PART II

CHAPTER-IX

Basis Of Proposals

9.1 General Objects of Management

- 9.1.1 The forests of Kathua Forest Division shall be managed with a view to achieve the following objectives:
 - Conservation of biodiversity and natural habitat through management of natural forests 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 a sustainable basis.
 - Checking denudation and soil erosion in catchments through watershed management approach.
 - Ensuring regeneration of conifer forests through assisted natural regeneration and artificial regeneration and maintenance of the health of the vegetation and 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 encouraging and utilising the mitigation and adaptation potential of forests in the context of climate change for achievement of environmental security.
 - Encouraging principles and practices of sustainable grazing through participatory management.
 - Reducing pressure on forests through appropriate interventions including development of forest fringe belt into high production tree strips.
 - Consistent with the above, to derive the yield of forest produce on sustainable basis for commercial markets.

9.2 Methods of Treatment to be Adopted

- 9.2.1 The following treatments are proposed to meet the objectives listed above.
 - Chir forests which are showing signs of rehabilitation after the resin extraction was stopped shall be managed under some sort of interim management for further improvement of the crop.
 - The forests occurring on steep and precipitous slopes shall be preserved and no fellings of whatsoever nature shall be allowed.

- All forest areas which are poorly stocked and close to habitations shall be taken up for rehabilitation. These forests are under high biotic pressure and shall be developed by raising suitable species of fuel, fodder and small timber in order to meet the local demands and to reduce the pressure on natural forests.
- The forest areas that have been degraded and prone to erosion shall be stabilized by carrying out suitable soil and water conservation works.
- All the areas subject to excessive grazing shall be tackled to increase their productivity and carrying capacity by means of rotational closures, introduction of suitable fodder species and various silvi-pastoral operations.
- The forest areas having important medicinal and other non-timber forest products as well as endangered species shall be developed by creating suitable conditions for their natural regeneration and by means of artificial regeneration wherever necessary.
- The wildlife present in the Division has not received as much importance as some other areas of the state. Efforts shall be made for the identification and creation of an inventory of wildlife species found in this Division for suitable measures taken for the protection, preservation and improvement of these species.

9.3. Constitution of Working Circles, their Area and Distribution

- 9.3.1 In the light of above mentioned objectives of management and methods of treatment, the following working circles are constituted:
 - i. Chir Rehabilitation Working circle.
 - ii. Broadleaf Improvement Working Circle.
 - iii. Bamboo Rehabilitation Working Circle.
 - iv. Rehabilitation-cum-Protection Working Circle.
 - v. Grazing (Overlapping) Working Circle.
 - vi. Plantation (Overlapping) Working Circle.
 - vii. NTFP (Overlapping) Working Circle.
 - viii. Forest Protection (Overlapping) Working Circle.
 - ix. Participatory Forest Management (Overlapping) Working Circle.
 - x. Wildlife Management (Overlapping) Working Circle.
- 9.3.2 Table 9.1 summarizes species-wise area distribution in the above mentioned principal working circles. Blanks occupy more than 2000 hectares of area in the Division while scrub covers an area larger than 12,000 hectares.

Table 9.1.

#	Working Circle	Chir	Broadleaf	Bamboo	Scrub	Blanks	Total
1.	Chir Rehabilitation Working Circle	11,371.34	1,952.50	0.00	2,138.56	691.16	16,153.56
2.	Broadleaf Improvement Working Circle	443.51	5,363.63	0.00	3,485.25	389.29	9,681.68
3.	Bamboo Rehabilitation Working Circle	0.00	679.92	807.55	618.89	46.35	2,152.71
4.	Rehabilitation-cum- Protection Working Circle	998.04	9,091.38	39.82	6,035.12	969.37	17,132.73
	Total	12,812.89	17,087.43	846.37	12,277.82	2,096.17	45120.68

Working circle-wise area distribution of Forest Division (in Ha)

9.4 Blocks and Compartments

- 9.4.1 The Range wise break up the territorial blocks, beats and compartments are shown in Appendix-III. The numbering of compartments as adopted in the previous plan has been retained. The abbreviations used for the territorial ranges in this working plan are "K" for Kathua Range, "J" for Jasrota Range, and "D" (Devak Series) and "B" (Basantar Series) for Samba Range. The sequence of compartments falling in various ranges of Kathua forest division is as follows:
 - (i) 1/K to 4/K, 8/K, 9/K, 15/K and from 17/K to 38/K in Kathua Range.
 - (ii) 7/J to 83/J in Jasrota Range.
 - (iii) 1/B to 82/B in Basantar series and 1/D to 7b/D, 23/D and from 26/D to 63/D in Devak series in Samba Range.
- 9.4.2 The compartments 1, 2, 3 and 4 of Kathua range and 1 to 12d of Jasrota range formed a belt of compartments traditionally called the bamboo compartments. The numbering of the ranges again starts from the northernmost ridge after Co 5 of Kathua range and Co 13 of Jasrota range. Compartments 5, 6 and 7 of Kathua range are no longer part of Kathua Forest Division, having being transferred to Billawar Division in the last re-organisation. Compartments 10, 11, 12, 13, 14 and 16 of Kathua range constitute the Thein Conservation Reserve while compartments 1 to 6 of Jasrota range form the Jasrota Wildlife Sanctuary.
- 9.4.3 In the case of Samba range, there are two series of compartments numbered on the basis of drainage. The entire Basantar series from 1/B to 82/B is present in the Samba range. Compartments 8/D to 22/D, 24/D and 25/D have been transferred to Jammu Forest Division.
- 9.4.4 Currently, another re-organisation of the forest divisions is under way. As part of this exercise, two new Forest Divisions, Basohli and Samba have been created in Jammu East Forest Circle. The Samba range of Kathua Forest Division, as discussed throughout in this plan has been transferred to the newly created Samba Forest Division. Now, Kathua FD is now left with only two ranges, Kathua

and Jasrota. As on the date of submission of this plan, the boundaries of the new Divisions have not been notified officially, as the process is ongoing. Therefore, the prescriptions given in this plan for Samba range shall be applicable to the new Samba Division as far as the extent of Samba range as discussed in this plan is concerned.

9.5. Period of the Plan and Necessity for Intermediate Revision

9.5.1 This plan shall remain in force for a period of 10 years beginning from 1st April 2017 till 31st March 2027. The plan under revision shall be deemed to have been extended from 1st April 2013 to 31st March 2017. Further, there is no necessity of inter-mediate revision of this Working Plan.

CHAPTER X

Working Plan For Chir Rehabilitation Working Circle

10.1 General Constitution of the Working Circle

10.1.1 This working circle is constituted of the Chir forests of this Division falling in all the three territorial ranges *viz* Kathua, Jasrota and Samba, and is identical to the Chir Improvement Working Circle of the plan under revision. In general all age classes of Chir are found mixed all over the area. A total of 16153.17 ha is allotted to this Working Circle, out of which 4181.54 ha (25.88 percent) falls in Kathua range, 5544.18 ha (34.32 percent) in Jasrota range, and 6427.85 ha (39.79 percent) falls in Samba range. 15462.40 ha out of the total area allotted to this Working Circle is wooded.

10.2 General Character of the Vegetation

- 10.2.1 The crop of Chir in the forests falling in this Working Circle is almost always found intermixed with broadleaved species. In Shiwalik Chir forests, the influence of altitude and aspect is very important and can be observed very clearly. These forests form a transitional zone between broadleaf forests and the Himalayan Chir forests. Chir is found on top of the ridges while towards the base of these same hills, broadleaved species are present. Chir crop is good and occurs in pure patches on northern aspects while on the southern aspects, the Chir crop found is quite poor. Overall there is preponderance of middle aged trees and relative deficiency of young and mature trees. The type of vegetation found in these forests has already been described in detail in Chapter-II. The Chir forests of Kathua belong to Group 9 Subtropical Pine forests and Sub-group 9/C1a Lower or Shiwalik Chir Pine forests according to the Revised Champion and Seth classification.
- 10.2.2 Regeneration of the Chir crop is not uniform in this division. Natural regeneration is observed to be good inside the protected patches. In unprotected areas the regeneration is not establishing due to frequent grazing and fire incidences. The distribution of Chir stems as a percentage of the total number of stems of all species over various diameter classes is presented in the Table 10.1. Chir stems count for 30.31 % of all the trees found over the forested area of the Working Circle.

Table 10.1.

Percentage distribution of Chir stems over various diameter classes in the forested area of the working circle

Diameter- class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Percentage Distribution	5.46%	7.28%	7.41%	5.42%	2.52%	1.47%	0.75%

10.2.3 If the number of only Chir stems occurring in the Working Circle are analysed, it is observed that there is a large deficiency of stems in lower diameter classes. The 10-20 diameter class accounts for only around 18 % while the percentage of stems of diameter 50 cm and above is 15.61 % of the total number of Chir stems found in this Working Circle. The inability of young crop to establish does not bode well for the future of the crop as replacement and movement across the diameter and age classes is not happening at the expected rates.

10.3 **Area and Allotment**

10.3.1 The detailed compartment/sub-compartment wise area statement of this working circle is shown in Appendix-III. Range wise area under different species in this Working Circle is shown as follows in Table 10.2.

Table 10.2.
Range-wise area allotted to Chir Rehabilitation Working Circle in
Kathua Forest Division

Range			Area (in	ha)		
	Chir	Broadleaf	Bamboo	Scrub	Blank	Total
Kathua	3587.60	499.53	0.00	40.39	54.01	4181.53
Jasrota	3631.55	377.29	0.00	1298.12	237.22	5544.18
Samba	4152.19	1075.68	0.00	800.05	399.93	6427.85
TOTAL	11371.34	1952.50	0.00	2138.56	691.16	16153.56

10.3.2 The compartments allotted to this Working Circle are given in Table 10.3. Compartment 51/B had been inadvertently omitted from the corresponding list in the previous plan and is now included here. Co 32a/J was included in Plantation Working Circle in the previous plan while Co 10/K which was part of Chir Improvement Working Circle has now been handed over to Thein Conservation Reserve.

	Compartments allotted to Chir Rehabilitatio	n Working Circl	e
Range	Compartments	Wooded Area	Total Area
		(ha)	(ha)
Kathua	22, 29a, 29b, 32, 36, 37, 38	4127.52	4181.53
Jasrota	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24,	5306.96	5544.18
	25, 27, 28, 30, 31, 32a, 32b, 33, 44, 58, 59,		
	65, 66, 67a, 75, 76, 77, 78		
Samba	8/B, 11/B, 12/B, 13/B, 14/B, 15/B, 16/B,	6027.92	6427.85
	17/B, 18/B, 20/B, 21/B, 22/B, 23/B, 24a/B,		
	25/B, 26/B, 27/B, 28/B, 29/B, 31/B, 32/B,		
	33/B, 34/B, 35/B, 36/B, 37/B, 38/B, 39/B,		
	40/B, 41/B, 42/B, 43/B, 44/B, 45/B, 46/B,		
	47/B, 49/B, 50/B, 51/B, 52/B, 63/B, 65/B,		
	66/B, 67/B, 69/B, 70/B, 71/B, 72/B		
	29/D, 32/D, 33/D, 36/D, 37/D, 38/D, 39/D		
Total	92 compartments	15462.40	16153.56

Table 10.3.

