilli	33/K	0.00	0.00	117.23	0.00	117.23	51.50	168.73	Fir Selection
Kellar	Malothi	Chilli	34/K	18.59	0.00	67.40	0.00	85.99	57.51	143.50	Mixed Coniferous
Kellar	Malothi	Chilli	35/K	23.84	8.51	53.64	0.00	85.99	43.71	129.70	Mixed Coniferous
Kellar	Malothi	Chilli	36/K	74.35	0.00	88.01	0.00	162.36	68.88	231.24	Mixed Coniferous
Kellar	Malothi	Chilli	37/K	0.00	0.00	50.26	0.00	50.26	61.14	111.40	Protection
Kellar	Malothi	Chilli	38a/K	174.32	0.00	0.00	0.00	174.32	143.75	318.07	Protection
Kellar	Malothi	Chilli	38b/K	0.00	24.18	147.75	0.00	171.93	147.57	319.50	Fir Selection
Kellar	Malothi	Chilli	39a/K	82.04	0.00	0.00	0.00	82.04	321.17	403.21	Protection
Kellar	Malothi	Chilli	39b/K	10.51	8.41	81.44	0.00	100.35	182.38	282.73	Protection
Kellar	Malothi	Chilli	40/K	106.00	9.76	0.00	0.00	115.76	70.48	186.24	Mixed Coniferous
Kellar	Malothi	Chilli	41/K	42.92	7.66	0.00	0.00	50.58	41.41	91.99	Reboisment
Kellar	Malothi	Chilli	42a/K	152.89	7.33	45.03	0.00	205.25	79.98	285.23	Mixed Coniferous
Kellar	Malothi	Chilli	42b/K	72.13	0.00	0.00	0.00	72.13	46.31	118.44	Protection
Kellar	Malothi	Chilli	43/K	93.43	4.63	20.35	0.00	118.41	69.73	188.14	Deodar-Kail
Kellar	Malothi	Gajoth I	44a/K	30.39	0.00	5.40	0.00	35.79	27.43	63.22	Deodar-Kail
Kellar	Malothi	Gajoth I	44b/K	35.99	0.00	32.00	0.00	67.99	30.68	98.67	Mixed Coniferous
Kellar	Malothi	Gajoth I	45a/K	16.88	0.00	59.09	0.00	75.97	64.78	140.75	Fir Selection
Kellar	Malothi	Gajoth I	45b/K	88.42	0.00	0.00	0.00	88.42	91.37	179.79	Protection
Kellar	Malothi	Gajoth I	46/K	147.72	0.00	0.00	0.00	147.72	115.00	262.72	Protection

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Kellar	Malothi	Gajoth I	47/K	41.90	67.84	19.95	0.00	129.69	90.35	220.04	Mixed Coniferous
Kellar	Malothi	Gajoth I	48/K	95.73	24.42	7.81	0.00	127.97	91.78	219.75	Mixed Coniferous
Kellar	Malothi	Gajoth I	49a/K	25.28	6.07	2.02	0.00	33.37	20.38	53.75	Deodar-Kail
Kellar	Malothi	Gajoth I	49b/K	46.86	0.00	0.00	0.00	46.86	55.14	102.00	Reboisment
Kellar	Malothi	Gajoth II	50a/K	37.09	6.96	11.59	3.48	59.12	35.97	95.09	Deodar-Kail
Kellar	Malothi	Gajoth II	50b/K	0.00	0.00	117.71	70.62	188.33	73.13	261.46	Fir Selection
Kellar	Malothi	Gajoth II	51/K	41.06	48.53	32.35	0.00	121.94	115.40	237.34	Protection
Kellar	Malothi	Gajoth II	52/K	88.02	13.54	0.00	0.00	101.56	109.58	211.14	Reboisment
Kellar	Malothi	Malothi	53/K	9.52	0.00	0.00	0.00	9.52	26.82	36.34	Reboisment
Kellar	Malothi	Malothi	54/K	43.10	19.75	0.00	0.00	62.85	22.21	85.06	Deodar-Kail
Kellar	Malothi	Malothi	55/K	36.75	19.15	11.39	0.00	67.28	32.10	99.38	Deodar-Kail
Kellar	Malothi	Malothi	56/K	72.29	0.00	0.00	0.00	72.29	34.33	106.62	Protection
Kellar	Malothi	Malothi	57/K	71.87	22.46	43.12	14.37	151.82	95.92	247.74	Mixed Coniferous
Kellar	Malothi	Malothi	58/K	62.52	51.07	22.01	0.00	135.60	62.03	197.63	Deodar-Kail
Kellar	Malothi	Malothi	59/K	54.07	9.67	0.00	0.00	63.74	23.22	86.96	Deodar-Kail
Kellar	Malothi	Malothi	60a/K	28.58	10.75	0.00	0.00	39.33	30.68	70.01	Deodar-Kail
Kellar	Malothi	Malothi	60b/K	14.13	7.77	0.00	0.00	21.90	45.47	67.37	Reboisment
Kellar	Trown	61-61	61/K	38.72	21.81	0.00	87.26	147.79	85.64	233.43	Chir Rehablitation
Kellar	Trown	Pranoo	62a/K	20.36	5.09	0.00	0.00	25.45	15.51	40.96	Reboisment
Kellar	Trown	Pranoo	62b/K	47.92	24.89	0.00	0.00	72.81	68.36	141.17	Reboisment
Kellar	Trown	Pranoo	63a/K	78.41	29.98	0.00	0.00	108.39	55.65	164.04	Deodar-Kail
Kellar	Trown	Pranoo	63b/K	0.00	0.00	0.00	17.50	17.50	69.22	86.72	Chir Rehablitation
Kellar	Trown	Pranoo	64/K	160.19	0.00	0.00	0.00	160.19	128.82	289.01	Chir Rehablitation
Kellar	Trown	Trown	65a/K	35.76	21.46	0.00	0.00	57.22	23.53	80.75	Deodar-Kail
Kellar	Trown	Trown	65b/K	13.93	6.46	6.80	0.00	27.18	33.75	60.93	Fir Selection
Kellar	Trown	Trown	66a/K	44.07	13.77	40.77	0.00	98.61	38.16	136.77	Deodar-Kail
Kellar	Trown	Trown	66b/K	28.99	8.05	0.00	0.00	37.04	37.99	75.03	Protection
Kellar	Marmat	67-69	67/K	26.22	11.09	15.46	0.00	52.77	44.41	97.18	Deodar-Kail
Kellar	Marmat	67-70	68/K	35.97	26.42	16.88	0.00	79.27	15.94	95.21	Mixed Coniferous
Kellar	Marmat	67-71	69/K	134.81	112.51	0.00	0.00	247.32	196.06	443.38	Fir Selection
Kellar	Marmat	Paryote I	1a/M	0.00	0.00	0.00	12.72	12.72	99.41	112.13	Chir Rehablitation
Kellar	Marmat	Paryote I	1b/M	1.56	6.24	0.00	10.93	18.73	85.19	103.92	Protection
Kellar	Marmat	Paryote I	2/M	0.00	0.00	0.00	26.09	26.09	52.12	78.21	Chir Rehablitation
Kellar	Marmat	Paryote I	3/M	62.00	53.91	118.61	0.00	234.52	239.56	474.08	Protection

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Kellar	Marmat	Paryote I	4/M	48.75	14.47	44.94	0.00	108.17	154.35	262.52	Deodar-Kail
Kellar	Marmat	Paryote II	5/M	124.78	31.20	0.00	0.00	155.98	170.54	326.52	Deodar-Kail
Kellar	Marmat	Paryote II	6a/M	23.45	5.86	2.93	0.00	32.25	43.71	75.96	Deodar-Kail
Kellar	Marmat	Paryote II	6b/M	12.37	8.40	3.51	0.00	24.29	47.16	71.45	Reboisment
Kellar	Marmat	Paryote II	6c/M	8.91	15.73	0.00	0.00	24.64	20.96	45.60	Deodar-Kail
Kellar	Marmat	Paryote II	7a/M	30.22	34.30	0.00	0.00	64.52	33.20	97.72	Deodar-Kail
Kellar	Marmat	Paryote II	7b/M	35.02	19.22	0.00	0.00	54.24	65.31	119.55	Deodar-Kail
Kellar	Marmat	Paryote II	8/M	43.02	26.56	0.00	0.00	69.58	100.61	170.19	Mixed Coniferous
Neeru	Duggi	Chinta I	1a/N	4.08	0.64	0.00	0.00	4.72	4.68	9.40	Protection
Neeru	Duggi	Chinta I	1b/N	83.75	20.51	19.65	0.00	123.91	83.55	207.46	Deodar-Kail
Neeru	Duggi	Chinta I	2/N	159.24	21.23	0.00	0.00	180.47	69.67	250.14	Deodar-Kail
Neeru	Duggi	Chinta I	3/N	133.69	14.23	0.00	0.00	147.92	63.35	211.27	Deodar-Kail
Neeru	Duggi	Chinta I	4a/N	1.11	9.72	0.00	0.00	10.83	45.49	56.32	Protection
Neeru	Duggi	Chinta I	4b/N	16.12	16.86	0.00	0.00	32.98	20.80	53.78	Deodar-Kail
Neeru	Duggi	Chinta I	5a/N	64.32	16.54	0.00	0.00	80.86	26.92	107.78	Deodar-Kail
Neeru	Duggi	Chinta I	5b/N	47.07	4.39	0.00	0.00	51.46	62.10	113.56	Deodar-Kail
Neeru	Duggi	Chinta I	5c/N	33.02	0.00	9.76	0.00	42.78	19.80	62.58	Deodar-Kail
Neeru	Duggi	Chinta I	6a/N	25.88	0.00	6.99	0.00	32.87	15.31	48.18	Mixed Coniferous
Neeru	Duggi	Chinta I	6b/N	23.51	0.00	6.41	0.00	29.92	26.43	56.35	Deodar-Kail
Neeru	Duggi	Chinta I	7/N	103.30	23.69	0.00	0.00	167.02	27.05	194.07	Deodar-Kail
Neeru	Duggi	Chinta I	8/N	47.25	7.93	0.00	0.00	90.03	46.83	136.86	Deodar-Kail
Neeru	Duggi	Chinta I	9/N	9.08	2.27	0.00	0.00	11.35	20.47	31.82	Protection
Neeru	Duggi	Chinta II	10/N	70.95	5.91	0.00	0.00	76.86	90.18	167.04	Protection
Neeru	Duggi	Duggi I	11/N	29.17	0.00	0.00	0.00	29.17	90.76	119.93	Reboisment
Neeru	Duggi	Duggi I	12/N	59.33	0.00	0.00	0.00	59.33	220.95	280.28	Reboisment
Neeru	Duggi	Duggi II	13/N	75.92	11.57	0.00	0.00	87.49	131.75	219.24	Deodar-Kail
Neeru	Duggi	Duggi II	14/N	78.66	22.26	6.68	0.00	107.60	47.35	154.95	Mixed Coniferous
Neeru	Duggi	Duggi II	15/N	37.67	6.99	0.00	0.00	44.66	53.98	98.64	Deodar-Kail
Neeru	Duggi	Duggi II	16a/N	18.92	15.76	0.00	0.00	34.68	77.72	112.40	Deodar-Kail
Neeru	Duggi	Duggi II	16b/N	15.61	10.50	0.00	0.00	26.11	44.77	70.88	Mixed Coniferous
Neeru	Duggi	Duggi II	17/N	86.79	25.35	15.36	0.00	127.50	68.79	196.29	Mixed Coniferous
Neeru	Duggi	Kansar	18a/N	30.68	0.00	0.00	0.00	30.68	83.67	114.35	Deodar-Kail
Neeru	Duggi	Kansar	18b/N	96.10	7.54	0.00	0.00	103.64	65.78	169.42	Deodar-Kail
Neeru	Duggi	Kansar	19a/N	65.06	10.12	7.23	0.00	82.41	27.24	109.65	Deodar-Kail