10.4 Silvicultural System Adopted

- 10.4.1 The most suitable silvicultural system for Chir, which is a strong light demanding species, is one which provides for heavy concentrated openings in the canopy to induce natural regeneration. This system needs complete protection of the area till the fresh regeneration gets established.
- 10.4.2 There is acute deficiency of younger trees in the crop. As discussed earlier, only around 18 percent trees are occurring in the 10 20 cm diameter class in the forested area of the Working Circle. Although there are adequate number of mature trees available over the entire working circle, there are no sizeable areas with sufficient number of mature trees that would be feasible for concentrated fellings. Moreover, the regeneration is not adequate in all the areas, although it is established in distributed patches. Thus, even if the mature or exploitable trees available were to be felled, there is not enough number of young trees to replace those felled.
- 10.4.3 In view of the above facts, the Chir forests falling in this Working Circle cannot be recommended to be worked under any regular silvicultural system. Hence, systematic felling program cannot be prescribed for this working circle for the next ten years, i.e., the period of the plan. These forests are therefore prescribed to be managed for the purpose of encouraging establishment of regeneration and normalizing the age and diameter class distribution of the standing crop.

10.5 Exploitable Size

10.5.1 The exploitable diameter for Shiwalik Chir is prescribed at 70 cm. However, no felling is prescribed for this Working Circle for the period of this Plan.

10.6 Rotation and Regeneration Period

10.6.1 A rotation period of 150 years, with a regeneration period of 30 years is prescribed for academic purposes.

10.7 Felling Cycle

10.7.1 No felling cycle is prescribed.

10.8 Felling Series

10.8.1 There is only one felling series constituted of the entire working circle although no felling is prescribed for the period of this Plan.

TABLE 10.4	Statement Of Species And Diameter	Class (Cm) -Wise Distribution	Of Trees In Chir Rehabilitation	Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	5.86	7.81	7.95	5.81	2.70	1.58	0.56	0.19	0.00	0.05	32.51
Khair	6.33	5.30	0.65	0.28	0.14	0.00	0.00	0.00	0.00	0.00	12.70
Kembal	3.91	2.93	2.42	0.37	0.09	0.05	0.00	0.05	0.00	0.00	9.82
Phulai	1.40	0.42	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91
Other	36.19	10.42	2.37	0.70	0.09	0.19	0.14	0.05	0.00	0.14	50.29
Total	53.69	26.88	13.48	7.16	3.02	1.82	0.70	0.29	0.00	0.19	107.23

Tree Count Per Hectare

Tree Count Over The Forested 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	90,610	1,20,761	1,22,926	89,837	41,748	24,431	8,659	2,938	0	773	5,02,683
Khair	97,877	81,951	10,051	4,329	2,165	0	0	0	0	0	1,96,373
Kembal	60,458	45,305	37,419	5,721	1,392	773	0	773	0	0	1,51,841
Phulai	21,647	6,494	1,392	0	0	0	0	0	0	0	29,533
Other	5,59,584	1,61,118	36,646	10,824	1,392	2,938	2,165	773	0	2,165	7,77,605
Total	8,30,176	4,15,629	2,08,434	1,10,711	46,697	28,142	10,824	4,484	0	2,938	16,58,035

Number Of Stems Computed At Lower Confidence Interval In The Forested 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	82,392	1,09,808	1,11,777	81,689	37,961	22,215	7,874	2,672	0	703	4,57,091
Khair	89,000	74,518	9,139	3,936	1,969	0	0	0	0	0	1,78,562
Kembal	54,974	41,196	34,025	5,202	1,266	703	0	703	0	0	1,38,069
Phulai	19,684	5,905	1,266	0	0	0	0	0	0	0	26,855
Other	5,08,830	1,46,505	33,322	9,842	1,266	2,672	1,969	703	0	1,969	7,07,078
Total	7,54,880	3,77,932	1,89,529	1,00,669	42,462	25,590	9,843	4,078	0	2,672	15,07,655

TABLE 10.5Statement Of Species And Diameter (Cm) Class-Wise Volume (M³) Of Trees In Chir Rehabilitation Working Circle

Volume (M³) Per Hectare

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.76	1.02	3.82	6.57	5.96	5.60	2.72	1.15	0.00	0.35	27.95
Khair	1.20	2.12	0.45	0.30	0.21	0.00	0.00	0.00	0.00	0.00	4.28
Kembal	1.02	1.73	2.54	0.61	0.22	0.15	0.00	0.25	0.00	0.00	6.52
Phulai	0.39	0.27	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77
Other	10.13	6.67	2.82	1.35	0.27	0.75	0.75	0.32	0.00	1.48	24.54
Total	13.50	11.81	9.74	8.83	6.66	6.50	3.47	1.72	0.00	1.83	64.06

Volume Of Stems Over The Forested 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	11,751	15,772	59,066	1,01,588	92,156	86,589	42,058	17,782	0	5,412	4,32,174
Khair	18,555	32,780	6,958	4,639	3,247	0	0	0	0	0	66,179
Kembal	15,772	26,750	39,274	9,432	3,402	2,319	0	3,866	0	0	1,00,815
Phulai	6,030	4,175	1,701	0	0	0	0	0	0	0	11,906
Other	1,56,634	1,03,134	43,604	20,874	4,175	11,597	11,597	4,948	0	22,884	3,79,447
Total	2,08,742	1,82,611	1,50,603	1,36,533	1,02,980	1,00,505	53,655	26,596	0	28,296	9,90,521

Volume Of Stems Computed At Lower Confidence Interval In The Forested 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	10,384	13,938	52,197	89,773	81,438	76,519	37,167	15,714	0	4,783	3,81,913
Khair	16,397	28,968	6,149	4,099	2,869	0	0	0	0	0	58,482
Kembal	13,938	23,639	34,706	8,335	3,006	2,049	0	3,416	0	0	89,089
Phulai	5,329	3,689	1,503	0	0	0	0	0	0	0	10,521
Other	1,38,417	91,140	38,533	18,446	3,689	10,248	10,248	4,373	0	20,223	3,35,317
Total	1,84,465	1,61,374	1,33,088	1,20,653	91,002	88,816	47,415	23,503	0	25,006	8,75,322

10.9 Analysis and Valuation of the crop.

10.9.1 For the assessment of the growing stock and preparation of inventory, plot sampling technique has been adopted, this methodology having already been discussed in detail in Chapter VIII. The sample plots were randomly distributed over the entire Working Circle. The results of the study and statistical analysis are presented in the following table.

Parameter	Number of stems	Volume
No of samples (n)	215	215
Mean (x)	107.21	64.06
Variance(S ²)	5234.23	3073.68
Std Deviation (S)	72.35	55.44
Std Error (SE)	4.93	3.78
Coefficient of Variation (%)	67.48	86.54
95% confidence lower limit	97.49	56.61
95% confidence upper limit	116.93	71.51
Confidence Interval (CI)	19.44	14.90
Lower limit as % of mean (%)	90.93	88.37

 Table 10.6

 Results of statistical analysis for Chir Rehabilitation Working Circle

10.10 Subsidiary Silvicultural Operations

- 10.10.1 The most important measures for the success of both natural or artificial regeneration programmes in Chir forests of these areas is protection. Effective closure to grazing and strict fire protection till the regeneration gets established are the required for improving the health of existing crop as well as for encouraging young crop to establish and grow.
- 10.10.2 It has been observed that for rehabilitating areas where the density of the crop is low, mere closing the area coupled with adequate fire protection are sufficient to induce natural regeneration.
- 10.10.3 In blank and scrub areas where the natural regeneration is unlikely to come on its own, direct sowing of Chir or planting of seedlings raised in polythene bags can be resorted to. The direct sowing of the Chir is done by way of the following methods:-
- a. Patch sowing about 2 meters apart with soil dug up to 30 cm depth. This technique is quite suitable when there is enough moisture in the soil.
- b. In contour lines 30 cm wide and spaced 2 to 3 m apart with the dug up earth heaped on the downhill side to conserve moisture. This is useful on slopes where there is some deficiency in the soil moisture.

- c. Contour trenches, preferably broken. This technique is useful on dry and hot aspects.
- 10.10.4 The land should be cleared of needles and weeds prior to seed fall in April-May each year. Chir can be raised very well in the nursery in polythene bags and then planted in the field at the onset of monsoon rains. Planting of these nursery raised seedlings (in polythene bags) is preferred to ensure better success in areas which have become quite refractory due to continuously disturbed ecological status. The details of nursery techniques involved and also the planting methods are quite well known and shall also be discussed in subsequent chapters. A network of nurseries consisting of one central Chir nursery in each range should be set up to implement regeneration measures effectively. Since Chir seedlings come up vigorously in slightly loosened or exposed soil, the soil surface may be worked to a depth of 5-10 cm in patches in the area taken up for rehabilitation in a good seed year.

10.11 Fire Protection

10.11.1 Southern hotter aspects and areas near habitations are more prone to fires. Dry needles of Chir, resinous wood and combined with hot and dry season render these forests more prone to fire. The recurrent forest fires are one of the major reasons of inadequate regeneration. The following measures are recommended for fire protection:

10.11.2 Fire Lines

Fire lines are much needed in these forests as these forests are situated in and around habitations and hence susceptible to fires. It is suggested that on all ridges and prominent spurs at least 15 m wide fire lines should be maintained. A network of footpaths can supplement the role of fire lines in these forests. Fire lines are also recommended in the areas where the Chir forests come in contact with broadleaf forests.

- 10.11.3 In areas bearing young and un-established regeneration, areas with shallow soil cover and steep slope and areas where efforts are being made to induce regeneration, the fire lines should be provided all around in a network.
- 10.11.4 In case construction of permanent fire lines is not feasible, 15 meter to 30 meter wide temporary fire line should be established. In these temporary fire lines, fellings are not done to clear up the area, rather these are control burnt every year.

10.11.5 Control burning

Areas where regeneration is already established should be control burnt at an interval of every two years. While carrying out the control burning of areas, the following guidelines should be kept in consideration.

- a. It should be done generally during the period December to February.
- b. The operation of control burning should be started from the higher elevations and then extended downwards on the slope (control burning proceeding upwards on the slope is dangerous for the crop).
- c. Small patches of un-established regeneration should be strictly protected against any damage during the operation of control burning.
- d. In no case should control burning be done before a thorough disposal of the slash/ debris in a worked area.
- e. Inspection/ observation posts should be located at vantage points to keep a close watch over any forest fires especially during the hot season.
- f. Adequate number of fire watchers should be engaged to actively work for the protection of these forests from fires.

10.11.6 Disposal of Debris

Since the Chir forests are easily accessible due to development of good network of roads and foot paths and are mostly surrounded by habitations, the falling debris is generally removed away and any leftover stuff is removed by the locals. However, if need arises, the un-disposed debris should be burnt off in heaps, far removed from the crop, particularly advance growth and young regeneration.

10.12 Tending

Cleanings in congested young regeneration of about 2 m height is beneficial for the crop. Tending of the young regeneration *viz* cleaning and thinning in the sapling stage (established regeneration) is useful for artificially regenerated crops.

10.12.1 Cleaning operations

Dead trees and those diseased beyond recovery should be removed. Broadleaved trees which are obstructing the young Chir crop may be removed, retaining some for providing shade, especially on the southern aspects. Bushes and weeds should be cut and removed from the area to be treated. Those endemic plants which are not interfering with the rehabilitation operations should be retained. Climbers should be cut or uprooted at the end of monsoon between mid-September to mid-October.

10.13 Nursery and Plantation Techniques

10.13.1 Found between altitude of 500 to 2300 m, Chir 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.

- 10.13.2 Cones ripen in the cold weather. They should be collected in March-May, dried in sun and seeds shaken out. Seeds can be stored in sealed tins up to 4 years. Approximately 10,000 seeds weigh a kilogram and on an average, 16 to 18 kg of cones yield 20 g of seed. Germination may be 70 to 100 percent and is complete within a month after initiation.
- 10.13.3 Dibbled or broadcast sowing of seeds is done in shaded beds during March-April at the rate of 100 g seeds per square metre bed area. Seedlings can be pricked out 10 cm apart in June-July.
- 10.13.4 *Pinus* spp. cannot grow well without mycorrhizae. Mycorrhizae help the development of roots and absorption of water and nutrients in *Pinus* spp. The potting mixture for raising Pine seedlings therefore, must be inoculated with mycorrhizae. This is done by collecting the soil around large Pine trees. This soil is then 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.
- 10.13.5 Seedlings can 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 is not required on dry sites. Young seedlings are damaged by grass-hoppers, birds, rats and porcupines etc.

10.14 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. 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 subject to heavy grazing are prescribed to be effectively closed to the complete exclusion of grazing and taken up for artificial regeneration by planting and patch sowing.

CHAPTER-XI

Working Plan For Broadleaf Improvement Working Circle

11.1 General Constitution of the Working Circle

- 11.1.1 This Working Circle is constituted of the compartments wherein relatively high frequency of Khair plants is seen and which comprised the Khair Improvement Working Circle of the previous plan. Since Khair by itself is never the dominant crop in the natural forests except in scattered patches, and the occurrence, health and distribution of Khair is inextricably linked with the general conditions prevalent in a broadleaf forest in which it is found, therefore the working circle was renamed with a view to focus on the characteristics and improvement of the natural forests, which would, in effect, reflect in the growth of Khair trees.
- 11.1.2 A total of 9681.68 ha have been allotted to this working circle. Of this, 42 percent area falls in Kathua range, 33 % in Jasrota range and the rest in Samba range. The forested area falling in the Division over the entire Working Circle amounts to 9292.39 ha.

11.2 General Character of Vegetation

- 11.2.1 The entire Kathua Forest Division lies in the subtropical belt of broadleaf forests where Khair is an important species from the economic point of view. In some river beds and nallah sides, Khair forms pure patches and in some of areas, it occurs more frequently in smaller pure patches. In general it is a component of Dry Deciduous mixed broadleaf forests. The important trees other than Khair occurring here are Lannea coromandelica, Acacia modesta, Bombax ceiba, Dalbergia sissoo, Acacia nilotica, Wendlandia heynei, Ficus species etc. The shrubs like Dodoanea viscosa, Carissa spinarum, Justicia adhatoda and Woodfordia floribunda and climbers like Bauhinia vahlii, Pureraria tuberosa and Clematis species are seen in these areas. Mallotus philippensis is a very common in all three ranges.
- 11.2.2 Khair comes up very well in natural conditions. But fire, grazing, lopping and weed infestation are major hindrances in its establishment in this area. The heavy exploitation of Khair in the past combined with illicit felling had reduced the number of trees drastically leading to reduction in seed production. Another important natural hazard is the occurrence of severe soil erosion seen in the entire broadleaf forest area. These forests lie in the zone of large shallow nallah beds which carry the torrential rainwater of the monsoons to the plains just below the forest area. It is the lower limit of the Kandi zone and hence is prone to soil erosion in the rainy season and drought in the summers.

11.2.3 The distribution of stems over various diameter classes is shown in the following table:

Table 11.1

Distribution of Khair stems over various diameter classes in Broadleaf Improvement Working Circle

Dia-class (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Khair (%)	10.27	6.71	0.24	0.32	0.00	0.00	0.00
Total Stems (%)	63.03	26.07	7.89	1.59	0.47	0.32	0.63

11.3 Area and Allotment

11.3.1 A total of 9682 ha area has been allotted to this Working Circle. This forms around 20 per cent of the total forest area of the Division. The detailed allotment of compartments to this Working Circle is given in Appendix-II. The range-wise distribution of area allotted to this Working Circle is shown in Table 11.2.

Table 11.2 Range-wise distribution of area (Ha) allotted to Broadleaf Improvement Working Circle in Kathua Forest Division

Danaa	Area (Ha)									
капде	Chir	Broadleaf	Bamboo	Scrub	Blank	Total				
Kathua	141.81	3109.92	0.00	775.91	67.42	4095.06				
Jasrota	47.29	475.81	0.00	2439.07	262.23	3224.40				
Samba	254.41	1777.90	0.00	270.27	59.64	2362.22				
Total	443.51	5363.63	0.00	3485.25	389.29	9681.68				

11.3.2 The allotment of compartments in this Working Circle has been done as follows:

Range	Compartments	Wooded Area	Total Area (ha)	
		(ha)		
Kathua	8/K, 9/K, 17/K, 18a/K, 20a/K,	4027.64	4095.06	
	20b/K, 24/K, 25/K, 26/K, 27/K			
Jasrota	60/J, 61/J, 63/J, 64/J, 57/J, 67b/J,	2962.17	3224.40	
	68/J, 69/J, 70/J, 71/J, 62/J, 73/J, 74/J,			
	72/J, 51/J, 56/J, 52/J, 54/J, 55a/J,			
	55b/J, 53/J			
Samba	7/B, 53/D, 5 B, 10 B, 3 B, 52/D, 4 B,	2302.58	2362.22	
	1 B, 2 B, 7a/D, 7b/D, 5/D, 43/D,			
	57/D, 58/D, 62/B, 61/B, 53/B			
Total	49 compartments	9292.39	9681.68	

11.3.3 Compartment 67b/J had been omitted from the list of compartments in the Khair Improvement Working Circle in the previous plan due to error, and has been included in Broadleaf Improvement Working Circle in this plan. Compartment 43/D of Samba range was previously included in Chir Improvement Working Circle. It has been included in this Working Circle due to the nature of vegetation observed in the compartment and also for the sake of efficiency of management.

11.4 Objectives of Management

- 1 To improve the growing stock of broadleaved trees by focussing on the requirements of broadleaf forests.
- 2 To improve the growing stock of Khair by natural and artificial regeneration.

11.5 Silvicultural System Adopted

- 11.5.1 The economically important species of Khair occurs mixed with other broadleaved species in these forests. Keeping in view the composition of the crop and nature of the mixed broadleaf forests, the Selection System would generally be proposed for the management of Khair. In this system the silviculturally available trees above the exploitable diameter are harvested with the purpose of facilitating growth of young regeneration.
- 11.5.2 However, the entire forest belt is highly prone to soil erosion due to Kandi nature of topography. Excessive grazing, frequent forest fires and infestation by alien invasive species like *Lantana camara* are primarily responsible for a gradual change in the character of these subtropical forests. Large patches are encountered within the forests where weeds and shrubs have taken over the area to the detriment of the local broadleaved species like Khair, Taali and *Terminalia* spp.
- 11.5.3 In case of Khair, there is complete absence of stems in the diameter classes 50-60 (cm) and above. There is a preponderance of stems in the lowest diameter class (10-20 cm), comprising around 58 percent of the total number of stems occurring in the Working Circle.
- 11.5.4 Also, after a long time, the local villagers are being allowed to fell the Khair trees grown by the farmers and available in the village lands under the Khair Management Plan issued under SRO 111 of 2016 dated 31.03.2016. This fact, coupled with the continuance of the Hon'ble Supreme Court's ban on green felling for some more time at least, necessitates that the Khair and other trees occurring in the natural forests not be considered for felling for the time being. Therefore, under the circumstances, felling of trees under any regular silvicultural system cannot be prescribed. Removals may only be of dead and fallen trees and other than this, no yield is prescribed for the period of the plan.
- 11.5.5 The aim of management must be towards achieving normality in age and diameter of the stems and therefore the trees currently under the lower diameter classes must be allowed to reach the higher diameter and age classes while also ensuring sufficient replacement by natural and artificial regeneration.

11.6 Exploitable Size

11.6.1 In general, an exploitable DBH (OB) of 20 cm is recommended for Khair while for Taali (*Dalbergia sissoo*) it is 50 cm and for Semal (*Bombax ceiba*) it is 60 cm for use

as timber. However, no felling is not prescribed in this Working Circle for the period of this plan.

11.7 Analysis and Valuation of the Crop

- 11.7.1 Previously, the volume of broadleaved species was not calculated in the Working Plan. Sampling was done using Point sampling technique which is quite unreliable in case of estimating number and characteristics of broadleaved species over sloping ground. In this Plan therefore, plot sampling technique was used overall, even in conifer areas. The volume of select species which are the most dominant ones in the tract were calculated using volume equations published by the Forest Survey of India for the relevant region and the results of statistical analysis of plot samples in Broadleaf Improvement Working Circle are presented in Table 11.3. The results show that there are an average of 117.22 trees per hectare with an average volume of 58.12 cubic metres per hectare.
- 11.7.2 The Diameter-class wise distribution of Khair and other broadleaved trees is shown in Table 11.4 and Table 11.5. The data reveals that there are 20.56 khair trees/hectare in the Working Circle while the maximum number of Khair trees, numbering 12.04 per hectare are in 10-20 cm diameter class. Only 3.16 percent Khair trees are above 30 cm DBH in the forested area of the Working Circle. Similarly 65.67 percent of other broadleaved trees in this Working Circle belong to 10 20 cm DBH class.
- 11.7.3 The volume of Khair trees in the Working Circle is only 6.02 cubic metres per hectare. Of this figure, 5.44 cubic metres per hectare is restricted to only two diameter classes, viz. 10 20 cm and 20 30 cm diameter classes. Out of a total of 58.13 cubic metres per hectare, 37.36 cubic metres is composed of species other than Khair, Kembal, Phulai and Chir trees in the forested area of the Working Circle.