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Neeru	Duggi	Kansar	19b/N	11.47	2.52	2.80	0.00	16.78	26.16	42.94	Deodar-Kail
Neeru	Duggi	Kansar	20/N	8.39	3.05	0.00	0.00	11.44	20.80	32.24	Protection
Neeru	Duggi	Kansar	21/N	16.57	6.02	0.00	0.00	22.59	197.93	220.52	Protection
Neeru	Duggi	Kansar	22a/N	19.73	0.00	0.00	0.00	19.73	96.03	115.76	Protection
Neeru	Duggi	Kansar	22b/N	3.73	7.69	0.00	0.00	11.42	44.41	55.83	Protection
Neeru	Puneja	Katyara	23a/N	15.12	5.40	6.75	0.00	27.27	42.94	70.21	Mixed Coniferous
Neeru	Puneja	Katyara	23b/N	43.18	11.78	0.00	0.00	54.95	37.41	92.36	Deodar-Kail
Neeru	Puneja	Katyara	24/N	22.80	0.00	33.07	0.00	55.87	152.88	208.75	Mixed Coniferous
Neeru	Puneja	Katyara	25a/N	28.90	13.73	114.87	0.00	157.49	113.53	271.02	Mixed Coniferous
Neeru	Puneja	Katyara	25b/N	6.26	0.00	39.35	0.00	45.61	79.22	124.83	Fir Selection
Neeru	Puneja	Katyara	25c/N	8.70	5.80	6.38	0.00	20.88	14.60	35.48	Mixed Coniferous
Neeru	Puneja	Katyara	26a/N	7.51	3.76	100.18	0.00	111.45	68.57	180.02	Fir Selection
Neeru	Puneja	Katyara	26b/N	28.26	5.98	5.98	0.00	40.21	51.55	91.76	Mixed Coniferous
Neeru	Puneja	Katyara	27/N	0.00	18.86	23.89	0.00	42.75	144.41	187.16	Protection
Neeru	Puneja	Katyara	28/N	0.00	12.00	235.38	0.00	247.38	119.76	367.14	Protection
Neeru	Puneja	Sartingal	29/N	0.00	0.00	254.92	0.00	254.92	231.59	486.51	Protection
Neeru	Puneja	Sartingal	30a/N	14.86	3.30	43.47	0.00	61.63	69.87	131.50	Protection
Neeru	Puneja	Sartingal	30b/N	77.20	12.73	7.96	0.00	97.89	61.57	159.46	Deodar-Kail
Neeru	Puneja	Sartingal	31a/N	4.46	2.23	23.63	0.00	30.32	43.64	73.96	Fir Selection
Neeru	Puneja	Sartingal	31b/N	46.96	2.06	3.10	0.00	52.12	36.08	88.20	Deodar-Kail
Neeru	Puneja	Sartingal	32/N	15.76	12.89	12.89	0.00	41.54	25.77	67.31	Deodar-Kail
Neeru	Puneja	Sartingal	33a/N	41.06	7.92	0.00	0.00	48.98	34.95	83.93	Deodar-Kail
Neeru	Puneja	Sartingal	33b/N	5.63	0.00	55.63	0.00	61.26	41.89	103.15	Fir Selection
Neeru	Puneja	Sartingal	34a/N	0.00	1.90	36.14	0.00	38.04	18.30	56.34	Fir Selection
Neeru	Puneja	Sartingal	34b/N	32.27	0.00	57.37	0.00	89.64	27.94	117.58	Mixed Coniferous
Neeru	Puneja	Sartingal	34c/N	61.79	27.09	1.69	0.00	90.57	34.04	124.61	Deodar-Kail
Neeru	Puneja	Sartingal	35/N	48.05	4.43	0.00	0.00	52.48	22.44	74.92	Deodar-Kail
Neeru	Puneja	Basti	36/N	58.55	9.94	0.00	0.00	68.49	99.77	168.26	Deodar-Kail
Neeru	Puneja	Basti	37/N	44.62	38.24	95.60	0.00	178.46	143.32	321.78	Mixed Coniferous
Neeru	Puneja	Basti	38/N	0.00	12.81	377.96	0.00	390.77	175.68	566.45	Protection
Neeru	Puneja	Basti	39/N	0.00	79.41	326.96	0.00	406.37	414.38	820.75	Protection
Neeru	Puneja	Basti	40a/N	0.00	0.00	49.08	0.00	49.08	78.52	127.60	Mixed Coniferous
Neeru	Puneja	Basti	40b/N	0.00	0.00	34.03	0.00	34.03	78.14	112.17	Fir Selection
Neeru	Puneja	Basti	40c/N	1.29	0.00	1.03	0.00	2.32	43.35	45.67	Protection

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Neeru	Puneja	Basti	40d/N	9.41	1.74	21.26	0.00	32.41	47.34	79.75	Mixed Coniferous
Neeru	Puneja	Basti	40e/N	22.79	4.56	15.96	0.00	43.31	25.22	68.53	Mixed Coniferous
Neeru	Puneja	Basti	41a/N	21.89	10.26	54.73	0.00	86.88	61.22	148.10	Mixed Coniferous
Neeru	Puneja	Basti	41b/N	0.00	4.68	149.70	0.00	154.38	212.54	366.92	Protection
Neeru	Puneja	Basti	42a/N	0.00	8.73	174.50	0.00	183.23	440.19	623.42	Protection
Neeru	Puneja	Basti	42b/N	16.11	17.35	24.78	0.00	58.23	43.05	101.28	Deodar-Kail
Neeru	Puneja	Basti	43a/N	21.07	20.19	0.00	0.00	41.26	4.94	46.20	Deodar-Kail
Neeru	Puneja	Basti	43b/N	47.93	18.64	61.24	0.00	50.81	1.49	52.30	Deodar-Kail
Neeru	Puneja	Basti	43c/N	0.00	0.00	0.00	0.00	77.00	61.13	138.13	Deodar-Kail
Neeru	Puneja	Basti	44/N	52.85	12.53	9.81	0.00	75.19	62.86	138.05	Protection
Neeru	Puneja	Puneja I	45a/N	65.23	18.81	0.00	0.00	84.04	49.45	133.49	Deodar-Kail
Neeru	Puneja	Puneja I	45b/N	8.06	8.68	26.65	0.00	43.38	41.83	85.21	Mixed Coniferous
Neeru	Puneja	Puneja I	46/N	0.00	0.00	551.23	0.00	551.23	264.83	816.06	Fir Selection
Neeru	Puneja	Puneja I	47/N	15.59	3.90	38.34	0.00	57.83	64.02	121.85	Mixed Coniferous
Neeru	Puneja	Puneja I	48/N	86.56	33.29	0.00	0.00	119.85	58.36	178.21	Deodar-Kail
Neeru	Puneja	Puneja II	49a/N	39.17	19.58	0.00	0.00	58.75	46.30	105.05	Deodar-Kail
Neeru	Puneja	Puneja II	49b/N	27.98	0.00	27.98	0.00	55.96	26.48	82.44	Mixed Coniferous
Neeru	Puneja	Puneja II	50a/N	8.11	9.99	104.24	0.00	122.34	70.97	193.31	Fir Selection
Neeru	Puneja	Puneja II	50b/N	13.70	9.62	35.91	0.00	59.23	78.63	137.86	Mixed Coniferous
Neeru	Puneja	Puneja II	51/N	47.33	2.31	2.89	0.00	52.52	118.87	171.39	Deodar-Kail
Neeru	Dandi	Chinote	52/N	68.52	0.00	2.86	0.00	71.38	86.11	157.49	Deodar-Kail
Neeru	Dandi	Chinote	53a/N	104.94	7.44	0.00	0.00	112.38	71.81	184.19	Mixed Coniferous
Neeru	Dandi	Chinote	53b/N	10.86	0.00	140.25	0.00	151.11	68.67	219.78	Fir Selection
Neeru	Dandi	Chinote	54/N	133.16	0.00	275.82	0.00	408.98	205.39	614.37	Protection
Neeru	Dandi	Dandi	55a/N	41.92	58.91	23.79	0.00	124.62	83.19	207.81	Fir Selection
Neeru	Dandi	Dandi	55b/N	53.48	63.28	0.00	0.00	116.76	43.81	160.57	Fir Selection
Neeru	Dandi	Dandi	56/N	61.56	5.60	1.87	0.00	69.02	101.48	170.50	Protection
Neeru	Dandi	Dandi	57/N	175.09	0.00	0.00	0.00	175.09	194.33	369.42	Deodar-Kail
Neeru	Dandi	Hanga	58a/N	60.77	0.00	0.00	0.00	60.77	36.66	97.43	Protection
Neeru	Dandi	Hanga	58b/N	88.94	0.00	0.00	0.00	88.94	29.16	118.10	Deodar-Kail
Neeru	Dandi	Hanga	59/N	35.97	42.91	1.26	0.00	80.14	50.93	131.07	Deodar-Kail
Neeru	Dandi	Hanga	60/N	36.45	8.75	68.53	0.00	113.73	48.97	162.70	Mixed Coniferous
Neeru	Dandi	Hanga	61/N	37.97	12.21	63.74	0.00	113.92	65.62	179.54	Mixed Coniferous
Neeru	Dandi	Hanga	62/N	0.00	0.00	183.10	0.00	183.10	82.39	265.49	Protection

Appendix-II Estate Area Statement (as per GIS) and Working Circles of Bhadarwah Forest Division

Range	Block	Beat	Compt.	Deodar	Kail	Fir	Chir	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Working Circle
Neeru	Dandi	Hanga	63/N	74.27	24.49	85.70	0.00	184.46	51.48	235.94	Mixed Coniferous
Neeru	Dandi	Hanga	64/N	126.98	6.58	16.45	0.00	150.01	77.97	227.98	Deodar-Kail
Neeru	Dandi	Hanga	65/N	34.14	29.01	0.00	0.00	63.15	153.86	217.01	Protection
Neeru	Dandi	Narnoo	66a/N	28.13	1.88	0.00	0.00	30.00	20.70	50.70	Deodar-Kail
Neeru	Dandi	Narnoo	66b/N	22.88	0.00	0.00	0.00	22.88	21.86	44.74	Deodar-Kail
Neeru	Dandi	Narnoo	66c/N	11.46	0.00	0.00	0.00	11.46	18.36	29.82	Deodar-Kail
Neeru	Dandi	Narnoo	66d/N	42.62	0.00	1.62	0.00	44.24	15.96	60.20	Deodar-Kail
Neeru	Dandi	Narnoo	66e/N	55.68	0.00	1.70	0.00	57.38	30.82	88.20	Deodar-Kail
Neeru	Padri	Padri	1/Pd	0.00	3.91	52.82	0.00	56.73	91.32	148.05	Fir Selection
Neeru	Padri	Padri	2/Pd	0.00	8.91	40.10	0.00	49.01	87.35	136.36	Fir Selection
Neeru	Padri	Padri	3/Pd	0.00	28.48	86.37	0.00	114.85	49.96	164.81	Fir Selection
Neeru	Padri	Padri	4/Pd	0.00	0.00	258.83	0.00	258.83	219.91	478.74	Protection
Neeru	Padri	Padri	5/Pd	0.00	0.00	65.54	0.00	65.54	146.65	212.19	Protection
Neeru	Padri	Padri	6/Pd	0.00	0.00	80.92	0.00	80.92	96.75	177.67	Fir Selection
Neeru	Padri	Padri	7/Pd	0.00	0.00	46.74	0.00	46.74	122.39	169.13	Fir Selection
Total (457)				**14146.92**	**7965.82**	**16291.88**	**861.37**	**39265.99**	**48330.08**	**87596.07**	

Appendix III. Comparison of Area Estimation in the Previous and Current Working Plans

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
1	Bhalesh	Jatota	Gandoh	1/Jt	170	50	220	166.65	80.68	247.33
2	Bhalesh	Jatota	Gandoh	2/Jt	177	0	177	121.97	49.74	171.71
3	Bhalesh	Jatota	Gandoh	3/Jt	249	90	339	102.65	157.38	260.03
4	Bhalesh	Jatota	Gandoh	4/Jt	121	127	248	52.57	47.14	99.71
5	Bhalesh	Jatota	Gandoh	5/Jt	116	83	199	222.62	104.16	326.78
6	Bhalesh	Jatota	Kansar	6/Jt	403	73	476	421.26	141.36	562.62
7	Bhalesh	Jatota	Kansar	7/Jt	279	0	279	105.62	70.44	176.06
8	Bhalesh	Jatota	Kansar	8/Jt	515	174	689	289.37	237.21	526.58
9	Bhalesh	Jatota	Kansar	9a/Jt	246	12	258	269.47	107.92	377.39
10	Bhalesh	Jatota	Kansar	9b/Jt	220	34	254	180.17	92.66	272.83
11	Bhalesh	Jatota	Kansar	10/Jt	322	27	349	175.73	82.69	258.42
12	Bhalesh	Jatota	Kansar	11a/Jt	98	16	114	61.51	62.26	123.77
13	Bhalesh	Jatota	Kansar	11b/Jt	216	61	277	99.18	173.92	273.10
14	Bhalesh	Jatota	Kansar	12/Jt	347	90	437	100.96	157.75	258.71
15	Bhalesh	Jatota	Kansar	13/Jt	116	43	159	117.02	106.52	223.54
16	Bhalesh	Jatota	Kansar	14/Jt	164	83	247	77.79	199.58	277.37
17	Bhalesh	Jatota	Gandoh	15/Jt	78	6	84	14.85	61.09	75.94
18	Bhalesh	Pingal	Dichhal	1/Bh	80	24	104	30.12	26.74	56.86
19	Bhalesh	Pingal	Pingal	2/Bh	209	59	268	31.12	164.90	196.02
20	Bhalesh	Pingal	Pingal	3/Bh	200	118	318	33.88	238.68	272.56
21	Bhalesh	Pingal	Champal	4/Bh	254	42	296	118.76	181.06	299.82
22	Bhalesh	Pingal	Champal	5/Bh	292	54	346	124.80	161.75	286.55
23	Bhalesh	Pingal	Champal	6/Bh	308	50	358	109.87	219.46	329.33
24	Bhalesh	Pingal	Champal	7/Bh	288	24	312	107.28	154.76	262.04
25	Bhalesh	Pingal	Champal	8/Bh	244	18	262	83.69	220.06	303.75
26	Bhalesh	Chilli	9/44/47	9/Bh	231	20	251	14.47	210.54	225.01
27	Bhalesh	Chilli	9/44/48	10/Bh	217	22	239	40.61	174.90	215.51
28	Bhalesh	Chilli	Balote	11/Bh	206	205	411	46.86	275.27	322.13
29	Bhalesh	Chilli	Balote	12/Bh	311	328	639	79.93	521.92	601.85