Parameter	Number of stems	Volume		
No of samples (n)	108	108		
Mean (x)	117.22	58.12		
Variance(S ²)	6990.34	2387.6		
Std Deviation (S)	83.61	48.86		
Std Error (SE)	8.05	4.7		
Coefficient of Variation (%)	71.33	84.07		
95% confidence lower limit	101.26	48.8		
95% confidence upper limit	133.18	67.44		
Confidence Interval (CI)	31.92	18.64		
Lower limit as % of mean (%)	86.38	83.96		

Table 11.3

Results of statistical	analysis for	Broadleaf Improvement	Working Circle
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Tree Count Per Hectare											
Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.74	1.02	0.83	0.56	0.19	0.09	0.19	0.00	0.00	0.00	3.62
Khair	12.04	7.87	0.28	0.37	0.00	0.00	0.00	0.00	0.00	0.00	20.56
Kembal	3.89	4.17	3.06	0.09	0.09	0.09	0.00	0.00	0.00	0.00	11.39
Phulai	5.83	2.59	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.44
Other	51.39	14.91	4.07	0.83	0.28	0.19	0.09	0.00	0.00	0.46	72.22
TOTAL	73.89	30.56	9.26	1.85	0.56	0.37	0.28	0.00	0.00	0.46	117.23
Tree Coun	nt Over The l	Forested Area	Of The Work	ting Circle							
Species.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	6,876	9,478	7,713	5,204	1,766	836	1,766	0	0	0	33,639

0

0

836

1,766

3,438

0

0

0

836

2,602

0

0

0

0

0

0

0

0

0

0

0

0

0

4,274

4,274

1,91,051

1,05,839

6,71,097

10,89,346

87,720

0

0

836

2,602

5,204

3,438

836

7,713

17,191

0

Khair

Kembal

Phulai

Other

TOTAL

1,11,880

36,147

54,175

4,77,536

6,86,614

73,131

38,749

24,067

1,38,550

2,83,975

2,602

28,435

9,478

37,820

86,048

 Table 11.4

 Statement Showing Species And Diameter Class (Cm) - Wise Tree Count Of Broadleaf Improvement Working Circle

Number Of Stems Computed At Lower Confidence Interval In The Forested 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	5,939	8,187	6,662	4,495	1,525	722	1,525	0	0	0	29,055
Khair	96,642	63,171	2,248	2,970	0	0	0	0	0	0	1,65,031
Kembal	31,224	33,471	24,562	722	722	722	0	0	0	0	91,423
Phulai	46,796	20,789	8,187	0	0	0	0	0	0	0	75,772
Other	4,12,496	1,19,679	32,669	6,662	2,248	1,525	722	0	0	3,692	5,79,693
TOTAL	5,93,097	2,45,297	74,328	14,849	4,495	2,969	2,247	0	0	3,692	9,40,974

Volume (M ³) Per Hectare											
Species.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.10	0.13	0.40	0.63	0.41	0.33	0.90	0.00	0.00	0.00	2.90
Khair	2.29	3.15	0.19	0.39	0.00	0.00	0.00	0.00	0.00	0.00	6.02
Kembal	1.01	2.46	3.21	0.15	0.22	0.30	0.00	0.00	0.00	0.00	7.35
Phulai	1.63	1.66	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50
Other	14.39	9.54	4.85	1.62	0.80	0.75	0.50	0.00	0.00	4.91	37.36
TOTAL	19.42	16.94	9.86	2.79	1.43	1.38	1.40	0.00	0.00	4.91	58.13
Volume Of	Stems Over T	The Forested A	Area Of The	Working Circ	cle						
Species.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	929	1,208	3,717	5,854	3,810	3,066	8,363	0	0	0	26,947
Khair	21,280	29,271	1,766	3,624	0	0	0	0	0	0	55,941
Kembal	9385	22,859	29,829	1,394	2,044	2,788	0	0	0	0	68,299
Phulai	15,147	15,425	11,244	0	0	0	0	0	0	0	41,816
Other	1,33,717	88,649	45,068	15,054	7,434	6,969	4,646	0	0	45,626	3,47,163
TOTAL	1,80,458	1,57,412	91,624	25,926	13,288	12,823	13,009	0	0	45,626	5,40,166

 Table 11.5
 Statement Of Species And Diameter Class (Cm) - Wise Volume (M³) Of Trees In Broadleaf Improvement Working Circle

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Volume Of Stems Computed At Lower Confidence Interval In The Forested 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	780	1,014	3,121	4,915	3,199	2,574	7,022	0	0	0	22,625
Khair	17,867	24,576	1,483	3,043	0	0	0	0	0	0	46,969
Kembal	7,880	19,192	25,044	1,170	1,716	2,341	0	0	0	0	57,343
Phulai	12,717	12,951	9,440	0	0	0	0	0	0	0	35,108
Other	1,12,269	74,430	37,839	12,639	6,242	5,851	3,901	0	0	38,308	2,91,479
TOTAL	1,51,513	1,32,163	76,927	21,767	11,157	10,766	10,923	0	0	38,308	4,53,524

11.8 Strategies for Improvement of Khair Stocking

11.8.1 The Khair crop is in poor condition with very low frequency of Khair trees. The following strategies are suggested for its improvement.

i. Natural Regeneration

The entire area under broadleaf forests is highly suited to natural regeneration of Khair. The Khair trees produce abundant quantity of seeds every year and seed fall occurs in January and February. The seeds are disseminated by wind. Germination takes place in the beginning of rainy season. The following cultural operations are recommended to favour natural regeneration:-

- a) The early development of seedlings in the beginning of rainy season (when fallen seeds germinate) requires weed free loose soil. The removal of bushes and weeds should be carried out by the end of January. The cut bushes and weeds should be cleared from the site or burnt after gathering them at suitable sites. By seed fall, these operations should be complete within a radius of 20 cm near the flowered Khair trees.
- b) The overhead shade (dense cover) near flowered trees should be removed by heavy lopping of other broad leaved trees by the middle of June.
- c) The young seedlings are preferred by cattle and grazing seriously affects the natural regeneration. The areas taken up for Khair improvement should be free from grazing. Effective closures are necessary for this purpose.
- d) The seed fall occurs in January-February and fire incidences in May-June usually kill the delicate Khair seeds completely. Therefore full protection from fire damage is necessary. The potential areas for natural regeneration should be identified every year by locating patches of land where trees of flowering age are present. In such patches the above mentioned cultural operations should be practiced.
- In the first 2-3 years repeated weedings in the areas where seedlings have come up are necessary. At least two weedings near the seedlings are required per year. One should be done in the beginning of the monsoon after the germination of seeds and the other at the end of monsoon in October.

ii. Artificial Regeneration

In blank areas or those areas which are occupied by weeds, bushes and other broad leaved species, the Khair trees are almost absent. As a result, natural seeding does not occur in these areas. Such areas should be delineated within each compartment for artificial regeneration of Khair.

a) **Nursery Techniques:** The seeds are sown in the nursery in the month of April-May. The seeds should be soaked in cold water for 24 hours before seeding. Daily irrigation is necessary till the monsoon rains start. Regular weeding should be done.

b) Root and Shoot Cuttings: The stumps should be made from seedlings about 15 months old. The stumps can be made with root length of 23-31 cm and shoot length of 2.5 to 5.0 cm. The best size of stumps at the root collar is 10-15 cm in diameter.

c) Entire Seedling Planting:

Polythene bags of size 30 x 10 cm are suitable as containers. The seeds should be sown in April-May and entire plant should be planted at the beginning of monsoon next year.

d) Direct Sowings:

The direct sowing methods give good results. Line sowing can be practiced as the method is cheap and easy and is very useful if the area is prone to growth of weeds. Where suppression from weeds is not a concern, broadcasting sowing can also be tried. In areas which get submerged for long after the monsoons, Khair can be sown in mounds 60-75 cm high although it can withstand submergence in water for a couple of weeks.

iii) Cultural Operations

a) **Preparation of Site:**

The areas to be taken up for artificial regeneration are identified in advance. By the end of June the weeds, bushes and shrubs should be cleared by cutting and burning. The broadleaved trees should be lopped heavily.

b) Planting and Sowing:

The planting of nursery raised entire plants/stumps should be done in 45 cm³ pits with a spacing of $2m \times 2m$ after monsoon rains start. If sowing is practiced seeds are sown at the outbreak of monsoon (June end or early July) in rows 3-4 m apart.

c) Weeding:

At least two good weedings are necessary per year upto 3 years.

d) Cleaning and Thinning:

In case of sown crop the Khair seedlings come up in a congested group. In early cleaning, plants should be spaced 80 to 120 cm apart. All shade should be removed. The first thinning should be done at the age of 3 years and subsequent thinnings are done at the age of 5, 10 & 20 years.

Coppicing is not recommended as it enhances root rot disease caused by *Ganoderma lucidum*.

CHAPTER-XII

Working Plan For Bamboo Rehabilitation Working Circle

12.1 General Constitution of the Working Circle

- 12.1.1 The compartments traditionally known to be Bamboo-bearing have been included in this Working Circle. It was named as Bamboo Improvement Working Circle in the previous plan. It includes compartments 7/J to 12d/J from Jasrota range and compartments 1/K to 4/K from Kathua range. Compartments 1 to 6 of Jasrota Range constitute the Jasrota Wildlife Sanctuary and are hence not included in this plan.
- 12.1.2 Currently, Bamboo is found scattered in varying densities over the entire lower altitude belt of the Division from Jasrota to Kathua. The requirement to constitute a Working Circle dedicated to Bamboo is due to its economic importance as a source of revenue for the Division. Also, this Division is the only place in the state known to have natural Bamboo and therefore, the conservation and preservation of this crop is vital.

12.2 General Character of Vegetation

12.2.1 The Bamboo found in Kathua is not characteristic of the Dry Bamboo Brakes described as Subgroup 5B Type E9 in the Revised Champion and Seth's classification. *Dendrocalamus strictus* is the only species occurring and forming scattered brakes in this Division. Often it is found growing along with grass and thorny scrub with scattered overwood of dry deciduous trees. It would be very rare to find this bamboo to be the dominant species in any large area of the Working Circle. It is found growing in a mix of trees like *Acacia catechu*, *Butea monosperma* etc. occurring with *Lantana camara* and *Murraya koenigii*.

12.3. Area and Allotment

12.3.1 The list of compartments allotted to this Working Circle is given in Appendix-III. The Range wise area allotted is shown in Table 12.1. Out of the total area of 2,152.71 ha allotted to this working circle, 57 percent falls in Kathua range in only four compartments while the rest (43%) falls in nine compartments of Jasrota range.

Damas		Area in hectares									
Kange	Chir	Broadleaf	Bamboo	Scrub	Blank	Total					
Kathua	0.00	378.70	672.36	126.98	46.35	1,224.39					
Jasrota	0.00	301.22	135.19	491.91	0.00	928.32					
Total	0.00	679.92	807.55	618.89	46.35	2,152.71					

Table 12.1Statement showing Range wise distribution of area under
Bamboo Working Circle in Kathua Forest Division

- 12.3.2 Compartments 1 to 4 in Kathua Range and 1 to 15 in Jasrota Range were traditionally called "Bamboo Compartments" in Kathua Forest Division. In Jasrota Range, compartments were numbered 1 to 15 (as Bamboo compartments) and the numbering again started from 13 to 83 in the same range. The compartments 13, 14 & 15, therefore occurred twice. To correct this anomaly, the Bamboo compartments 12, 13, 14 and 15 were renamed as 12a, 12b, 12c and 12d respectively in the previous plan. The same scheme is followed in this plan as well.
- 12.3.3 The compartments 18b and 12 of Kathua range were not considered to bear Bamboo historically. Consequently, the above mentioned compartments were removed as in the previous plan also, these had been included merely as areas having the potential of growth of bamboo. Co 1 and 2 of Kathua range which were previously a part of Biodiversity Conservation Working Circle have been included in this Working Circle.
- 12.3.4 The compartments allotted to this Working Circle are given below in Table 12.2:

Compa	Compartments another to Damboo Kenabilitation working Circle									
Range	Compartments	Wooded area (ha)	Total area (ha)							
Kathua	1/K, 2/K, 3/K, 4/K	1178.04	1224.39							
Jasrota	7/J, 8/J, 9/J, 10/J, 11/J, 12a/J, 12b/J, 12c/J, 12d/J	928.32	928.32							
TOTAL	13 compartments	2106.36	2152.71							

 Table 12.2

 Compartments allotted to Bamboo Rehabilitation Working Circle

12.4 Special Objectives of Management

- 12.4.1 The special objectives of constituting this working circle are:
 - i. To rehabilitate degraded Bamboo areas
 - ii. To sustainably manage the existing Bamboo crop

12.5 Analysis and Valuation of the Crop

- 12.5.1 The growing stock was estimated by randomly laying out 27 sample plots of size 0.1 ha in compartments 1 to 4 in Kathua Range and compartments 7 to 12d in Jasrota Range. In this Working Circle also, the volume assessment of broadleaved species was carried out and the results of statistical analysis carried out are given in Table 12.3, followed by the statements of species-wise distribution of stems and volume of different species in various diameter classes in Tables 12.4 and 12.5 respectively.
- 12.5.2 The average growing stock of this working circle works out to be 151.48 stems per hectare, and the volume of the corresponding data is calculated as 124.40 cubic metre per hectare for the stems above 10 cm DBH.

Results of statistical analysis for Bamboo Rehabilitation Working Circle

Parameter	Number of stems	Volume
No of samples (n)	27	27
Mean (x)	151.48	124.4
Variance(S ²)	5990.03	10342.61
Std Deviation (S)	77.4	101.7
Std Error (SE)	14.9	19.57
Coefficient of Variation (%)	51.1	81.75
95% confidence lower limit	120.85	84.17
95% confidence upper limit	182.11	164.63
Confidence Interval (CI)	61.26	80.46
Lower limit as % of mean (%)	79.78	67.66

Table 12.5

Statement Of Species And Diameter Class (Cm) - Wise Distribution Of Trees In Bamboo Rehabilitation Working Circle *Tree Count Per Hectare*

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.00	0.74	1.11	0.00	0.37	0.00	0.00	0.00	0.00	0.00	2.22
Khair	4.81	6.67	2.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.44
Kembal	1.85	2.96	5.56	1.48	2.59	1.11	0.00	0.00	0.00	0.00	15.55
Phulai	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	65.93	35.93	9.26	3.33	1.11	0.37	0.37	0.00	0.00	2.96	119.26
TOTAL	72.59	46.30	18.89	4.81	4.07	1.48	0.37	0.00	0.00	2.96	151.47

Tree Count Over The Forested 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	1,559	2,338	0	779	0	0	0	0	0	4,676
Khair	10,132	14,049	6,235	0	0	0	0	0	0	0	30,416
Kembal	3,897	6,235	11,711	3,117	5,455	2,338	0	0	0	0	32,753
Phulai	0	0	0	0	0	0	0	0	0	0	0
Other	1,38,872	75,682	19,505	7,014	2,338	779	779	0	0	6,235	2,51,204
TOTAL	1,52,901	97,525	39,789	10,131	8,572	3,117	779	0	0	6,235	3,19,049

Number Of Stems Computed At Lower Confidence Interval In The Forested 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	1,244	1,865	0	621	0	0	0	0	0	3,730
Khair	8,083	11,208	4,974	0	0	0	0	0	0	0	24,265
Kembal	3,109	4,974	9,343	2,487	4,352	1,865	0	0	0	0	26,130
Phulai	0	0	0	0	0	0	0	0	0	0	0
Other	1,10,792	60,379	15,561	5,596	1,865	621	621	0	0	4,974	2,00,409
TOTAL	1,21,984	77,805	31,743	8,083	6,838	2,486	621	0	0	4,974	2,54,534

 Table 12.6

 Statement Of Species And Diameter (Cm) Class Wise Volume (M³) Of Trees In Bamboo 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	0.10	0.53	0.00	0.82	0.00	0.00	0.00	0.00	0.00	1.45
Khair	0.91	2.67	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.62
Kembal	0.48	1.75	5.83	2.44	6.17	3.60	0.00	0.00	0.00	0.00	20.27
Phulai	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	18.46	22.99	11.02	6.47	3.21	1.50	1.99	0.00	0.00	31.42	97.05
TOTAL	19.85	27.51	19.42	8.91	10.20	5.10	1.99	0.00	0.00	31.42	124.40

Volume (M³) Per Hectare

Volume Of Stems Over The Forested 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	211	1,116	0	1,727	0	0	0	0	0	3,054
Khair	1,917	5,624	4,297	0	0	0	0	0	0	0	11,838
Kembal	1,011	3,686	12,280	5,140	12,996	7,583	0	0	0	0	42,696
Phulai	0	0	0	0	0	0	0	0	0	0	0
Other	38,883	48,425	23,212	13,628	6,761	3,160	4,192	0	0	6,6161	2,04,422
TOTAL	41,811	57,946	40,905	18,768	21,484	10,743	4,192	0	0	6,6161	2,62,010

Volume Of Stems Computed At Lower Confidence Interval In The Forested 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	143	755	0	1,168	0	0	0	0	0	2,066
Khair	1,297	3,805	2,907	0	0	0	0	0	0	0	8,009
Kembal	684	2,494	8,309	3,478	8,793	5,131	0	0	0	0	28,889
Phulai	0	0	0	0	0	0	0	0	0	0	0
Other	26,308	32,764	15,705	9,221	4,574	2,138	2,836	0	0	44,765	1,38,311
TOTAL	28,289	39,206	27,676	12,699	14,535	7,269	2,836	0	0	44,765	1,77,275

12.6 Silvicultural System Adopted

For the management of existing Bamboo, the Culm Selection-cum-Improvement System is proposed to be implemented to improve the stocking and proliferation of the crop. A Felling Cycle of 4 years is recommended.

12.6.1 Marking of Culms for Reservation

The minimum number of clumps to be retained in a clump is based on Clump quality. Healthy, well stocked clumps with culm height above 9 m may be considered to belong to Class-I while Class-II clumps have culm height of 6 to 9 m. Usually in Kathua, such areas are only found occasionally in natural forests and even well-stocked areas have clumps which are degraded, damaged, congested and/or fire-burnt. In such conditions, 10 to 15 culms should be retained in each clump. In each clump to be worked, the culms to be retained are marked with paint at breast height and the number of culms to be retained is written on one of such reserved culms. The marking list includes the serial number of the clump, the number of culms to be retained and number of culms to be felled.

The marking should be carried out by DFO or ACF and at least 25% of clumps should be checked by the DFO himself.

12.6.2 Felling Rules

- 12.6.2.1 As far as possible the felling should be completed by the end of March. The area should be strictly protected from fire during the year of working and the year following it. The worked area should be closed for grazing for one year. Lopping of Bamboo for fodder or other uses should be strictly prohibited.
- 12.6.2.2 One year and two year old culms should not be cut under any circumstances. Clumps having less than 8 culms should not be worked. Rhizomes should not be allowed to be dug out.
- 12.6.2.3 The height above which culms are cut should be more than 15 cm and less than 45 cm from the ground level. In no case should the cut be given below the first prominent node from ground. The culm should be cut with a sharp instrument so that the stump does not split.
- 12.6.2.4 The felling operations should be suspended from 1st July to 15th October.
- 12.6.2.5 When flowering is sporadic, all flowered culms within the coupe under working which have shed their seed should be clear felled. In the event of gregarious flowering all clumps which have flowered in the area irrespective of crop age should be clear felled after seed has been shed.

- 12.6.2.6 In each clump all new culms (less than one year old), all two-year old culms and at least 8 mature culms over two year old should be retained. While retaining culms it should be ensured that they are well spaced, preferably at the periphery.
- 12.6.2.7 All cutting debris like lops and tops should be removed to avoid fire hazard at least to a distance of one meter from around the worked clump. Climbers should be cut from all the clumps during the working of the area.

12.6.3 Treatment of Congested Clumps

The congested Bamboo clump should be clear felled by forming segments as culm selection is not possible here. The clump is divided into three segments. In each working only one segment is cut. The middle segment will be in the shape of a triangle having apex at the centre and base formed by of the periphery. This segment should be felled in the first working. In subsequent cycles the other two segments should be felled one by one working from the centre of the clump towards the periphery.

12.7 Other Cultural Operations

The following operations are to be carried out as measures to promote hygiene and health of the crop:

- i. All dead and dry clumps should be removed.
- ii. All malformed, twisted, insect attacked and top broken culms should be removed.
- iii. Cleaning and thinning should be done to open up the clump to such an extent that it is possible to see through it as this ensures free circulation of air inside the clump.
- iv. The shrubs and bushes surrounding the clump should be cleared by uprooting to a distance of one meter from periphery of each clump.
- v. The climbers and weeds like *Lantana camara* spreading over the clumps should be eradicated by root-stock cutting or by uprooting and burning.
- vi. All the slash should be collected, removed and burnt to avoid fire incidence.

12.8 Treatment for gregariously flowered areas

12.8.1 In sporadic flowering, only a few culms flower in a clump. These culms may or may not die after the event, and the clump usually does not die after flowering takes place. Gregarious flowering involves almost all clumps in an area. All the culms in a clump die after flowering, and it is followed by the death of the entire

clump as well. It is a long-term cycle, taking 20 to 60 years and in Kathua, it may be occurring every 30-45 years.

12.8.2 In case of gregarious flowering, clear felling should be done only after seed shedding takes place. The area should be strictly closed for grazing and protected from fire. The closure should be continued till the new Bamboo clumps are established and is beyond serious damage by grazing. Gregarious flowering takes two to four years to complete. In Kathua FD, gregarious flowering occurred in a few compartments in 2013-14 and consequently, 1,83,955 culms were sanctioned to be extracted from Co 4/K in 2014.

12.9 Regeneration Of Bamboo

- 12.9.1. In all compartments of the Working Circle, both natural and artificial regeneration is recommended for establishment and proliferation of bamboo.
- 12.9.2. In compartments 1 and 2 of Kathua range and compartments 11, 12a, 12b, 12c and 12d of Jasrota range, full fledged artificial regeneration should be taken up.

12.9.3 Natural Regeneration

In *Dendrocalamus strictus* both the sporadic as well as gregarious flowering is seen, with the former occurring almost every year. Flowering takes place from December to January and seed ripens from February to April. Ripened seeds fall on the ground in April-May. The germination takes place with the onset of monsoons. During this period strict protection from fire and grazing is necessary. Protection should continue up to first five years for the clump to establish. as full clump formation takes 4 to 5 years. Reproduction within the clump takes place through rhizomes.

12.9.4 Overhead Canopy Manipulation

Once the seed fall is complete in flowered clumps, the dead clumps should be removed and the shrubs and weeds in the seed fall area should be cut. If trees with dense foliage are present in the overhead canopy, heavy lopping should be carried out. All other miscellaneous trees species should be lopped and if present in large numbers, should be thinned.

12.9.5 Artificial Regeneration

In Bamboo areas where the crop density is very less and in all non-bamboo areas artificial regeneration is recommended through plantations.

12.9.5.1 Collection and Storage of Seeds

The bamboo crop is in poor condition at present and adequate amount of seed cannot be obtained locally. The seeds of *Dendrocalamus strictus* should be

purchased from authentic sources. Seeds should be stored in air tight tins. Up to three years viability can be retained if seed moisture content is regulated at 8%.

12.9.5.2 Nursery Technique

Raised nursery beds of one meter width are prepared. Farm yard manure is mixed while preparing the beds. The current year seeds are sown in May-June. About 15g of seed is sown per square meter of nursery area (20 g in case of stored seed). Watering with fine rose-can is to be done regularly till the germination is complete (up to 45 days). When the seedlings are about 10-15 cm tall, they are picked out in perforated poly bags of 20cm x 10 cm size. These bags are filled with pulverized soil mixed with sand and FYM in the ratio 2:1:1.

The seedlings can be pricked out in the nursery beds also, at a spacing of 5 cm x 5 cm. Direct sowing in poly bags is also done. Four to five seeds per bag are sown in each bag. Seedlings so raised attain a height of 25 to 30 cm in about three months. These plants are ready for planting by next July.