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
30	Bhalesh	Chilli	Balote	13/Bh	190	104	294	139.99	153.16	293.15
31	Bhalesh	Chilli	Balote	14/Bh	128	418	546	59.38	559.46	618.84
32	Bhalesh	Chilli	Balote	15/Bh	329	247	576	87.47	126.16	213.63
33	Bhalesh	Chilli	Balote	16/Bh	155	49	204	293.75	197.71	491.46
34	Bhalesh	Chilli	Mano	17/Bh	171	158	329	43.94	153.85	197.79
35	Bhalesh	Chilli	Mano	18/Bh	75	552	627	13.90	685.69	699.59
36	Bhalesh	Chilli	Mano	19/Bh	287	461	748	146.24	571.46	717.70
37	Bhalesh	Chilli	Mano	20/Bh	125	380	505	28.85	446.17	475.02
38	Bhalesh	Chilli	Mano	21/Bh	179	264	443	41.80	478.61	520.41
39	Bhalesh	Chilli	Mano	22/Bh	325	271	596	71.47	555.04	626.51
40	Bhalesh	Chilli	Mano	23/Bh	107	397	504	31.45	376.28	407.73
41	Bhalesh	Chilli	Mano	24/Bh	89	225	314	52.41	188.94	241.35
42	Bhalesh	Chilli	Mano	25/Bh	188	280	468	156.76	415.55	572.31
43	Bhalesh	Chilli	Mano	26/Bh	71	312	383	115.81	219.82	335.63
44	Bhalesh	Chilli	Mano	27/Bh	231	259	490	68.52	338.66	407.18
45	Bhalesh	Chilli	Mano	28/Bh	250	0	250	60.18	193.91	254.09
46	Bhalesh	Chilli	Mano	29/Bh	286	72	358	194.20	282.19	476.39
47	Bhalesh	Chilli	Mano	30/Bh	252	306	558	119.81	353.20	473.01
48	Bhalesh	Chilli	Mano	31/Bh	285	353	638	52.02	483.82	535.84
49	Bhalesh	Chilli	Mano	32/Bh	292	90	382	43.21	177.05	220.26
50	Bhalesh	Chilli	Mano	33/Bh	261	125	386	151.00	317.56	468.56
51	Bhalesh	Chilli	Mano	34/Bh	209	102	311	104.18	146.82	251.00
52	Bhalesh	Chilli	Mano	35/Bh	296	102	398	81.60	204.56	286.16
53	Bhalesh	Chilli	Mano	36/Bh	225	0	225	74.31	96.39	170.70
54	Bhalesh	Chilli	Mano	37/Bh	203	16	219	77.72	128.56	206.28
55	Bhalesh	Chilli	Mano	38/Bh	211	6	217	91.95	101.73	193.68
56	Bhalesh	Chilli	Mano	39/Bh	197	48	245	62.29	176.80	239.09
57	Bhalesh	Chilli	Mano	40/Bh	253	71	324	140.39	99.95	240.34
58	Bhalesh	Chilli	Mano	41/Bh	207	40	247	92.13	118.10	210.23
59	Bhalesh	Chilli	Mano	42/Bh	104	118	222	72.00	95.90	167.90
60	Bhalesh	Chilli	Mano	43/Bh	164	0	164	82.23	50.55	132.78

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
61	Bhalesh	Chilli	9/44/47	44/Bh	223	26	249	162.25	118.16	280.41
62	Bhalesh	Chilli	9/44/48	45/Bh	212	17	229	47.91	198.01	245.92
63	Bhalesh	Chilli	9/44/49	46/Bh	374	55	429	160.77	262.30	423.07
64	Bhalesh	Chilli	9/44/47	47/Bh	219	150	369	105.58	195.25	300.83
65	Bhalesh	Pingal	Manoi	48/Bh	176	67	243	71.01	142.26	213.27
66	Bhalesh	Neeli	Dhansa	49/Bh	103	26	129	41.85	64.55	106.40
67	Bhalesh	Neeli	Dhansa	50/Bh	200	16	216	112.78	167.75	280.53
68	Bhalesh	Neeli	Dhansa	51/Bh	128	0	128	13.21	42.93	56.14
69	Bhalesh	Neeli	Dhansa	52/Bh	139	38	177	66.04	94.10	160.14
70	Bhalesh	Neeli	Dhansa	53/Bh	129	38	167	41.23	84.46	125.69
71	Bhalesh	Neeli	Dhansa	54/Bh	199	63	262	87.50	180.10	267.60
72	Bhalesh	Neeli	Dhansa	55/Bh	180	18	198	45.44	142.57	188.01
73	Bhalesh	Neeli	Dhansa	56a/Bh	148	28	176	40.26	119.53	159.79
74	Bhalesh	Neeli	Dhansa	56b/Bh	106	4	110	17.24	68.70	85.94
75	Bhalesh	Neeli	Chanti	57/Bh	117	151	268	34.25	134.49	168.74
76	Bhalesh	Neeli	Chanti	58/Bh	85	242	327	31.39	304.54	335.93
77	Bhalesh	Neeli	Chanti	59/Bh	287	0	287	128.57	157.82	286.39
78	Bhalesh	Neeli	Chanti	60/Bh	170	8	178	100.73	80.14	180.87
79	Bhalesh	Neeli	Chanti	61/Bh	198	0	198	95.25	92.65	187.90
80	Bhalesh	Neeli	Jugassar	62/Bh	183	46	229	45.21	175.79	221.00
81	Bhalesh	Neeli	Jugassar	63/Bh	307	108	415	32.03	282.29	314.32
82	Bhalesh	Neeli	Jugassar	64/Bh	323	106	429	67.20	326.38	393.58
83	Bhalesh	Neeli	Jugassar	65/Bh	87	373	460	15.90	423.38	439.28
84	Bhalesh	Neeli	Jugassar	66/Bh	223	226	449	101.28	420.98	522.26
85	Bhalesh	Neeli	Jugassar	67/Bh	289	198	487	129.96	250.55	380.51
86	Bhalesh	Neeli	Jugassar	68/Bh	222	22	244	83.23	162.33	245.56
87	Bhalesh	Neeli	Jugassar	69/Bh	184	0	184	55.53	135.05	190.58
88	Bhalesh	Neeli	Jugassar	70/Bh	236	151	387	48.30	301.64	349.94
89	Bhalesh	Neeli	Jugassar	71/Bh	179	304	483	98.46	397.82	496.28
90	Bhalesh	Neeli	Jugassar	72/Bh	99	641	740	145.81	539.92	685.73
91	Bhalesh	Neeli	Jugassar	73/Bh	281	106	387	66.56	342.28	408.84

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
92	Bhalesh	Neeli	Jugassar	74/Bh	213	38	251	43.02	112.49	155.51
93	Bhalesh	Neeli	Jugassar	75/Bh	112	9	121	51.42	94.37	145.79
94	Bhalesh	Neeli	Jugassar	76/Bh	187	0	187	46.55	113.55	160.10
95	Bhalesh	Neeli	Jugassar	77/Bh	116	273	389	48.59	400.55	449.14
96	Bhalesh	Neeli	Jugassar	78/Bh	119	131	250	21.50	110.48	131.98
97	Bhalesh	Neeli	Jugassar	79/Bh	124	24	148	29.57	110.52	140.09
98	Bhalesh	Neeli	Jugassar	80/Bh	158	27	185	47.42	98.99	146.41
99	Bhalesh	Neeli	Jugassar	81/Bh	161	26	187	76.04	86.83	162.87
100	Bhalesh	Neeli	Jugassar	82/Bh	139	69	208	74.01	158.89	232.90
101	Bhalesh	Neeli	Jugassar	83/Bh	259	138	397	161.15	220.91	382.06
102	Bhalesh	Kilhotran	Soti	84/Bh	152	146	298	90.21	204.41	294.62
103	Bhalesh	Kilhotran	Soti	85a/Bh	28	40	68	45.75	33.49	79.24
104	Bhalesh	Kilhotran	Soti	85b/Bh	73	49	122	27.26	91.39	118.65
105	Bhalesh	Kilhotran	Soti	86/Bh	220	5	225	13.11	90.74	103.85
106	Bhalesh	Kilhotran	Soti	87/Bh	182	16	198	81.59	137.45	219.04
107	Bhalesh	Kilhotran	Soti	88/Bh	292	26	318	110.31	135.53	245.84
108	Bhalesh	Kilhotran	Soti	89/Bh	196	158	354	101.00	292.91	393.91
109	Bhalesh	Kilhotran	Soti	90/Bh	219	179	398	136.98	238.92	375.90
110	Bhalesh	Kilhotran	Soti	91/Bh	216	28	244	77.62	152.48	230.10
111	Bhalesh	Kilhotran	Soti	92/Bh	147	197	344	128.86	214.05	342.91
112	Bhalesh	Kilhotran	Soti	93/Bh	331	77	408	58.58	259.74	318.32
113	Bhalesh	Kilhotran	Thiloran	94/Bh	180	78	258	103.74	155.68	259.42
114	Bhalesh	Kilhotran	Thiloran	95/Bh	247	28	275	141.70	98.50	240.20
115	Bhalesh	Kilhotran	Thiloran	96/Bh	296	22	318	114.03	80.65	194.68
116	Bhalesh	Kilhotran	Thiloran	97/Bh	217	0	217	123.53	206.54	330.07
117	Bhalesh	Kilhotran	Thiloran	98/Bh	226	0	226	141.78	177.75	319.53
118	Bhalesh	Kilhotran	Thiloran	99/Bh	251	52	303	103.19	106.05	209.24
119	Bhalesh	Kilhotran	Thiloran	100/Bh	230	98	328	171.74	221.72	393.46
120	Bhalesh	Kilhotran	Thiloran	101/Bh	212	46	258	179.86	72.75	252.61
121	Bhalesh	Kilhotran	Thiloran	102/Bh	216	40	256	157.45	82.37	239.82
122	Bhalesh	Kilhotran	Thiloran	103/Bh	154	74	228	102.24	84.98	187.22

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
123	Bhalesh	Kilhotran	Thiloran	104/Bh	117	119	236	74.72	113.99	188.71
124	Bhalesh	Kilhotran	Thiloran	105/Bh	133	116	249	80.92	165.07	245.99
125	Bhalesh	Kilhotran	Thiloran	106/Bh	172	223	395	76.79	322.34	399.13
126	Bhalesh	Kilhotran	Kilotran	107/Bh	42	0	42	7.94	31.46	39.40
127	Bhalesh	Kilhotran	Kilotran	108/Bh	182	10	192	69.45	78.58	148.03
128	Bhalesh	Kilhotran	Kilotran	109/Bh	138	49	187	49.08	122.51	171.59
129	Chiralla	Chiralla	Chiralla	1a/Ch	23	3	26	12.75	73.90	86.65
130	Chiralla	Chiralla	Chiralla	1b/Ch	177	25	202	2.63	5.60	8.23
131	Chiralla	Chiralla	Chiralla	2/Ch	81	18	99	24.53	94.66	119.19
132	Chiralla	Chiralla	Chiralla	3a/Ch	71	9	80	13.52	36.23	49.75
133	Chiralla	Chiralla	Chiralla	3b/Ch	55	3	58	56.04	40.86	96.90
134	Chiralla	Chiralla	Chiralla	3c/Ch	97	7	104	82.89	33.96	116.85
135	Chiralla	Chiralla	Chiralla	3d/Ch	40	5	45	35.29	24.27	59.56
136	Chiralla	Chiralla	Chiralla	4a/Ch	157	0	157	85.83	30.44	116.27
137	Chiralla	Chiralla	Chiralla	4b/Ch	86	0	86	60.84	17.71	78.55
138	Chiralla	Chiralla	Chiralla	5a/Ch	88	0	88	61.92	24.07	85.99
139	Chiralla	Chiralla	Chiralla	5b/Ch	72	0	72	76.15	10.50	86.65
140	Chiralla	Chiralla	Chiralla	6a/Ch	63	4	67	71.20	29.08	100.28
141	Chiralla	Chiralla	Chiralla	6b/Ch	27	0	27	34.81	13.28	48.09
142	Chiralla	Chiralla	Chiralla	7/Ch	108	0	108	56.02	12.28	68.30
143	Chiralla	Chiralla	Chiralla	8/Ch	88	0	88	99.19	62.67	161.86
144	Chiralla	Chiralla	Bhalara	9/Ch	140	0	140	27.04	30.22	57.26
145	Chiralla	Chiralla	Bhalara	10/Ch	190	0	190	118.47	82.07	200.54
146	Chiralla	Chiralla	Bhalara	11/Ch	130	18	148	112.61	52.03	164.64
147	Chiralla	Chiralla	Bhalara	12a/Ch	81	0	81	75.34	91.21	166.55
148	Chiralla	Chiralla	Bhalara	12b/Ch	130	0	130	81.90	17.89	99.79
149	Chiralla	Chiralla	Bhalara	13a/Ch	32	0	32	16.12	9.59	25.71
150	Chiralla	Chiralla	Bhalara	13b/Ch	125	36	161	107.63	38.53	146.16
151	Chiralla	Chiralla	Bhalara	14a/Ch	115	35	150	75.37	40.46	115.83
152	Chiralla	Chiralla	Bhalara	14b/Ch	49	0	49	22.54	31.77	54.31
153	Chiralla	Chiralla	Bhalara	15/Ch	140	0	140	115.75	52.74	168.49