12.10 Planting Technique

12.10.1 Land Preparation

In all the blank areas, scrub areas and areas occupied by weeds, land should be cleared of all shrubs and weeds. All this waste should be collected and burnt. The operations should be complete by June-end.

12.10.2 Treatment of Broadleaved Species

- 12.10.2.1 The retention of broadleaved trees species above 10 cm diameter do not affect rehabilitation of Bamboo if present in small number. These species are also the natural associates of *Dendrocalamus strictus*. Therefore all the broadleaved tree species above 10 cm DBH should be retained especially the naturally occurring Khair, Sissoo, Ber, Dhaman, Mango, Ficus, Amla and Kambel trees.
- 12.10.2.2 The area should be cleared of bushes and weeds. The slash should be collected and burnt. If the foliage of retained trees is very dense and affects establishment of Bamboo, heavy lopping is recommended.
- 12.10.2.3 It is pertinent to note that if broadleaved tree species and bushes of endemic species are removed and the Bamboo is not planted as recommended, obnoxious weeds like *Lantana camara* and *Parthenium hysterophorus*. quickly occupy the area and it becomes extremely difficult to remove them. The cleared areas should be fenced with barbed wire fence.

12.10.3 Planting

12.10.3.1 One year old seedlings raised in poly-bags are planted in pits of size 45 cm³ at 5m x 5m spacing. After planting in July immediately after showers, the first

weeding is done. Three weedings are done in the first year and two in the second year. Casualties are replaced in the year of planting and again in July next year.

- 12.10.3.2 Soil working is done around the seedlings up to a radius of at least 50 cm and to a depth of 8 to 10 cm in the last weedings of the first year and both weedings of the second year. Protection from fire and grazing up to five years is necessary for establishment of clumps.
- 12.10.3.3 Planting of Bamboo rhizomes can be considered for maintenance of continuity especially if there are large gaps left from previous years' planting.

12.11 Potential Growth And Yield From Rehabilitated Bamboo

- 12.11.1 Once planted, it takes about 6 years to form the clumps. It is observed from plantation studies that at the age of five years, on an average, 10.83 culms/clump are found. If an average of 60 clumps/ha exist the yield/ha is around 0.57 tons.
- 12.11.2 In plantations of Bamboo, on an average five new culms are produced per year per clump. Around 275 to 300 of these clumps are maintained per hectare (average culm dimensions are 5 cm diameter, 6-8 m height and 2-2.5 kg weight).
- 12.11.3 Systematic and commercial working of the rehabilitated Bamboo areas can be started on a full scale from the 8th year. It is expected that on a three years cycle, a good plantation may yield about 3-4 tons of Bamboo/ha at first cut, 5-6 tons at second cut and 8 tons/ha in the third cut.
- 12.11.4 Assuming a life cycle of 32 years only a total of eight cuttings can be made with a final clear felling after gregarious flowering which is expected to yield about 15-16 tons per hectare. Thus the total expected yield per hectare is about 70-74 tons for the entire life of the plantation.

12.11.5 Realization of Yield

- 12.11.5.1 The data from the field shows that there are only 16.30 clumps of Bamboo/hectare with around 812.30 mature culms/ hectare.
- 12.11.5.2 As the recommended silvicultural system prescribes retention of 8 mature culms/clump along with all culms less than two years of age, the number of culms harvestable per ha is only 640. The total yield works out to be 5.16 lakh culms over the Bamboo area of the Working Circle. This yield should be taken as a by-product of clump improvement work and a part of it should be given free of cost as an incentive to local farmers and other local people associated with Bamboo rehabilitation work.

12.11.6 Yield from Broadleaved Species

During Bamboo rehabilitation it is necessary to clear all bushes and unwanted tree species. The data shows that the number of broadleaved tree species above 10 cm DBH class per ha is 151.47/ha. However, out of these, 72.59 stems/ha are in 10-20 diameter class and 46.30 stems/ha in 20-30 diameter class. The broadleaved species are natural associates of Bamboo in this area. Therefore it is recommended that all broad leaved trees above 10 cm DBH in diameter class should be retained. No yield is prescribed from them. The clearing of bushes will yield some amount of firew

CHAPTER-XIII

Working Plan For The Rehabilitation-Cum -Protection Working Circle

13.1 General Constitution of the Working Circle

- 13.1.1 This Working Circle consists of areas which were allotted to the Plantation, Grazing and Biodiversity Conservation Working Circles in the previous plan. Grazing and plantation have been dealt with in overlapping working circles in this Plan. Most of the compartments falling in this Working Circle are located near habitations and are facing excessive biotic pressure.
- 13.1.2 The percentage distribution of stems and the volume of trees occurring in this Working Circle have been shown in Table 13.1. It includes areas all over the Division encompassing all forests from Chir to broadleaf. Out of the total tree count, around 10 percent are Khair trees and 5 percent are Chir trees, accounting for 6 percent and 11.74 percent of the total volume of trees of this Working Circle respectively. More than 60 percent of the trees observed here belong to the 10-20 cm diameter class and only around 13 percent of the trees belong to diameter class 30-40 cm or above. This indicates the condition of the crop occurring over about 37 percent area of the Division which falls in this Working Circle.

Species-wise	Species-wise stem distribution (in %) in the forested area of the Working Circle												
Creation	Diamet	Diameter classes											
Species	10-20	20-30	30-40	40-50	50-60	60-70	>70	Total					
Chir	0.24	0.65	1.74	1.57	0.6	0.36	0.12	5.28					
Khair	6.33	3.83	0.44	0.04	0	0	0.00	10.64					
Kembal	3.72	2.78	2.18	0.32	0.12	0	0.04	9.16					
Phulai	8.67	3.67	0.73	0.2	0.04	0	0.00	13.31					
Other	41.23	15.53	3.35	1.10	0.12	0.16	0.12	61.64					
TOTAL	60.19	26.46	8.44	3.23	0.88	0.52	0.28	100.00					

Table 13.1

Percentage distribution of stems over various diameter classes in the Rehabilitation Working Circle in Kathua Forest Division

Species-wise	Species-wise volume distribution (in %) in the forested area of the Working Circle											
Spacing	Diameter classes											
species.	10-20	20-30	30-40	40-50	50-60	60-70	>70	Total				
Chir	0.05	0.16	1.64	3.49	2.62	2.52	1.26	11.74				
Khair	2.36	2.99	0.60	0.09	0.00	0.00	0.00	6.04				
Kembal	1.88	3.21	4.47	1.04	0.56	0.00	0.42	11.59				
Phulai	4.75	4.59	1.69	0.76	0.23	0.00	0.00	12.02				
Other	22.58	19.45	7.80	4.29	0.69	1.27	2.52	58.60				
TOTAL	31.62	30.42	16.20	9.67	4.10	3.79	4.20	100.00				

13.2 General Character of the Vegetation

- 13.2.1 The forests included in this Working Circle are generally degraded as these are poorly stocked, with low density and where regeneration has either failed to come up or failed to establish. Broadleaved trees have become bushy due to repeated browsing and grazing. Soil has become compact due to excessive grazing and frequent fires whereby most of the rain water is lost as run-off. Problem of soil erosion is severe in the form of land slips and gullies.
- 13.2.2 The productive forests, although adequately stocked, are also included in this Working Circle as because of their proximity to human habitations and settlements these are unfit for commercial exploitation as these forests are more vulnerable to excessive pressure for timber, firewood, grazing etc.
- 13.2.3 As the area allotted to this Working Circle is spread out almost all over this Division, the vegetation encountered varies from the Sub-tropical Broadleaf Forests to scattered mixed Chir Pine. It means that all type of forests discussed in detail in Chapter-II of Part-I of this plan (except maybe bamboo) are met within this Working Circle.
- 13.2.4 Due to proximity to habitations these areas are under serve biotic pressure. Acacia modesta is the main broadleaved species in the area whereas Kembal, Khair, Jamun, etc are other prominent broadleaved species. Scrub areas and blanks abound in various types of shrubs like Murraya koenigii, Carissa spinarum, Justicia adhatoda, Dodonaea viscosa etc. Broadleaf areas, blanks and scrub portions are mostly in and around habitations and thus face very high biotic interference. The incidence and spread of Lantana camara is of urgent concern.

13.3 Area and Allotment

13.3.1 The area allotted to this Working Circle is a total of 18,129.77 Ha which works out to be 37.30 percent of the entire area of the Division. Out of this, 6,303.12 Ha is in Kathua range, 3,670.80 Ha in Jasrota range, while the maximum i.e., 8,155.85 Ha falls in Samba range. Areas devoid of tree cover i.e. blanks and scrub portions constitute 7,431.72 Ha or 41 % of the total area of this Working Circle. Detailed area statement of compartment/sub-compartments allotted to this Working Circle is given in Annexure-III. The range wise distribution of area under various species/ categories is given in Table 13.2.

Range wise distribution of area allotted to Rehabilitation cum Protection Working Circle in Kathua Forest Division

Danaa		Area (Ha)										
Kange	Chir	Broadleaf	Bamboo	Scrub	Blank	Total						
Kathua	207.37	4,006.56	38.82	739.10	314.23	5,306.08						
Jasrota	359.36	520.20	0.00	2,455.90	335.34	3,670.80						
Samba	431.31	4,564.62	0.00	2,840.12	319.80	8,155.85						
Total	998.04	9,091.38	38.82	6,035.12	969.37	17,132.73						

Range	Compartments	Wooded area (ha)	Total area (ha)
Kathua	15/K, 18b/K, 19/K, 21a/K, 21b/K,		
	23/K, 28/K, 30/K, 31/K, 33/K, 34/K,	4991.85	5306.08
	35/K		
Jasrota	26a/J, 26b/J, 26c/J, 26d/J, 29/J, 34/J,		
	35/J, 36/J, 37/J, 38/J, 39/J, 40/J, 41/J,	3335.46	3670.80
	42/J, 43/J, 45/J, 46/J, 47a/J, 47b/J,		
	48a/J, 48b/J, 49/J, 50/J, 67c/J, 79/J,		
	80/J, 81/J, 82/J, 83/J		
Samba	6a/B, 6b/B, 9/B, 19/B, 24b/B, 30/B,	B, B, B, B, 7836.05 /D, /D, /D, /D,	8155.85
	48/B, 54/B, 55/B, 56/B, 57/B, 58/B,		
	59/B, 60/B, 64/B, 68/B, 73/B, 74/B,		
	75/B, 76/B, 77/B, 78/B, 79/B, 80/B,		
	81/B, 82/B, 1/D, 2/D, 3a/D, 3b/D,		
	4/D, 6/D, 23/D, 26/D, 27/D, 28/D,		
	30/D, 31/D, 34/D, 35/D, 40/D, 41/D,		
	42/D, 44/D, 45/D, 46/D, 47/D, 48/D,		
	49/D, 50/D, 51/D, 54/D, 55/D, 56/D,		
	59/D, 60/D, 61/D, 62/D, 63/D		
Total		16163.36	17132.73

13.3.2 The following compartments have been allotted to this Working Circle:

13.4 Special Objectives of Management

- i. To rehabilitate the degraded areas by protecting the existing vegetation and undertaking various regeneration measures.
- ii. To control soil erosion in eroded and erosion vulnerable areas by means of effective soil conservation measures.
- iii. To protect and preserve the vegetation from further deterioration and degradation by protecting these areas till they become fit for working by parts in the future.