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
154	Chiralla	Chiralla	Bhalara	16/Ch	163	7	170	136.63	44.42	181.05
155	Chiralla	Chiralla	Bhalara	17/Ch	267	25	292	88.76	93.35	182.11
156	Chiralla	Chiralla	Bhalara	18/Ch	69	130	199	33.59	14.97	48.56
157	Chiralla	Chiralla	Jagota I	19/Ch	65	0	65	15.59	9.32	24.91
158	Chiralla	Chiralla	Jagota I	20/Ch	209	0	209	144.15	85.96	230.11
159	Chiralla	Chiralla	Jagota I	21/Ch	197	0	197	111.27	21.32	132.59
160	Chiralla	Chiralla	Jagota I	22/Ch	80	0	80	103.84	22.42	126.26
161	Chiralla	Chiralla	Jagota I	23a/Ch	112	8	120	105.28	49.16	154.44
162	Chiralla	Chiralla	Jagota I	23b/Ch	30	0	30	11.42	18.77	30.19
163	Chiralla	Chiralla	Jagota I	24a/Ch	45	3	48	16.48	6.39	22.87
164	Chiralla	Chiralla	Jagota I	24b/Ch	90	0	90	48.89	8.62	57.51
165	Chiralla	Chiralla	Jagota I	25/Ch	61	89	150	42.74	28.15	70.89
166	Chiralla	Chiralla	Jagota I	26a/Ch	30	0	30	15.36	32.71	48.07
167	Chiralla	Chiralla	Jagota I	26b/Ch	95	5	100	31.75	30.15	61.90
168	Chiralla	Chiralla	Jagota II	27/Ch	200	5	205	150.81	51.00	201.81
169	Chiralla	Chiralla	Jagota II	28/Ch	120	28	148	82.58	55.88	138.46
170	Chiralla	Chiralla	Jagota II	29/Ch	90	22	112	97.02	25.97	122.99
171	Chiralla	Chiralla	Jagota II	30/Ch	140	5	145	35.65	13.91	49.56
172	Chiralla	Chiralla	Jagota II	31a/Ch				47.87	26.92	74.79
173	Chiralla	Chiralla	Jagota II	31b/Ch	130	0	130	45.11	8.96	54.07
174	Chiralla	Chiralla	Jagota II	32a/Ch	165	5	170	125.23	99.01	224.24
175	Chiralla	Chiralla	Jagota II	32b/Ch	81	20	101	67.55	61.65	129.20
176	Chiralla	Chiralla	Jagota II	33/Ch	75	110	185	98.92	122.46	221.38
177	Chiralla	Jai	Tanta I	1a/Jai	82	27	109	30.44	73.87	104.31
178	Chiralla	Jai	Tanta I	1b/Jai	78	23	101	31.74	68.82	100.56
179	Chiralla	Jai	Tanta I	2/Jai	181	18	199	83.37	95.41	178.78
180	Chiralla	Jai	Tanta I	3/Jai	215	7	222	131.44	140.42	271.86
181	Chiralla	Jai	Tanta I	4a/Jai	48	0	48	16.68	55.89	72.57
182	Chiralla	Jai	Tanta I	4b/Jai	42	8	50	16.06	62.97	79.03
183	Chiralla	Jai	Tanta I	5a/Jai	51	5	56	17.81	55.55	73.36
184	Chiralla	Jai	Tanta I	5b/Jai	83	0	83	46.23	61.99	108.22

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
185	Chiralla	Jai	Tanta I	6/Jai	89	28	117	41.17	44.72	85.89
186	Chiralla	Jai	Tanta II	7a/Jai	94	10	104	81.65	54.60	136.25
187	Chiralla	Jai	Tanta II	7b/Jai	75	0	75	28.04	22.39	50.43
188	Chiralla	Jai	Tanta II	8/Jai	139	0	139	98.24	50.56	148.80
189	Chiralla	Jai	Tanta II	9/Jai	62	42	104	24.96	72.15	97.11
190	Chiralla	Jai	Tanta II	10/Jai	136	20	156	78.14	119.33	197.47
191	Chiralla	Jai	Tanta II	11/Jai	130	10	140	84.68	80.48	165.16
192	Chiralla	Jai	Tanta II	12/Jai	156	33	189	194.99	-12.28	182.71
193	Chiralla	Jai	Jai	13a/Jai	110	56	166	74.37	68.10	142.47
194	Chiralla	Jai	Jai	13b/Jai	100	5	105	91.34	46.51	137.85
195	Chiralla	Jai	Jai	14a/Jai	58	8	66	22.28	31.73	54.01
196	Chiralla	Jai	Jai	14b/Jai	82	0	82	47.93	37.03	84.96
197	Chiralla	Jai	Jai	15/Jai	184	0	184	118.18	65.46	183.64
198	Chiralla	Jai	Jai	16a/Jai	143	3	146	84.92	73.02	157.94
199	Chiralla	Jai	Jai	16b/Jai	26	0	26	8.67	15.95	24.62
200	Chiralla	Jai	Jai	16c/Jai	72	13	85	49.69	34.25	83.94
201	Chiralla	Jai	Jai	17a/Jai	156	42	198	125.58	82.53	208.11
202	Chiralla	Jai	Jai	17b/Jai	58	4	62	36.18	21.98	58.16
203	Chiralla	Jai	Jai	18/Jai	187	10	197	167.88	46.79	214.67
204	Chiralla	Jai	Jai	19a/Jai	76	18	94	33.80	22.22	56.02
205	Chiralla	Jai	Jai	19b/Jai	267	0	267	166.94	84.29	251.23
206	Chiralla	Jai	Jai	20/Jai	150	50	200	70.45	70.95	141.40
207	Chiralla	Jai	Jai	21a/Jai	82	14	96	96.91	91.75	188.66
208	Chiralla	Jai	Jai	21b/Jai	56	0	56	31.11	25.20	56.31
209	Chiralla	Jai	Jai	21c/Jai	67	12	79	29.71	39.75	69.46
210	Chiralla	Jai	Jai	22a/Jai	105	10	115	28.26	99.47	127.73
211	Chiralla	Jai	Jai	22b/Jai	241	18	259	131.51	142.61	274.12
212	Chiralla	Jai	Jai	23/Jai	221	25	246	94.22	187.51	281.73
213	Chiralla	Jai	Jai	24/Jai	170	20	190	92.11	68.04	160.15
214	Chiralla	Jai	Jai	25/Jai	209	52	261	161.34	110.37	271.71
215	Chiralla	Jai	Jai	26/Jai	125	25	150	59.63	65.93	125.56

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
216	Chiralla	Jai	Jai	27/Jai	79	42	121	55.04	25.55	80.59
217	Chiralla	Jai	Jai	28/Jai	96	36	132	172.70	61.97	234.67
218	Chiralla	Jai	Jai	29/Jai	111	0	111	89.85	32.62	122.47
219	Chiralla	Jai	Jai	30/Jai	204	0	204	86.16	143.49	229.65
220	Chiralla	Jai	Jai	31/Jai	164	30	194	100.76	90.24	191.00
221	Chiralla	Jai	Jai	32a/Jai				39.91	68.77	108.68
222	Chiralla	Jai	Jai	32b/Jai	46	0	46	28.38	22.27	50.65
223	Chiralla	Jai	Jai	33/Jai	205	20	225	54.51	228.62	283.13
224	Chiralla	Jai	Jai	34/Jai	205	24	229	146.19	156.32	302.51
225	Chiralla	Jai	Jai	35/Jai	123	10	133	62.18	71.69	133.87
226	Chiralla	Jai	Jai	36a/Jai	80	50	130	44.15	115.34	159.49
227	Chiralla	Jai	Jai	36b/Jai	105	4	109	10.07	66.02	76.09
228	Chiralla	Jai	Jai	37a/Jai	88	8	96	23.99	58.87	82.86
229	Chiralla	Jai	Jai	37b/Jai	134	0	134	23.65	103.73	127.38
230	Chiralla	Jangalwar	Mahari	1/Jwr	64	60	124	110.23	407.71	517.94
231	Chiralla	Jangalwar	Mahari	2a/Jwr				145.13	68.12	213.25
232	Chiralla	Jangalwar	Mahari	2b/Jwr	93	40	133	110.15	143.27	253.42
233	Chiralla	Jangalwar	Mahari	3/Jwr				70.50	114.35	184.85
234	Chiralla	Jangalwar	Mahari	4a/Jwr	137	51	188	41.01	46.44	87.45
235	Chiralla	Jangalwar	Mahari	4b/Jwr	107	3	110	38.36	168.68	207.04
236	Chiralla	Jangalwar	Mahari	5/Jwr	184	0	184	161.52	92.86	254.38
237	Chiralla	Jangalwar	Mahari	6/Jwr	113	61	174	19.86	71.07	90.93
238	Chiralla	Jangalwar	Jangalwar	7/Jwr	161	12	173	155.08	65.65	220.73
239	Chiralla	Jangalwar	Jangalwar	8a/Jwr	89	0	89	110.38	32.73	143.11
240	Chiralla	Jangalwar	Jangalwar	8b/Jwr	165	0	165	107.08	33.55	140.63
241	Chiralla	Jangalwar	Jangalwar	9a/Jwr	130	26	156	80.17	96.44	176.61
242	Chiralla	Jangalwar	Jangalwar	9b/Jwr	69	0	69	62.97	28.97	91.94
243	Chiralla	Jangalwar	Jangalwar	10/Jwr	88	5	93	68.49	27.47	95.96
244	Chiralla	Jangalwar	Jangalwar	11a/Jwr	81	0	81	42.48	22.07	64.55
245	Chiralla	Jangalwar	Jangalwar	11b/Jwr	252	20	272	144.33	92.98	237.31
246	Chiralla	Jangalwar	Bhella II	12/Jwr	103	55	158	48.89	142.34	191.23

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
247	Chiralla	Jangalwar	Bhella II	13/Jwr	90	82	172	42.66	129.56	172.22
248	Chiralla	Jangalwar	Bhella I	14/Jwr	95	55	150	35.90	25.74	61.64
249	Chiralla	Jangalwar	Bhella I	15/Jwr	60	20	80	19.19	48.63	67.82
250	Kellar	Guraka	Guraka	1/K	69	0	69	26.06	19.03	45.09
251	Kellar	Guraka	Guraka	2/K	185	83	268	102.96	49.72	152.68
252	Kellar	Guraka	Guraka	3/K	98	0	98	82.00	60.84	142.84
253	Kellar	Guraka	Guraka	4/K	170	42	212	74.47	103.74	178.21
254	Kellar	Guraka	Guraka	5/K	107	35	142	83.97	87.31	171.28
255	Kellar	Guraka	Guraka	6/K	176	25	201	129.59	73.80	203.39
256	Kellar	Guraka	Guraka	7/K	135	28	163	87.01	16.43	103.44
257	Kellar	Guraka	Guraka	8/K	219	27	246	203.86	175.28	379.14
258	Kellar	Guraka	Sharora	9/K	101	164	265	34.58	112.28	146.86
259	Kellar	Guraka	Sharora	10/K	92	0	92	70.96	26.87	97.83
260	Kellar	Guraka	Sharora	11/K	128	152	280	94.75	72.04	166.79
261	Kellar	Guraka	Sharora	12/K	154	5	159	89.52	120.70	210.22
262	Kellar	Guraka	Sharora	13/K	81	15	96	58.77	58.31	117.08
263	Kellar	Guraka	Sharora	14/K	76	0	76	40.71	64.80	105.51
264	Kellar	Guraka	Gutassa	15/K	120	5	125	171.85	56.73	228.58
265	Kellar	Guraka	Gutassa	16a/K	130	0	130	52.75	23.13	75.88
266	Kellar	Guraka	Gutassa	16b/K	86	0	86	55.66	29.17	84.83
267	Kellar	Guraka	Gutassa	17a/K	51	6	57	47.43	19.44	66.87
268	Kellar	Guraka	Gutassa	17b/K	31	28	59	118.58	39.36	157.94
269	Kellar	Guraka	Gutassa	18/K	328	36	364	85.51	82.88	168.39
270	Kellar	Guraka	Gutassa	19/K	136	127	263	86.42	81.49	167.91
271	Kellar	Guraka	Gutassa	20/K	111	0	111	95.22	94.98	190.20
272	Kellar	Guraka	Gutessa	21/K	147	28	175	146.83	39.32	186.15
273	Kellar	Guraka	Khellani	22a/K	45	0	45	36.26	12.17	48.43
274	Kellar	Guraka	Khellani	22b/K	46	0	46	19.48	32.05	51.53
275	Kellar	Malothi	Duggli	23/K	219	5	224	155.62	93.90	249.52
276	Kellar	Malothi	Duggli	24/K	232	10	242	75.71	61.18	136.89
277	Kellar	Malothi	Duggli	25a/K	70	0	70	44.78	11.86	56.64

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
278	Kellar	Malothi	Duggli	25b/K	30	0	30	48.62	6.20	54.82
279	Kellar	Malothi	Duggli	26/K	85	104	189	144.42	49.54	193.96
280	Kellar	Malothi	Duggli	27/K	185	31	216	140.55	73.64	214.19
281	Kellar	Malothi	Duggli	28a/K	110	18	128	71.86	27.92	99.78
282	Kellar	Malothi	Duggli	28b/K	83	0	83	97.53	23.56	121.09
283	Kellar	Malothi	Duggli	29a/K	169	6	175	125.07	33.42	158.49
284	Kellar	Malothi	Duggli	29b/K	153	7	160	197.98	54.14	252.12
285	Kellar	Malothi	Chilli	30/K	199	36	235	163.15	128.56	291.71
286	Kellar	Malothi	Chilli	31/K	229	334	563	294.02	432.25	726.27
287	Kellar	Malothi	Chilli	32/K	138	42	180	144.87	87.83	232.70
288	Kellar	Malothi	Chilli	33/K	118	19	137	117.23	51.50	168.73
289	Kellar	Malothi	Chilli	34/K	111	11	122	85.99	57.51	143.50
290	Kellar	Malothi	Chilli	35/K	101	11	112	85.99	43.71	129.70
291	Kellar	Malothi	Chilli	36/K	107	8	115	162.36	68.88	231.24
292	Kellar	Malothi	Chilli	37/K	178	25	203	50.26	61.14	111.40
293	Kellar	Malothi	Chilli	38a/K	227	114	341	174.32	143.75	318.07
294	Kellar	Malothi	Chilli	38b/K	128	94	222	171.93	147.57	319.50
295	Kellar	Malothi	Chilli	39a/K	91	286	377	82.04	321.17	403.21
296	Kellar	Malothi	Chilli	39b/K	191	37	228	100.35	182.38	282.73
297	Kellar	Malothi	Chilli	40/K	83	52	135	115.76	70.48	186.24
298	Kellar	Malothi	Chilli	41/K	99	23	122	50.58	41.41	91.99
299	Kellar	Malothi	Chilli	42a/K	196	32	228	205.25	79.98	285.23
300	Kellar	Malothi	Chilli	42b/K	78	25	103	72.13	46.31	118.44
301	Kellar	Malothi	Chilli	43/K	128	19	147	118.41	69.73	188.14
302	Kellar	Malothi	Gajoth I	44a/K	53	17	70	35.79	27.43	63.22
303	Kellar	Malothi	Gajoth I	44b/K	85	17	102	67.99	30.68	98.67
304	Kellar	Malothi	Gajoth I	45a/K	81	9	90	75.97	64.78	140.75
305	Kellar	Malothi	Gajoth I	45b/K	90	20	110	88.42	91.37	179.79
306	Kellar	Malothi	Gajoth I	46/K	124	91	215	147.72	115.00	262.72
307	Kellar	Malothi	Gajoth I	47/K	130	15	145	129.69	90.35	220.04
308	Kellar	Malothi	Gajoth I	48/K	131	20	151	127.97	91.78	219.75

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
309	Kellar	Malothi	Gajoth I	49a/K	132	28	160	33.37	20.38	53.75
310	Kellar	Malothi	Gajoth I	49b/K	66	6	72	46.86	55.14	102.00
311	Kellar	Malothi	Gajoth II	50a/K	51	0	51	59.12	35.97	95.09
312	Kellar	Malothi	Gajoth II	50b/K	160	0	160	188.33	73.13	261.46
313	Kellar	Malothi	Gajoth II	51/K	196	19	215	121.94	115.40	237.34
314	Kellar	Malothi	Gajoth II	52/K	90	35	125	101.56	109.58	211.14
315	Kellar	Malothi	Malothi	53/K	33	13	46	9.52	26.82	36.34
316	Kellar	Malothi	Malothi	54/K	175	0	175	62.85	22.21	85.06
317	Kellar	Malothi	Malothi	55/K	130	18	148	67.28	32.10	99.38
318	Kellar	Malothi	Malothi	56/K	129	40	169	72.29	34.33	106.62
319	Kellar	Malothi	Malothi	57/K	169	25	194	151.82	95.92	247.74
320	Kellar	Malothi	Malothi	58/K	154	30	184	135.60	62.03	197.63
321	Kellar	Malothi	Malothi	59/K	112	73	185	63.74	23.22	86.96
322	Kellar	Malothi	Malothi	60a/K	139	60	199	39.33	30.68	70.01
323	Kellar	Malothi	Malothi	60b/K	62	8	70	21.90	45.47	67.37
324	Kellar	Trown	61-61	61/K	271	25	296	147.79	85.64	233.43
325	Kellar	Trown	Pranoo	62a/K	60	10	70	25.45	15.51	40.96
326	Kellar	Trown	Pranoo	62b/K	117	21	138	72.81	68.36	141.17
327	Kellar	Trown	Pranoo	63a/K	188	82	270	108.39	55.65	164.04
328	Kellar	Trown	Pranoo	63b/K	50	0	50	17.50	69.22	86.72
329	Kellar	Trown	Pranoo	64/K	70	44	114	160.19	128.82	289.01
330	Kellar	Trown	Trown	65a/K	112	8	120	57.22	23.53	80.75
331	Kellar	Trown	Trown	65b/K	80	0	80	27.18	33.75	60.93
332	Kellar	Trown	Trown	66a/K	179	18	197	98.61	38.16	136.77
333	Kellar	Trown	Trown	66b/K	46	14	60	37.04	37.99	75.03
334	Kellar	Marmat	67-69	67/K	157	67	224	52.77	44.41	97.18
335	Kellar	Marmat	67-70	68/K	108	0	108	79.27	15.94	95.21
336	Kellar	Marmat	67-71	69/K	488	0	488	247.32	196.06	443.38
337	Kellar	Marmat	Paryote I	1a/M	70	0	70	12.72	99.41	112.13
338	Kellar	Marmat	Paryote I	1b/M	48	0	48	18.73	85.19	103.92
339	Kellar	Marmat	Paryote I	2/M	96	0	96	26.09	52.12	78.21

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
340	Kellar	Marmat	Paryote I	3/M	87	0	87	234.52	239.56	474.08
341	Kellar	Marmat	Paryote I	4/M	142	0	142	108.17	154.35	262.52
342	Kellar	Marmat	Paryote II	5/M	35	13	48	155.98	170.54	326.52
343	Kellar	Marmat	Paryote II	6a/M	220	50	270	32.25	43.71	75.96
344	Kellar	Marmat	Paryote II	6b/M	159	60	219	24.29	47.16	71.45
345	Kellar	Marmat	Paryote II	6c/M	47	13	60	24.64	20.96	45.60
346	Kellar	Marmat	Paryote II	7a/M	79	16	95	64.52	33.20	97.72
347	Kellar	Marmat	Paryote II	7b/M	127	15	142	54.24	65.31	119.55
348	Kellar	Marmat	Paryote II	8/M	131	60	191	69.58	100.61	170.19
349	Neeru	Duggi	Chinta I	1a/N	88	0	88	4.72	4.68	9.40
350	Neeru	Duggi	Chinta I	1b/N	145	7	152	123.91	83.55	207.46
351	Neeru	Duggi	Chinta I	2/N	221	32	253	180.47	69.67	250.14
352	Neeru	Duggi	Chinta I	3/N	239	0	239	147.92	63.35	211.27
353	Neeru	Duggi	Chinta I	4a/N	39	0	39	10.83	45.49	56.32
354	Neeru	Duggi	Chinta I	4b/N	90	0	90	32.98	20.80	53.78
355	Neeru	Duggi	Chinta I	5a/N	88	0	88	80.86	26.92	107.78
356	Neeru	Duggi	Chinta I	5b/N	82	29	111	51.46	62.10	113.56
357	Neeru	Duggi	Chinta I	5c/N	57	0	57	42.78	19.80	62.58
358	Neeru	Duggi	Chinta I	6a/N	47	0	47	32.87	15.31	48.18
359	Neeru	Duggi	Chinta I	6b/N	56	2	58	29.92	26.43	56.35
360	Neeru	Duggi	Chinta I	7/N	193	5	198	126.99	67.08	194.07
361	Neeru	Duggi	Chinta I	8/N	153	2	155	55.18	81.68	136.86
362	Neeru	Duggi	Chinta I	9/N	50	0	50	11.35	20.47	31.82
363	Neeru	Duggi	Chinta II	10/N	195	8	203	76.86	90.18	167.04
364	Neeru	Duggi	Duggi I	11/N	178	35	213	29.17	90.76	119.93
365	Neeru	Duggi	Duggi I	12/N	98	24	122	59.33	220.95	280.28
366	Neeru	Duggi	Duggi II	13/N	189	20	209	87.49	131.75	219.24
367	Neeru	Duggi	Duggi II	14/N	145	0	145	107.60	47.35	154.95
368	Neeru	Duggi	Duggi II	15/N	166	12	178	44.66	53.98	98.64
369	Neeru	Duggi	Duggi II	16a/N	110	0	110	34.68	77.72	112.40
370	Neeru	Duggi	Duggi II	16b/N	87	0	87	26.11	44.77	70.88

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
371	Neeru	Duggi	Duggi II	17/N	166	10	176	127.50	68.79	196.29
372	Neeru	Duggi	Kansar	18a/N	127	7	134	30.68	83.67	114.35
373	Neeru	Duggi	Kansar	18b/N	110	20	130	103.64	65.78	169.42
374	Neeru	Duggi	Kansar	19a/N	114	17	131	82.41	27.24	109.65
375	Neeru	Duggi	Kansar	19b/N	60	7	67	16.78	26.16	42.94
376	Neeru	Duggi	Kansar	20/N	30	0	30	11.44	20.80	32.24
377	Neeru	Duggi	Kansar	21/N	30	9	39	22.59	197.93	220.52
378	Neeru	Duggi	Kansar	22a/N	72	13	85	19.73	96.03	115.76
379	Neeru	Duggi	Kansar	22b/N	98	36	134	11.42	44.41	55.83
380	Neeru	Puneja	Katyara	23a/N	101	17	118	27.27	42.94	70.21
381	Neeru	Puneja	Katyara	23b/N	28	0	28	54.95	37.41	92.36
382	Neeru	Puneja	Katyara	24/N	98	158	256	55.87	152.88	208.75
383	Neeru	Puneja	Katyara	25a/N	218	76	294	157.49	113.53	271.02
384	Neeru	Puneja	Katyara	25b/N	102	18	120	45.61	79.22	124.83
385	Neeru	Puneja	Katyara	25c/N	36	0	36	20.88	14.60	35.48
386	Neeru	Puneja	Katyara	26a/N	178	7	185	111.45	68.57	180.02
387	Neeru	Puneja	Katyara	26b/N	74	10	84	40.21	51.55	91.76
388	Neeru	Puneja	Katyara	27/N	68	65	133	42.75	144.41	187.16
389	Neeru	Puneja	Katyara	28/N	371	69	440	247.38	119.76	367.14
390	Neeru	Puneja	Sartingal	29/N	243	215	458	254.92	231.59	486.51
391	Neeru	Puneja	Sartingal	30a/N	112	10	122	61.63	69.87	131.50
392	Neeru	Puneja	Sartingal	30b/N	123	21	144	97.89	61.57	159.46
393	Neeru	Puneja	Sartingal	31a/N	68	7	75	30.32	43.64	73.96
394	Neeru	Puneja	Sartingal	31b/N	101	17	118	52.12	36.08	88.20
395	Neeru	Puneja	Sartingal	32/N	87	28	115	41.54	25.77	67.31
396	Neeru	Puneja	Sartingal	33a/N	99	0	99	48.98	34.95	83.93
397	Neeru	Puneja	Sartingal	33b/N	87	0	87	61.26	41.89	103.15
398	Neeru	Puneja	Sartingal	34a/N	160	0	160	38.04	18.30	56.34
399	Neeru	Puneja	Sartingal	34b/N	50	0	50	89.64	27.94	117.58
400	Neeru	Puneja	Sartingal	34c/N	107	11	118	90.57	34.04	124.61
401	Neeru	Puneja	Sartingal	35/N	83	0	83	52.48	22.44	74.92