13.5 Analysis and Valuation of the Crop

- 13.5.1 The growing stock of the areas allotted to this Working Circle was assessed by plot sampling technique as already discussed in Chapter VIII.
- 13.5.2 The assessment of growing stock in this Working Circle has been made on the basis of data collected from 223 sample plots selected at random, located and surveyed in the field by the plot sampling technique.
- 13.5.3 The mean values of the two variables studied *viz.*, number of stems and volume have been computed and tabulated diameter-class wise and species-wise. The species-wise distribution of number of stems and volume in various diameter-classes per hectare as well as in the forested area over the entire Working Circle is

shown in Table 13.4. Statistical tests have been applied to the sampling datasets and the results of statistical analysis are shown in Table 13.3.

13.5.4 The average growing stock of this Working Circle works out to be 111 stems of Chir and broadleaved species per hectare, out of which, only around 6 stems per hectare belong to Chir and around 12 belong to Khair species, and the volume of the corresponding data is calculated as 57 cubic metre per hectare for the stems above 10 cm DBH.

Parameter	Number of stems	Volume
No of samples (n)	223	223
Mean (x)	111.21	56.81
Variance(S ²)	7677.36	2265.29
Std Deviation (S)	87.62	47.6
Std Error (SE)	5.87	3.19
Coefficient of Variation (%)	78.79	83.79
95% confidence lower limit	99.64	50.52
95% confidence upper limit	122.78	63.1
Confidence Interval (CI)	23.14	12.58
Lower limit as % of mean (%)	89.6	88.93

Table 13.3
Results of statistical analysis for Rehabilitation cum Protection Working Circle
Tree Count

Species
Chir
Khair
Kembal
Phulai
Other
TOTAL

Table 13.4 Statement Showing Species And Diameter Class (Cm) Wise Tree Count Of Rehabilitation-Cum-Protection Working Circle

Tree Count Over The Forested 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	4,364	11,638	31,195	28,286	10,829	6,465	1,455	647	0	0	94,879
Khair	1,13,790	68,856	7,920	647	0	0	0	0	0	0	191,213
Kembal	66,755	49,945	39,115	5,819	2,101	0	0	647	0	0	164,382
Phulai	1,55,815	65,947	13,092	3,556	647	0	0	0	0	0	239,057
Other	7,40,767	2,78,980	60,128	20,366	2,101	2,909	0	0	0	2,101	11,07,352
TOTAL	10,81,491	4,75,366	1,51,450	58,674	15,678	9,374	1,455	1,294	0	2,101	17,96,883

Number Of Stems Computed At Lower Confidence Interval In The Forested Area Of Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	3,910	10,428	27,951	25,344	9,703	5,793	1,304	580	0	0	85,013
Khair	1,01,956	61,695	7,096	580	0	0	0	0	0	0	1,71,327
Kembal	59,812	44,751	35,047	5,214	1,882	0	0	580	0	0	1,47,286
Phulai	1,39,610	59,089	11,730	3,186	580	0	0	0	0	0	2,14,195
Other	6,63,727	2,49,966	53,875	18,248	1,882	2,606	0	0	0	1,882	9,92,186
TOTAL	9,69,015	4,25,929	1,35,699	52,572	14,047	8,399	1,304	1,160	0	1,882	16,10,007

Volume (M	³) Per Hectar	·e		× ,							0
Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	0.03	0.09	0.93	1.98	1.49	1.43	0.44	0.28	0.00	0.00	6.67
Khair	1.34	1.70	0.34	0.05	0.00	0.00	0.00	0.00	0.00	0.00	3.43
Kembal	1.07	1.83	2.54	0.59	0.32	0.00	0.00	0.24	0.00	0.00	6.59
Phulai	2.70	2.61	0.96	0.43	0.13	0.00	0.00	0.00	0.00	0.00	6.83
Other	12.83	11.05	4.43	2.44	0.39	0.72	0.00	0.00	0.00	1.43	33.29
TOTAL	17.97	17.28	9.20	5.49	2.33	2.15	0.44	0.52	0.00	1.43	56.81
Volume Of	Stems Over T	The Forested A	Area Of The V	Vorking Circ	le						
Species	10-20	20-30	<u>30-40</u>	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	485	1,455	15,032	32,003	24,083	23,114	7,112	4,526	0	0	1,07,810
Khair	21,659	27,478	5,496	808	0	0	0	0	0	0	55,441
Kembal	17,295	29,579	41,055	9,536	5,172	0	0	3,879	0	0	1,06,516
Phulai	43,641	42,186	15,517	6,950	2,101	0	0	0	0	0	1,10,395
Other	2,07,376	1,78,605	71,604	39,439	6,304	11,638	0	0	0	23,114	5,38,080
TOTAL	2,90,456	2,79,303	1,48,704	88,736	37,660	34,752	7,112	8,405	0	23,114	9,18,242
Volume Of	Stems Compu	ited At Lower	Confidence	Interval In Th	he Forested A	rea Of Work	ing Circle		•		
Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Total
Chir	431	1,294	13,368	28,460	21,417	20,555	6,325	4,025	0	0	95,875
Khair	19,261	24,436	4,888	719	0	0	0	0	0	0	49,304
Kembal	15,380	26,305	36,510	8,480	4,599	0	0	3,450	0	0	94,724
Phulai	38,810	37,516	13,799	6,181	1,868	0	0	0	0	0	98,174
Other	1,84,419	1,58,833	63,677	35,073	5,606	10,350	0	0	0	20,555	4,78,513
TOTAL	2,58,301	2,48,384	1,32,242	78,913	33,490	30,905	6,325	7,475	0	20,555	8,16,590

 Table 11.5

 Statement Of Species And Diameter Class(Cm) Wise Volume (M³) Of Trees In Rehabilitation-Cum-Protection Working Circle

13.6 Exploitable Size

13.6.1 No regular fellings are prescribed in the area assigned to this Working Circle. However, only dry and fallen trees in these forests are to be removed leaving 10% of such dry and fallen trees in the forests for ecological considerations. There shall be strict control against illicit damage, encroachments, excessive grazing and forest fires.

13.7 Method of Treatment

- 13.7.1 In view of the data findings and the discussion above, in order to achieve the special objects of management, these forests require complete rest and strict protection from biotic interference, namely grazing, fire, illicit damage, encroachments and lopping. The following treatments are prescribed to be given to these forests:
- 13.7.2 Chir areas constitute 1,089 Ha of total area under this Working Circle. As already stated these areas are under various stages of degradation due to excessive biotic interference and frequent fires leading to failure of regeneration. The treatment proposed is closure of the area followed by artificial regeneration of Chir. Artificial regeneration of Chir by patch sowing is quite successful in the areas where soil is deep and moisture is sufficient. In areas where moisture content is low, seeds may be sown in contour lines 30 cm deep, 30 cm wide and 2 m apart with dug up soil heaped in mounds on the downhill side. In areas where moisture and soil conditions are unfavourable for patch sowing, trench planting of nursery raised plants is suggested. To develop proper ground cover, plantation and seed sowing of grasses, legumes and shrubs is suggested.
- 13.7.3 As already discussed, regeneration of Chir is highly susceptible to grazing and fire. All the possible measures to protect the regeneration, natural as well as artificial, should be adopted as suggested in the chapter on Working Plan of Chir Rehabilitation Working Circle. *In-situ* soil and moisture conservation measures like contour furrows, staggered trenches, terracing, bunding and mulching etc are also recommended. Minor engineering structures like check-dams, retaining walls etc. should be constructed wherever required. Gully control measures should be taken to control the gully erosion.
- 13.7.4 Broadleaf areas constitute about 52 % of the forests falling in this Working Circle. The principal broadleaved species are Khair, Kembal, Phulai, Sheesham, Amla, Ber etc. Intensive soil conservation measures including closure, planting and engineering works are necessary in areas where soil erosion is occurring. Minor engineering works for soil conservation and measures for gully control wherever necessary are suggested. Protection against lopping is very important in the Khair trees. Highly degraded areas may be planted with local broadleaved species.

13.7.5 As already stated 41 % of the total area of this Working Circle falls in scrub and blank areas. These are treeless areas and are scattered throughout the Division. These areas abound in various types of shrubs like *Carissa spinarum*, *Dodonaea* viscosa, Justicia adhatoda, Murraya koenigii etc. These are most difficult areas needing treatment on priority basis. These areas are prescribed to be treated under silvi-pastoral model where good quality grasses are to be raised along with local trees. Since these areas are prone to soil erosion, intensive soil and moisture conservation techniques have to be adopted. 30 cm deep continuous/ staggered V-shaped ditch cum bunds should be dug along the contour at 5 m spacing in which tree species shall be planted along with sowing of seeds of shrub species on bunds at 50 cm spacing. Grass seeds shall be sown in between continuous contour furrows 1 m apart. Grass species like Napier, Dinanath, Setaria, Stylosanthes hamata, Lucerne etc., should be planted. The forest area falling in this category is suggested to be developed as fodder bank for nomadic graziers. Minor engineering works for soil conservation are also suggested for these forest areas.

13.8 Nursery Techniques for Species of Sub-Tropical Zones

Various sub-tropical species like Chir, Shisham, Leucaenia etc are artificially regenerated in the above mentioned degraded areas. Some of the general recommendations for raising these plants in nurseries are given below.

13.8.1 Site Selection:

13.8.1.1 The site of the nursery should be as near the planting as possible. The areas of the nursery should be about 0.4 ha for every 1,00,000 seedlings. The site should have a reliable water supply of 200 litres per day for every 1,000 plants. The water should have pH between 5.5 to 7.5 and salt less than 400 ppm. The soil should be well drained and fertile. Loam to sandy loam texture with good structure is preferred.

13.8.2 Preparation of Beds:

- 13.8.2.1 There are four types of beds namely seed flats, containers, housing beds and transplanting beds generally used in preparing beds in nurseries. Seed flats used for germinating seeds can be made of earthen pots, shallow wooden boxes, plastic trays or bamboo baskets of portable size. The growing medium should be disinfected quartz sand or sandy loam soil.
- 13.8.2.2 Polythene containers are either open at both ends called sleeves or closed at one end called bags. They should be transparent. The size of the container varies depending upon the species to be raised in them and the period for which the seedlings shall be growing in them.
- 13.8.2.3 Housing beds are sunk by removing top soil to house polythene containers. The depth should be equal to the length of the container. The floor of the container

should be provided with a black polythene sheet of 300-500 gauge to keep seedling roots from penetrating mother bed earth. The size of the bed is usually $10 \text{ m} \times 1.2 \text{ m}$.

13.8.2.4 The transplanting beds are of 10 m x 1.2 m size raised or sunk by 10-20 cm. The bigger particles are removed and the soil is dug out and pulverized. One part of compost or dry cow dung manure to four parts of soil and 100 gms of 5% Aldex are thoroughly mixed with the sieved soil and put back in the dugout space, raised or sunken as the case may be. The number of beds required is approximately one bed of 12 m x 1.2 m for 2,000 seedlings. The seed flat area required is 6% of the transplanting or housing bed areas.

13.8.3 Seeds:

13.8.3.1 The selection of the tree for seed collection should be done with care. Middle aged, vigorously growing trees free from knots are usually selected for collection of seeds. Seeds should be used as quickly as possible after collection. If they are stored, they should be sun-dried, put in gunny bags or perforated plastic bags and kept on wooden platforms in well aerated huts. Before storing, seeds should be mixed with prophylactics like gamaxene or neem leaves. The treatment should be given to seeds as and when required. Seeds should be sown in seed flats or in germinating beds if they are of small size. They can be sown directly in containers if they are of bigger size. In each pot a maximum of 2 or 3 seeds can be sown.