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
402	Neeru	Puneja	Basti	36/N	124	4	128	68.49	99.77	168.26
403	Neeru	Puneja	Basti	37/N	252	16	268	178.46	143.32	321.78
404	Neeru	Puneja	Basti	38/N	488	142	630	390.77	175.68	566.45
405	Neeru	Puneja	Basti	39/N	261	479	740	406.37	414.38	820.75
406	Neeru	Puneja	Basti	40a/N	81	62	143	49.08	78.52	127.60
407	Neeru	Puneja	Basti	40b/N	124	0	124	34.03	78.14	112.17
408	Neeru	Puneja	Basti	40c/N	45	5	50	2.32	43.35	45.67
409	Neeru	Puneja	Basti	40d/N	93	0	93	32.41	47.34	79.75
410	Neeru	Puneja	Basti	40e/N	76	0	76	43.31	25.22	68.53
411	Neeru	Puneja	Basti	41a/N	127	0	127	86.88	61.22	148.10
412	Neeru	Puneja	Basti	41b/N	165	190	355	154.38	212.54	366.92
413	Neeru	Puneja	Basti	42a/N	210	450	660	183.23	440.19	623.42
414	Neeru	Puneja	Basti	42b/N	94	0	94	58.23	43.05	101.28
415	Neeru	Puneja	Basti	43a/N	47	1	48	41.26	4.94	46.20
416	Neeru	Puneja	Basti	43b/N	48	0	48	127.81	-75.51	52.30
417	Neeru	Puneja	Basti	43c/N	133	0	133	0.00	138.13	138.13
418	Neeru	Puneja	Basti	44/N	138	0	138	75.19	62.86	138.05
419	Neeru	Puneja	Puneja I	45a/N	134	0	134	84.04	49.45	133.49
420	Neeru	Puneja	Puneja I	45b/N	70	0	70	43.38	41.83	85.21
421	Neeru	Puneja	Puneja I	46/N	380	447	827	551.23	264.83	816.06
422	Neeru	Puneja	Puneja I	47/N	89	31	120	57.83	64.02	121.85
423	Neeru	Puneja	Puneja I	48/N	162	18	180	119.85	58.36	178.21
424	Neeru	Puneja	Puneja II	49a/N	90	5	95	58.75	46.30	105.05
425	Neeru	Puneja	Puneja II	49b/N	58	1	59	55.96	26.48	82.44
426	Neeru	Puneja	Puneja II	50a/N	196	39	235	122.34	70.97	193.31
427	Neeru	Puneja	Puneja II	50b/N	160	0	160	59.23	78.63	137.86
428	Neeru	Puneja	Puneja II	51/N	182	18	200	52.52	118.87	171.39
429	Neeru	Dandi	Chinote	52/N	175	15	190	71.38	86.11	157.49
430	Neeru	Dandi	Chinote	53a/N	151	3	154	112.38	71.81	184.19
431	Neeru	Dandi	Chinote	53b/N	167	7	174	151.11	68.67	219.78
432	Neeru	Dandi	Chinote	54/N	602	234	836	408.98	205.39	614.37

	Range	Block	Beat	Comptt.	Area Estimated in Previous Working Plan (ha)			Area Estimated under GIS in Current Working Plan		
					Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)	Commercial Area (ha)	Un-Commercial Area (ha)	Total Area (ha)
433	Neeru	Dandi	Dandi	55a/N	110	0	110	124.62	83.19	207.81
434	Neeru	Dandi	Dandi	55b/N	131	11	142	116.76	43.81	160.57
435	Neeru	Dandi	Dandi	56/N	185	23	208	69.02	101.48	170.50
436	Neeru	Dandi	Dandi	57/N	313	32	345	175.09	194.33	369.42
437	Neeru	Dandi	Hanga	58a/N	95	1	96	60.77	36.66	97.43
438	Neeru	Dandi	Hanga	58b/N	109	7	116	88.94	29.16	118.10
439	Neeru	Dandi	Hanga	59/N	127	17	144	80.14	50.93	131.07
440	Neeru	Dandi	Hanga	60/N	234	6	240	113.73	48.97	162.70
441	Neeru	Dandi	Hanga	61/N	84	10	94	113.92	65.62	179.54
442	Neeru	Dandi	Hanga	62/N	165	102	267	183.10	82.39	265.49
443	Neeru	Dandi	Hanga	63/N	226	10	236	184.46	51.48	235.94
444	Neeru	Dandi	Hanga	64/N	228	22	250	150.01	77.97	227.98
445	Neeru	Dandi	Hanga	65/N	74	10	84	63.15	153.86	217.01
446	Neeru	Dandi	Narnoo	66a/N	64	0	64	30.00	20.70	50.70
447	Neeru	Dandi	Narnoo	66b/N	67	0	67	22.88	21.86	44.74
448	Neeru	Dandi	Narnoo	66c/N	30	0	30	11.46	18.36	29.82
449	Neeru	Dandi	Narnoo	66d/N	82	2	84	44.24	15.96	60.20
450	Neeru	Dandi	Narnoo	66e/N	101	6	107	57.38	30.82	88.20
451	Neeru	Padri	Padri	1/Pd	58	202	260	56.73	91.32	148.05
452	Neeru	Padri	Padri	2/Pd	143	43	186	49.01	87.35	136.36
453	Neeru	Padri	Padri	3/Pd	121	0	121	114.85	49.96	164.81
454	Neeru	Padri	Padri	4/Pd	139	22	161	258.83	219.91	478.74
455	Neeru	Padri	Padri	5/Pd	143	59	202	65.54	146.65	212.19
456	Neeru	Padri	Padri	6/Pd	114	86	200	80.92	96.75	177.67
457	Neeru	Padri	Padri	7/Pd	156	156	312	46.74	122.39	169.13
					65848	22786	88634	39265.99	48330.08	87596.07

Appendix IV Area Statement of Compartments under Conversion Block in Bhadarwah Forest Division

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total area
1	29/Ch	97.02	25.97	122.99
2	31b/Ch	45.11	8.96	54.07
3	15/K	171.85	56.73	228.58
4	16a/K	52.75	23.13	75.88
5	17b/K	118.58	39.36	157.94
6	21/K	146.83	39.32	186.15
7	25a/K	44.78	11.86	56.64
8	25b/K	48.62	6.20	54.82
9	54/K	62.85	22.21	85.06
10	55/K	67.28	32.10	99.38
11	2/N	180.47	69.67	250.14
12	31b/N	52.12	36.08	88.20
13	32/N	41.54	25.77	67.31
14	33a/N	48.98	34.95	83.93
15	34c/N	90.57	34.04	124.61
16	43a/N	41.26	4.94	46.20
17	43b/N	127.81	-75.51	52.30
18	43c/N	0.00	138.13	138.13
19	49a/N	58.75	46.30	105.05
20	58b/N	88.94	29.16	118.10
21	59/N	80.14	50.93	131.07

Appendix V. Area Statement of Compartments under Converted Block Bhadarwah Forest Division

S.No	Comptt. No.	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
1	12/Jt	100.96	157.75	258.71
2	5b/Ch	76.15	10.50	86.65
3	7/Ch	56.02	12.28	68.30
4	8/Ch	99.19	62.67	161.86
5	10/Ch	118.47	82.07	200.54
6	11/Ch	112.61	52.03	164.64
7	13b/Ch	107.63	38.53	146.16
8	14a/Ch	75.37	40.46	115.83
9	15/Ch	115.75	52.74	168.49
10	16/Ch	136.63	44.42	181.05
11	18/Ch	33.59	14.97	48.56
12	20/Ch	144.15	85.96	230.11
13	21/Ch	111.27	21.32	132.59
14	22/Ch	103.84	22.42	126.26
15	27/Ch	150.81	51.00	201.81
16	28/Ch	82.58	55.88	138.46
17	12/Jai	194.99	-12.28	182.71
18	17a/Jai	125.58	82.53	208.11
19	33/Jai	54.51	228.62	283.13
20	4b/Jwr	38.36	168.68	207.04
21	5/Jwr	161.52	92.86	254.38
22	7/Jwr	155.08	65.65	220.73
23	7/K	87.01	16.43	103.44
24	10/K	70.96	26.87	97.83
25	12/K	89.52	120.70	210.22
26	27/K	140.55	73.64	214.19
27	28a/K	71.86	27.92	99.78

S.No	Comptt. No.	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
28	49a/K	33.37	20.38	53.75
29	65a/K	57.22	23.53	80.75
30	66a/K	98.61	38.16	136.77
31	67/K	52.77	44.41	97.18
32	4/M	108.17	154.35	262.52
33	5/M	155.98	170.54	326.52
34	6a/M	32.25	43.71	75.96
35	6c/M	24.64	20.96	45.60
36	7a/M	64.52	33.20	97.72
37	7b/M	54.24	65.31	119.55
38	1b/N	123.91	83.55	207.46
39	3/N	147.92	63.35	211.27
40	5a/N	80.86	26.92	107.78
41	5b/N	51.46	62.10	113.56
42	5c/N	42.78	19.80	62.58
43	7/N	126.99	67.08	194.07
44	8/N	55.18	81.68	136.86
45	13/N	87.49	131.75	219.24
46	15/N	44.66	53.98	98.64
47	18a/N	30.68	83.67	114.35
48	18b/N	103.64	65.78	169.42
49	19a/N	82.41	27.24	109.65
50	19b/N	16.78	26.16	42.94
51	35/N	52.48	22.44	74.92
52	36/N	68.49	99.77	168.26
53	51/N	52.52	118.87	171.39
54	52/N	71.38	86.11	157.49
55	57/N	175.09	194.33	369.42
56	64/N	150.01	77.97	227.98

S.No	Comptt. No.	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
57	66a/N	30.00	20.70	50.70
58	66b/N	22.88	21.86	44.74
59	66c/N	11.46	18.36	29.82
60	66d/N	44.24	15.96	60.20
61	66e/N	57.38	30.82	88.20

Appendix VI. Area Statement of Compartments under Unallotted Block Bhadarwah Forest Division

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
1	14/Jt	77.79	199.58	277.37
2	3a/Ch	13.52	36.23	49.75
3	3d/Ch	35.29	24.27	59.56
4	4a/Ch	85.83	30.44	116.27
5	6a/Ch	71.20	29.08	100.28
6	6b/Ch	34.81	13.28	48.09
7	12b/Ch	81.90	17.89	99.79
8	17/Ch	88.76	93.35	182.11
9	23a/Ch	105.28	49.16	154.44
10	23b/Ch	11.42	18.77	30.19
11	24a/Ch	16.48	6.39	22.87
12	32b/Ch	67.55	61.65	129.20
13	16c/Jai	49.69	34.25	83.94
14	2a/Jwr	145.13	68.12	213.25
15	8a/Jwr	110.38	32.73	143.11
16	2/K	102.96	49.72	152.68
17	3/K	82.00	60.84	142.84
18	6/K	129.59	73.80	203.39
19	8/K	203.86	175.28	379.14
20	13/K	58.77	58.31	117.08
21	14/K	40.71	64.80	105.51
22	24/K	75.71	61.18	136.89
23	26/K	144.42	49.54	193.96
24	43/K	118.41	69.73	188.14
25	44a/K	35.79	27.43	63.22
26	50a/K	59.12	35.97	95.09
27	58/K	135.60	62.03	197.63
28	59/K	63.74	23.22	86.96
29	60a/K	39.33	30.68	70.01
30	63a/K	108.39	55.65	164.04
31	4b/N	32.98	20.80	53.78
32	6b/N	29.92	26.43	56.35
33	16a/N	34.68	77.72	112.40
34	23b/N	54.95	37.41	92.36
35	30b/N	97.89	61.57	159.46
36	42b/N	58.23	43.05	101.28
37	45a/N	84.04	49.45	133.49
38	48/N	119.85	58.36	178.21

Appendix VII. Area Statement of Compartments under Mixed Conifer Selection Working Circle of Bhadarwah Forest Division

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
1	1/Jt	166.65	80.68	247.33
2	2/Jt	121.97	49.74	171.71
3	3/Jt	102.65	157.38	260.03
4	4/Jt	52.57	47.14	99.71
5	5/Jt	222.62	104.16	326.78
6	6/Jt	421.26	141.36	562.62
7	7/Jt	105.62	70.44	176.06
8	8/Jt	289.37	237.21	526.58
9	9b/Jt	180.17	92.66	272.83
10	11b/Jt	99.18	173.92	273.10
11	13/Jt	117.02	106.52	223.54
12	19/Bh	146.24	571.46	717.70
13	43/Bh	82.23	50.55	132.78
14	44/Bh	162.25	118.16	280.41
15	45/Bh	47.91	198.01	245.92
16	46/Bh	160.77	262.30	423.07
17	49/Bh	41.85	64.55	106.40
18	50/Bh	112.78	167.75	280.53
19	52/Bh	66.04	94.10	160.14
20	53/Bh	41.23	84.46	125.69
21	55/Bh	45.44	142.57	188.01
22	56b/Bh	17.24	68.70	85.94
23	60/Bh	100.73	80.14	180.87
24	69/Bh	55.53	135.05	190.58
25	76/Bh	46.55	113.55	160.10
26	80/Bh	47.42	98.99	146.41
27	85a/Bh	45.75	33.49	79.24
28	85b/Bh	27.26	91.39	118.65
29	94/Bh	103.74	155.68	259.42
30	5a/Ch	61.92	24.07	85.99
31	6/Jai	41.17	44.72	85.89
32	7a/Jai	81.65	54.60	136.25
33	8/Jai	98.24	50.56	148.80
34	10/Jai	78.14	119.33	197.47
35	11/Jai	84.68	80.48	165.16
36	13b/Jai	91.34	46.51	137.85
37	14a/Jai	22.28	31.73	54.01
38	16a/Jai	84.92	73.02	157.94

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
39	18/Jai	167.88	46.79	214.67
40	21a/Jai	96.91	91.75	188.66
41	21c/Jai	29.71	39.75	69.46
42	22a/Jai	28.26	99.47	127.73
43	34/Jai	146.19	156.32	302.51
44	28b/K	97.53	23.56	121.09
45	29a/K	125.07	33.42	158.49
46	34/K	85.99	57.51	143.50
47	35/K	85.99	43.71	129.70
48	36/K	162.36	68.88	231.24
49	40/K	115.76	70.48	186.24
50	42a/K	205.25	79.98	285.23
51	44b/K	67.99	30.68	98.67
52	47/K	129.69	90.35	220.04
53	48/K	127.97	91.78	219.75
54	57/K	151.82	95.92	247.74
55	68/K	79.27	15.94	95.21
56	8/M	69.58	100.61	170.19
57	6a/N	32.87	15.31	48.18
58	14/N	107.60	47.35	154.95
59	16b/N	26.11	44.77	70.88
60	17/N	127.50	68.79	196.29
61	23a/N	27.27	42.94	70.21
62	24/N	55.87	152.88	208.75
63	25a/N	157.49	113.53	271.02
64	25c/N	20.88	14.60	35.48
65	26b/N	40.21	51.55	91.76
66	34b/N	89.64	27.94	117.58
67	37/N	178.46	143.32	321.78
68	40a/N	49.08	78.52	127.60
69	40d/N	32.41	47.34	79.75
70	40e/N	43.31	25.22	68.53
71	41a/N	86.88	61.22	148.10
72	45b/N	43.38	41.83	85.21
73	47/N	57.83	64.02	121.85
74	49b/N	55.96	26.48	82.44
75	50b/N	59.23	78.63	137.86
76	53a/N	112.38	71.81	184.19
77	60/N	113.73	48.97	162.70
78	61/N	113.92	65.62	179.54
79	63/N	184.46	51.48	235.94

Appendix VIII. Area Statement of Compartments under Fir Selection Working Circle of Bhadarwah Forest Division

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
1	9a/Jt	269.47	107.92	377.39
2	10/Jt	175.73	82.69	258.42
3	11a/Jt	61.51	62.26	123.77
4	28/Bh	60.18	193.91	254.09
5	29/Bh	194.20	282.19	476.39
6	33/Bh	151.00	317.56	468.56
7	35/Bh	81.60	204.56	286.16
8	36/Bh	74.31	96.39	170.70
9	37/Bh	77.72	128.56	206.28
10	38/Bh	91.95	101.73	193.68
11	39/Bh	62.29	176.80	239.09
12	40/Bh	140.39	99.95	240.34
13	41/Bh	92.13	118.10	210.23
14	54/Bh	87.50	180.10	267.60
15	59/Bh	128.57	157.82	286.39
16	62/Bh	45.21	175.79	221.00
17	64/Bh	67.20	326.38	393.58
18	68/Bh	83.23	162.33	245.56
19	70/Bh	48.30	301.64	349.94
20	73/Bh	66.56	342.28	408.84
21	74/Bh	43.02	112.49	155.51
22	88/Bh	110.31	135.53	245.84
23	89/Bh	101.00	292.91	393.91
24	90/Bh	136.98	238.92	375.90
25	93/Bh	58.58	259.74	318.32
26	95/Bh	141.70	98.50	240.20
27	96/Bh	114.03	80.65	194.68
28	97/Bh	123.53	206.54	330.07
29	98/Bh	141.78	177.75	319.53
30	101/Bh	179.86	72.75	252.61
31	102/Bh	157.45	82.37	239.82
32	103/Bh	102.24	84.98	187.22
33	104/Bh	74.72	113.99	188.71
34	3c/Ch	82.89	33.96	116.85
35	4b/Ch	60.84	17.71	78.55
36	12a/Ch	75.34	91.21	166.55
37	13a/Ch	16.12	9.59	25.71
38	14b/Ch	22.54	31.77	54.31
39	7b/Jai	28.04	22.39	50.43
40	14b/Jai	47.93	37.03	84.96
41	15/Jai	118.18	65.46	183.64
42	16b/Jai	8.67	15.95	24.62

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
43	17b/Jai	36.18	21.98	58.16
44	19b/Jai	166.94	84.29	251.23
45	20/Jai	70.45	70.95	141.40
46	21b/Jai	31.11	25.20	56.31
47	22b/Jai	131.51	142.61	274.12
48	23/Jai	94.22	187.51	281.73
49	24/Jai	92.11	68.04	160.15
50	25/Jai	161.34	110.37	271.71
51	26/Jai	59.63	65.93	125.56
52	27/Jai	55.04	25.55	80.59
53	28/Jai	172.70	61.97	234.67
54	29/Jai	89.85	32.62	122.47
55	30/Jai	86.16	143.49	229.65
56	32a/Jai	39.91	68.77	108.68
57	32b/Jai	28.38	22.27	50.65
58	8b/Jwr	107.08	33.55	140.63
59	16b/K	55.66	29.17	84.83
60	17a/K	47.43	19.44	66.87
61	29b/K	197.98	54.14	252.12
62	30/K	163.15	128.56	291.71
63	32/K	144.87	87.83	232.70
64	33/K	117.23	51.50	168.73
65	38b/K	171.93	147.57	319.50
66	45a/K	75.97	64.78	140.75
67	50b/K	188.33	73.13	261.46
68	65b/K	27.18	33.75	60.93
69	69/K	247.32	196.06	443.38
70	25b/N	45.61	79.22	124.83
71	26a/N	111.45	68.57	180.02
72	31a/N	30.32	43.64	73.96
73	33b/N	61.26	41.89	103.15
74	34a/N	38.04	18.30	56.34
75	40b/N	34.03	78.14	112.17
76	46/N	551.23	264.83	816.06
77	50a/N	122.34	70.97	193.31
78	53b/N	151.11	68.67	219.78
79	55a/N	124.62	83.19	207.81
80	55b/N	116.76	43.81	160.57
81	1/Pd	56.73	91.32	148.05
82	2/Pd	49.01	87.35	136.36
83	3/Pd	114.85	49.96	164.81
84	6/Pd	80.92	96.75	177.67
85	7/Pd	46.74	122.39	169.13

Appendix IX. Area Statement of Compartments under Chir Rehablitation Working Circle of Bhadarwah Foest Division

S.No	Comptt. No	Commercial Area (ha)	Un-commercial Area (ha)	Total Area (ha)
1	19/Ch	15.59	9.32	24.91
2	24b/Ch	48.89	8.62	57.51
3	25/Ch	42.74	28.15	70.89
4	26a/Ch	15.36	32.71	48.07
5	26b/Ch	31.75	30.15	61.90
6	30/Ch	35.65	13.91	49.56
7	31a/Ch	47.87	26.92	74.79
8	32a/Ch	125.23	99.01	224.24
9	33/Ch	98.92	122.46	221.38
10	2b/Jwr	110.15	143.27	253.42
11	3/Jwr	70.50	114.35	184.85
12	4a/Jwr	41.01	46.44	87.45
13	6/Jwr	19.86	71.07	90.93
14	12/Jwr	48.89	142.34	191.23
15	13/Jwr	42.66	129.56	172.22
16	15/Jwr	19.19	48.63	67.82
17	1/K	26.06	19.03	45.09
18	4/K	74.47	103.74	178.21
19	22b/K	19.48	32.05	51.53
20	61/K	147.79	85.64	233.43
21	63b/K	17.50	69.22	86.72
22	64/K	160.19	128.82	289.01
23	1a/M	12.72	99.41	112.13
24	2/M	26.09	52.12	78.21

Appendix : X Statement of Afforestation Works conducted in Bhadarwah Forest Division

Year	Comptt.	Name of Scheme	Fencing (Rft)	Plantation (Nos)	Patch Sowing (Nos)	Soil Conservation works (in m^3)
2000-01	14/K	RDF Distt	6000	10000	5000	50
	26/Ch		6000	10000	5000	50
	10/N		6000	10000	5000	0
	56a/Bh		6000	10000	5000	0
2001-02	53/N	RDF State	5000	8000	5333	42.2
	1/M		5000	6000	8150	50
	64/K		7000	5000	0	50
	57/Bh		5000	5000	11500	0
	11/Jwr		7000	6500	0	30
	1/N	Eco Fuel Wood Plantation	6000	9000	6000	56.71
	107/Bh		5000	8000	8000	60
	26/Ch	RDF Distt	4700	7000	5083	0
	12/N		5000	7500	4800	0
	108/Bh		5000	7500	4534	0
	64/K	Economi-cally Fuel Wood	5500	7000	4950	0
2002-03	67/K	CMP	5500	12000	10000	100
	13/N	RDF Distt	4000	6000	7600	90
	6/Jwr		4000	6000	7600	90
	5/Jit		4000	6000	6933	90
	14/K	Economi-cally Fuel Wood	5000	4000	8566	0
	53/N	RDF State	7000	10000	7000	200
	2/Jai		7000	10000	7000	200
	8/K		7000	10000	7000	200
	15/Jwr		0	0	25000	0
	1/Jit	Economi-cally Fuel Wood	7000	0	32758	0
	40/N		0	0	40000	0
2004-05	22/N	CMP	6000	0	0	0
	23/N	RDF Distt	4500	4000	0	0
	4/K		4500	3400	0	0
	47/Bh		4500	4000	0	0
	11/Jwr		4500	3400	0	0

Year	Comptt.	Name of Scheme	Fencing (Rft)	Plantation (Nos)	Patch Sowing (Nos)	Soil Conservation works (in m^3)
	2/K	Economi-cally Fuel Wood	8000	10000	5000	0
	2/N	RDF State	6000	5000	5000	0
	5/Jwr		6000	5000	5000	0
	94/Bh		6000	5000	5000	0
	10-11/Jwr		6000	5000	5000	0
	26/K		6000	5000	5000	0
2005-06	22/N	CMP	0	10000	0	0
	26/Ch	RDF Distt	6000	8000	5000	176
	1/Jai		6000	8000	5000	176
	2/N	RDF State	4000	7000	5000	32
	15/Jwr		5000	7000	5000	32.9
	57/Bh		6000	7000	5000	32
	4/K		5000	7000	4500	35
	26/K		5000	7000	5000	32
2006-07	25/N	CMP	7000	12500	5000	107
	25/Ch	RDF Distt	6000	6000	4535	65
	109/Bh		5000	5000	4535	70
	19/K		6000	6000	4535	65
	66/N		6000	6000	4535	65
		RDF State	0	0	0	0
2007-08	1/N	RDF State	5000	5000	4000	0
	61/K		6000	6000	5000	60
	1/Ch	RDF Distt	5000	5000	4535	40
	95/Bh		6000	6000	4535	40
	23/K		6000	6000	4535	46
	18b/N		5000	8000	4535	51
	25/N	CMP	7000	12500	5000	107
2008-09	20/N	CMP	6000	1500	2610	49
	21/N		0	15000	2500	49
	1/K	RDF State	6000	4000	4000	90
	1/M		5500	6000	9120	136
	12/Jai		6000	4000	4600	90
	4/Jwr		5500	6000	2190	136
	85/Bh	RDF Distt	4725	4000	2500	71.25
	63/K		4725	4000	2500	71.25

Year	Comptt.	Name of Scheme	Fencing (Rft)	Plantation (Nos)	Patch Sowing (Nos)	Soil Conservation works (in m^3)
	18b/N		4725	4000	2620	71.25
	14/Jwr		4725	4000	2500	71.25
2009-10	22/N	CMP	5000	0	0	0
	19/N		0	9300	4800	137
	48/Bh	RDF Distt	4500	4500	2100	16
	5/K		4500	4500	2100	16
	3/N		4500	4500	2100	16
	14/Jwr		4500	4500	2100	15
	2/Bh	RDF State	4200	5400	4800	58
	60/K		4200	5400	4800	60
	12/Jwr		4200	5400	4800	60
2010-11	50/Bh	RDF State	5000	5000	5000	30
	20/K		5000	5000	5000	30
	9/Ch		5000	5000	5000	40
	3/K	RDF Distt	4200	4500	4000	20
	108/Bh		4200	4500	4000	20
	36/N		4200	4500	4000	20
	3/Jwr		4200	4500	4000	20
	48/N	CMP	7000	22000	10000	24
	22/N		0	5800	0	0
2011-12	26/K	CMP	6000	0	0	50
	48/N		0	8000	5000	0
	4/K	RDF Distt	9000	13000	10000	474
	9/Bh	RDF State	4500	4500	3500	40
	19/K		4500	4500	3600	39
	57/N		4500	4500	3500	0
2012-13	1/N	RDF State	9000	7000	4000	30
	3/N		6000	5000	4000	40
	43/K	RDF Distt	4500	4500	5000	72
	32/Jai		4500	4500	5000	65
	50/N		4500	4500	5000	65
	36/N	CMP	7500	0	0	0
2013-14	59/N	RDF State	10500	7000	4000	49
	14/Jit	RDF Distt	4500	5000	3000	50
	66/N		4500	5000	3000	50
	26/K	CMP	0	4425	5000	50
	36/N		0	4425	5000	49
2014-15	18/N	RDF State	7500	8000	5000	220

Year	Comptt.	Name of Scheme	Fencing (Rft)	Plantation (Nos)	Patch Sowing (Nos)	Soil Conservation works (in m^3)
	21/Jai	RDF Distt	4000	3000	800	25
	1/M		4000	3000	1000	29
	9/K	CMP	3600	0	0	43
2015-16	5/K	RDF State	6000	5600	4900	50
	4/Jai		6000	5400	4825	50
	50/Bh	RDF Distt	3000	2000	850	45
	19/K		3000	2000	845	45

Appendix XI List of Nurseries of Bhadarwah Forest Division

Year	Range Wise	Name of Nursery	Area in Ha (Gross)
2000-01	Chiralla	Bhella	1.00
	Kellar	Malothi	1.00
2013-14	Chiralla	Bhella	1.00
	Kellar	Malothi	1.00
	Kellar	Danda	1.00
2015-16	Chiralla	Bhella	1.00
	Kellar	Malothi	1.00
	Kellar	Danda	1.00

Appendix XII List of Check Posts of Bhadarwah Forest Division
(Existing)

S.No.	Range	Name of Check Post	Remarks
1	Neru	Sungli	-
2		Domail	-
3	Kellar	Pranoo	-
4	Bhalesh	Donadi	Under illegal occupation of Sh. Noor Mohd Gujjar

(Proposed)

S.No.	Range	Name of Check Post	Remarks
1	Neru	Padri	On Bhadarwah- Chamba road
2		Chattargalla	On Bhadarwah- Bani road

Appendix XIII List of Forest Roads of Bhadarwah Forest Division

S.No	Range	Name of road	Length (in Km)
1	Neru	Attalgarh to Chinta	32 Km
2		Bhadarwah to Chattargalla	25 Km
3		Sarna to Hanga	8.50 Km
4		Bhadarwah to Chamba	143 Km
5		Bhadarwah to Mathola	16 Km
6		Bhadarwah to Manthla	15 Km
7		Gathi More to Gurakha	19 Km
8		Bhadarwah to Kansar	17 Km
9	Kellar	Drafra to Ishan Dhar	15 Km

Appendix XIV Statement of Buildings of Bhadarwah Forest Division

S.No.	Name of Building	Location	Remarks
1.	Forest Rest House	Jai	
2.	Labour Shed Thathri	Thathri, Chiralla Range	Needs Repair
3.	Range Office, Bhalesh	Gandoh	Needs Repair
4.	Range Qtr. Bhalesh	Gandoh	Needs Repair
5.	Kitchen F.R.H. Gandoh	Gandoh	Needs Repair
6.	F.R.H. Gandoh	Gandoh	Needs Repair
7.	F.R.H. Manoo	Comptt. 17/Bh	Needs Repair
8.	Range Qtr. Neeru Range	Bhaderwah	Needs Repair
9.	Divisional Qtr. Bhaderwah	Bhaderwah	Needs Repair
10.	Range Office, Neeru/Chiralla	Bhaderwah	Needs Repair
11.	Guard/Chowkidar Hut	Bhaderwah	Needs Repair
12.	Inspection Hut	Bhaderwah	Needs Repair
13.	Divisional Office Bhaderwah	Bhaderwah	Needs Repair
14.	Range Office, Killar	Bhalla	Needs Repair
15.	Labour Shed Kahra	Kahra, Gandoh	Needs Repair
16.	Guard Hut	Comptt. 12/N	Structure fallen due to winds, Needs new construction
17.	Forest Check Post Sungli	Comptt. 44/N	
18.	Forest Check Post Domail	Neru Range	
19.	Forest Check Post Pranoo/Doda	Killar Range	
20.	Forest Check Post Danadi	Bhalesh Range	Newly Constructed
21.	Guard Hut Pul Doda	Pul Doda, Killar Range	Needs Repair
22.	Labour Shed Bhalla	Bhalla, Killer Range	Needs Repair
23.	Labour Shed Kahra	Kahra, Bhalesh Range	
24.	Guard Hut Chinta	Comptt. 2/N	

Appendix XV Statement showing marking handed over to SFC from 1989-90 to 2015-16 (ending 3/2016) of Forest Division Bhaderwah.

S. No.	Year	Species with Volume of Marking handed Over (in Cft.)					Total Cft.
		Deodar	Kail	Fir	Chir	Spruce	
1.	1987-88	476242	90779	1038084	0	0	1605105
2.	1988-89	837895	440342	406812	0	0	1685049
3.	1989-90	977065	352677	887235	0	0	2216977
4.	1990-91	49015	32650	59606	0	0	141271
5.	1991-92	44649	185997	53790	0	0	284436
6.	1992-93	58228	189236	49524	0	0	296988
7.	1993-94	82266	86136	51164	0	0	219566
8.	1994-95	117596	138879	461430	0	0	717905
9.	1995-96	435153	612412	664503	0	1525	1713593
10.	1996-97	No Marking Conducted during this Year					0
11.	1997-98	520306	329200	20000	0	0	869506
12.	1998-99	615392	310100	200100	0	0	1125592
13.	1999-00	No Marking Conducted during this Year					0
14.	2000-01	540554	430000	215000	0	0	1185554
15.	2001-02	550000	420069	214000	0	0	1184069
16.	2002-03	330420	250330	156226	0	0	736976
17.	2003-04	620230	230130	119220	0	0	969580
18.	2004-05	525430	325235	127230	0	0	977895
19.	2005-06	6.31	2.58	1.87	0	0	10.76
20.	2006-07	402220	305110	125484	77742	0	910556
21.	2007-08	279663	419645	426063	0	0	1125371
22.	2008-09	20471	6100	0	0	0	26571
23.	2009-10	695649	541100	355654	33633	0	1626036
24.	2010-11	178851	394693	168755	0	0	742299
25.	2011-12	184271	183497.50	97821	0	0	465589.50
26.	2012-13	509334	186001	247680	0	0	943015
27.	2013-14	408654	395084	229883	0	0	1033621
28.	2014-15	616574	297808	74019	0	0	988401
29.	2015-16	579455	326438	350302	0	0	1256195
Total (in Cft)		10655589.31	7479651.08	6799586.87	111375	1525	25047727.26

Appendix XVI Area diverted for Non-forestry purposes under J&K Forest (Conservation) Act, 1997 in Bhadarwah Forest Division

S.No.	Agency	Name of Project	Sanction Order No.	Area involved (Hac.)	No. of trees / Poles / Saplings involved
1	PMGSY	Malothi to Dugli via Gajoth Phase-I	16-FC of 2005 17-10-05	1.70	241
2	--do--	Km. 4th of Beru Bhasti road to Dugli	73-FC-2009 28-07-2009	2.39	965
3	--do--	Jangalwar to Sarsi road	255-FST of 08 03-06-2008	4.48	343
4	--do--	Km 76 NHIB to Kandote	33-FC of 09 26-02-2009	1.05	350
5	--do--	Bhalra to Gurekha	430-FST of 09 29-10-2009	2.66	792
6	--do--	Khara to Tanta	42-FC 2010 13-10-2010	1.50	469
7	--do--	Dudwar to Chanti Bala	17-FCA 2012 20-07-2012	1.455	277
8	--do--	Gandoh to Dharayri	35-FCA 2011 13-10-2011	1.00	71
9	--do--	Constt. Of Dradhu to Gutassa road	24 FCA 2012 25-07-2012	1.5015	452
10	--do--	Bhalla to Dhalla road	47-FCA 2011 26-11-2011	1.29	204
11	--do--	Km. 2nd of Nagar Lanchan to Kansar road	209-FST of 14 03-07-2014	0.75	105
12	--do--	Bhella to Gosti	5-FST of 15 17-01-2015	2.035	1038
13	--do--	Constt. of Ghati Gurakha PWD road. Phase-I (Km 1st & 2nd)	02-FC of 04 23-02-2004	0.56	
1	PWD Divn. Bhadarwah	Constt. Of Manthla-Malani PWD road.	9-FC 12-06-2002	0.62	34
2	--do--	Constt. of Sanai Dugli via Khelani link road (PWD)	13-FC-02 26-11-02	0.56	52
3	--do--	Constt. Of Bhella-Thellela to Parnote PWD (Ph-I) road.	12-FC-02 26-11-02	0.18	11

S.No.	Agency	Name of Project	Sanction	Area	No. of trees /
4	--do--	Constt. Of Chiralla link road (PWD)	2-FST-03 1-1-2003	3.36	239
5	--do--	Constt. of Ghati Gurakha PWD road. Phase-I (Km 1st & 2nd)	02-FC of 04 23-02-2004	0.56	63
6	--do--	Constt. of Neota-Manwa Dispensary road	15-FC of 04 21-12-2004	1.30	137
7	--do--	Constt. of road from Gajoth to Dugli. {(R&B) Div. Bhadarwah}	240 FST of 09 22-05-09	0.27	10
8	--do--	Constt. of Puneja to Bhallara (Km. 0-07) {(R&B) Div. Bhadarwah}	70-FC of 09 04-07-2009	2.38	391
9	--do--	Contt. Of road from Puneja to Sewa	17-FC of 10 17-05-2010	2.079	174
10	--do--	Constt. of Jai to Joura road	225-FST of 12 dt 26-04-2012	7.92	354
11	--do--	Constt. Of Jai road to Dhammundah road via Thuba and its link upto Dharamshalla	26-FCA of 11 30-09-2011	1.095	292
12	--do--	Improvement and Upgradation of Sanai Khellani road	29-FCA of 11 30-09-2011	0.54	14
13	--do--	Improvement and Upgradation of Bhalla Malothi road.	27-FCA 2012 25-07-2012	**1.3545**	**70**
14	PWD Divn. Gandoh	Const. of road from Changa to Kaljugasar	05-FC of 2009 13-01-2009	**1.045**	**135**
15	--do--	Constt. Gandoh Sinoo Jai road upto Rajpura (Phase-I)	224-FST of 12 26-04-2012	**4.98**	**1056**
16	PWD Divn. Doda	Constt. of Shiva Allal Bani PWD road	14-FC of 2010 19-03-2010	**1.15**	**176**

S.No.	Agency	Name of Project	Sanction	Area	No. of trees /
17	…do…	Dharara link road	49-FCA of 13 08-01-2013	**1.05**	**280**
18	--do-	PHE Reservoir Pul Doda to Ganpat bridge. (Length= 1.85 Kms)	01 -FCA of 2015 3-7-2015	**2.125**	**0**
1	**GREF**	Constt. of Chatargalla to Bhaderwah road (BBB road)	217-FST of 92 24-114-1992	43.415	769
2	--do--	Widening of Chatargalla to Bhaderwah road (BBB road)	116-FST of 07 15-03-2007	13.1725	1674
3	--do--	Widening of Pul Doda to Bhadarwah road	533-FST of 06 17-10-2006	16.537	5177
4	--do--	Widening of Batote-Kishtwar NH road	269-FST of 08 03-06-20086	18.414	19396
1	Army/MES	Constt. of Chinta-Chinchora-Jaigathi Water point Army road.	403-FST of 05 04-10-2005	5.536	198
2	--do--	Widening of Kapra-Chinta Army road.	148-FST 17-02-2000	1.93	207
3	--do--	Constt. of Naska-Balote Army road.	208-FST 16-04-2002	3.85	213
4	--do--	Revised proposal for constt. of Water Supply Installation at Jai Ghathi	208-FST of 08 27-05-2008	0.694	0
5	--do--	Felling of trees in Defence land at Kursari village	426-FST 09 29-10-09	0	42
6	--do--	Constt. Of Km 75th NHIB to Kahila & Jangalwar road	0	**0**	**0**
1	Irri. & FC Divn. Bhadarwah	Constt. of Kandi Canal of Irrigation Divn. Bhaderwah.	27-FST of 05 17-01-2005	4.60	124

S.No.	Agency	Name of Project	Sanction	Area	No. of trees /
2	Irri. & FC Divn. Doda	Renovation of Bhalla-malnie (Pranoo) Khul.	120-FC 2009 18-12-2009	0.027	8
1	BHEP Dam Divn. Ramban	Constt. of Khellani-Pul Doda Bye-Pass road. (Revised sanction)	180-FST 2007 09-04-2007	5.637	71
1	Ex. Engg. TLMD-II Udhampur	Constt. of 132 KV D/C transmission line from Ramban-Khellani-Kishtwar R/L & from Thathri to Bhalessa R/L	13-FST 2010 11-01-2010	17.1476	1380
1	Baglihar HEP by JK SPDC Ltd.	Post-Facto forest clearance to allow use of forest land under submergence of Baglihar HEP by JK SPDC Ltd.	224-FST of 2013 17-05-2013	11.15	497
1	PHE Divn. Doda	Constt. Of 10000 Gln. Capacity RCC Reservior at Lehrote Khellani	200-FST 2011 21-04-2011	0.032	8
2	..do..	Laying of G. I. Pipe 150 MM dia from Jai to Chakrabathi.	135-FST of 12 20-03-2012	1.71	0
1	Power Grid Corp. of India Ltd.	Laying of 400 KV (D/C) (QUAD) Dulhasti- Kishanpur transmission line.	50-FST of 2015 Dated 24-02-2015	16.667	432+6P