13.8.4 Pricking Out:

13.8.4.1 Pricking out should be done when the cotyledons have dropped off or at least two leaves have formed and the seedlings stem have reasonable strength to withstand transplanting. This takes about 3 to 4 weeks after germination. The seedlings should be held with thumb and the forefingers by the leaves or just below the first pair of leaves and pulled up softly. This operation should be carried out on a humid day during rains or in the evenings. The distance between transplants varies with the species. It should be 6 cm x 6 cm if the seedling is retained in the transplant bed for six to eight months.

13.8.5 Nursing:

13.8.5.1 Watering should be just adequate so that the soil reaches field capacity. The frequency of watering is about twice a day initially followed up by once a day and finally once in four days. This varies depending upon the climate and weather of the locality. The quantity of the water should be calculated at the rate of 200 cc per plant for each watering. The water should have low salinity and low sodium. Weeding in each bed should be done at least once in 15 days. Good hygiene should be maintained to avoid pest attack. If an attack does take place, fungicides and insecticides should be used as per the requirement.

Mulching should be carried one day after watering as it reduces rate of watering and boosts growth.

13.8.6 Fertilization:

13.8.6.1 Fertilization should be done as a foliar spray at a regular interval in appropriate quantities. It should be stopped during the last two months of the nursery life of seedlings to make them hardy and to allow lignification of the stem. Inoculation of rhizobium and mycorrhizae is necessary to maintain and improve the health and growth of seedlings of some species.

13.8.7 Planting Out:

13.8.7.1 The collar size of the seedling should be sufficient to keep the plant erect and the fibrous root system should be well developed in the seedling. The size of the seedling for planting out varies depending upon the suitability for transportation and its vulnerability to damage during transportation. It also depends upon the locality and presence of weeds in plantation area. The size may vary from 25 cm to 45 cm depending upon above mentioned factors. To reduce the mortality in naked root planting, the seedlings should be hardened before lifting them. Hardening consists of root trimming at intervals, gradual reduction of watering for the last two months of the seedling life in the nursery and shoot and /or side branch pruning, keeping one third of the crown intact. Seedlings are transported in containers which are removed before planting except those plants for which naked root planting is possible. While still in the nursery, the containers should be shifted every fortnight to keep the roots away from penetrating the mother bed earth.

13.9 Annual Treatment

- 13.9.1 As already stated, 17,132 ha, i.e., 36 % area of the Division falls in this Working Circle and hence it requires to be developed with sincere focus. Kathua Forest Division, Social Forestry Division Kathua, Agrostology wing and Directorate of Soil Conservation should be involved in the development of these degraded forests.
- 13.9.2 Keeping in view the distribution of these forests among Chir, broadleaved, scrub and other areas, an annual target of 1,000 ha is fixed for development. The areas falling under scrub require rehabilitation through development activities otherwise these run the risk of being overrun with weeds and shrubs. Annually, 500 ha from this category should be treated with artificial regeneration through nursery techniques as mentioned above along with intensive soil conservation measures. 100 ha of the degraded Chir shall also be rehabilitated per year to achieve full treatment by the end of the plan period. The broadleaved areas required to be developed are around 400 ha annually. The blanks are generally found in the exposed areas of rocky substratum and sandstone hills. Generally

these areas can be left to rest to let natural vegetation take over. However, further spread of these blanks needs to be strictly checked and planted over.

- 13.9.3 The development programme should be prepared by territorial DFO in advance in consultation with DFO Social Forestry and representatives of other wings involved in the forestry development, so that targets and methods to achieve them are clearly laid down well in time. All such agencies should work in coordination to achieve best results.
- 13.9.4 Development should be taken up on watershed basis. Micro watershed should be the unit of development. Various water sheds falling in the area can be identified and development of these watersheds can be prioritised on the basis of degree of degradation. Project formulation wing of the department should be ascribed to formulate Integrated Watershed Development Project for this tract.

CHAPTER-XIV

Working Plan For Grassland Development (Overlapping) Working Circle

14.1. General Constitution of Working Circle and Character of Vegetation.

- 14.1.1 This Working Circle overlaps all other working circles of this plan. A large area of the Division is under scrub vegetation. In the forested areas like those under Chir, the under storey is rich in shrubs and grasses which can be used for browsing and grazing purposes. The Shiwalik Chir pine (9/C1a of Revised Champion and Seth Classification) has been differentiated into six sub-types based on associations occurring with Chir, of which the following five can be observed in this Division:
 - Chir-Carissa-grass with Terminalia chebula, Lannea etc
 - Chir-Carissa-Indigofera-grass with abundant pine regeneration
 - Chir-Acacia-grass with Mallotus, Lannea etc.
 - Chir-Wendlandia-Dodonaea-Carissa
 - Chir-Carissa-Flacourtia-grass
- 14.1.2 Extending from the Shiwalik Chir pine forests (9/C1a) into mixed deciduous forests (5B/C2), Dry Bamboo brake (5/E9) and to Deciduous scrubs (5B/DS1, 10/C1/DS1), the overwood has suffered natural seral succession stages or large-scale interference from humans to currently present open shrub formations occupying the ground. Edaphic, climatic and biotic factors together determine the dominant species which may vary from site to site owing to persistence by the predominant ones.
- 14.1.3 In mixed deciduous forests and scrub areas, *Carissa spinarum*, *Dodonaea viscosa*, Woodfordia fruticosa and Justicia adhatoda occur with Bauhinia vahlii. The associated grasses include Cenchrus ciliaris, Chrysopogon fulvus, Eulaliopsis binata, Heteropogon contortus and Themeda anathera.
- 14.1.4 The range wise distribution of scrub and blank areas is shown in Table 14.1.

Range wise	e statement o	of scrub and	blank areas in Kathua I	Forest Division
RANGE	Scrub	Blank	Total (Scrub and Blank)	Total area of range
Kathua	1,682	482	2,164	14,807
Jasrota	6,685	835	7,520	13,368
Samba	3,910	779	4,689	16,946
Total	12,277	2,096	14,373	45,121

 Table 14.1

 Range wise statement of scrub and blank areas in Kathua Forest Division

14.1.5 The data presented above indicates that the maximum scrub area (6,685 Ha) is present in Jasrota range which along with blank area of the range counts for

56.25 % of the range. The scrubs and blank areas together constitute 4.8 % area of the Division in Kathua range, 16.7 % in Jasrota range and 10.4 % area of the entire Division in Samba range.

14.2. Problem of Grazing

- 14.2.1 A large number of families of Gujjars and Bakerwals migrate to the Kathua Forest Division along with their livestock during the winter months. The data regarding the exact number of livestock grazing locally or moving in and out during migrations is not known with certainty. The Range-wise distribution of area allotted to nomadic graziers is given in Table 14.2. The information obtained from the Sheep and Animal Husbandry Department is shown in Tables 14.3 and 14.4.
- 14.2.2 Even though it was pointed out in the previous plan, the unhealthy practice of allotting forest compartments for grazing purposes by name to nomadic graziers has not abated. According to the records of Divisional Office, 1,691 hectares of forest area in 35 compartments is allotted for grazing purposes to around 77 Bakerwal families and the number of committed animals is 23,908 including 14,155 sheep and 9,753 goats.

Range	Number of Compartments	Area (Ha)
Kathua	5	319
Jasrota	15	692
Samba	12	520
Total	32	1,531

Table 4.2

R

Table 4.3

District wise number of exotic/Crossbred and Indigenous Sheep in Kathua and Samba districts

District	Exotic/Crossbred Sheep		Indigeno	us Sheep	Total Sheep		
	Male	Female	Male	Female	Male	Female	
Kathua	14,0661	81,300	22,503	61,930	1,63,164	1,43,230	
Samba	9396	23,883	2,929	6,936	12,325	30,819	
Total	15,0057	1,05,183	25,432	68,866	1,75,489	1,74,049	

Table 4.4

District wise number of goats in Kathua and Samba districts

District	Goat pop	Total	
	Male	Female	
Kathua	51,535	1,61,208	2,12,743
Samba	21,451	61,029	82,480
Total	72,986	2,22,237	2,95,223

14.2.3 These numbers show the tremendous numbers of livestock being reared in the areas around the forests and are an indication of the pressures these forest areas face. The nomadic of grazers are using forest land for establishment of semipermanent/permanent Behaks. The grazing is not restricted to allotted area but spreads all over the Division excluding some closures. Almost all the trees are severely lopped during the winter affecting production of seeds. The overgrazing, browsing and trampling by sheep and goats usually destroy all vegetation and also erodes the soil, besides leading to compaction of soil which discourages seeding and growth of grasses. The actual number of livestock of graziers and locals grazing and browsing in the forests is several times more than the recorded number. It can be said that the grazing, browsing and lopping on ground is uncontrolled and unmanaged. The demands of local and nomadic communities regarding fodder and fuel wood has not been addressed by the Department in a systematic way which would regulate the grazing as per the carrying capacity of the forests so that grazing could be managed sustainably for a long time in the future. The areas of these forests require some respite from grazing at least for some period.

14.3 Special Objectives of Management

- 1. To improve the grazing potential of forest land allotted for grazing purposes.
- 2. To reduce the grazing pressuring on forest land.
- 3. To meet the fodder requirements of local and nomadic livestock.

Grazing management, unlike other aspects of forest management requires complete involvement and cooperation of nomadic grazers and local land lords.

14.4 Method of Treatment

- 14.4.1 In most of the areas being allotted for Bakerwals, the grazing is not restricted to allotted area as there is no demarcation on ground for verification, nor is grazing regulated as strictly. The Bakerwals stay in huts or Behaks in a small portion of allotted area. In Kathua and Jasrota Ranges the Bamboo belt is adjoining the villages and is nearer to National Highway. For their socio-economic interaction and marketing requirements nomadic grazers prefer to stay in this areas, but the pressure of their livestock along with that of local population has changed the entire character of these forests to a degraded scrub infested with unproductive weeds.
- 14.4.2 The nomadic grazers may be allowed to stay in this area but grazing should be avoided in bamboo rehabilitation area at least for 5 years. The alternative measures during this period have already been suggested under Bamboo Rehabilitation Working Circle.
- 14.4.3 For improved productivity of the forests as far as the provision of grass and fodder are concerned, effective range management is the only solution. Unregulated and excessive grazing are pressing issues in the forests of this Division. The strategies e suggested for solving grazing based problems in forests are discussed in the succeeding sections.

14.5 Range Improvement

14.5.1 Closing areas for 1 to 5 years

The area allotted for grazing needs closing for grazing in order to help natural and artificial regeneration of palatable grasses, legumes and shrubs. Angle iron and barbed wire fencing is most effective and cheapest in the long run. The cooperation of nomadic people and local land lords is also necessary for social fencing.

14.5.2 Weed Control

Due to heavy grazing the percentage of palatable species per unit area has decreased and in blanks and degraded areas, weeds have occupied the land. Mainly *Lantana camara* and *Parthenium hysterophorus* are seen in lower region of the hills.

In closed areas, at the beginning of monsoon and immediately after end of rainy season (that is in June and in September) these obnoxious weeds should be manually removed by root stock cutting or uprooting and burning methods. Some simple mechanical equipments like *Lantana* lifter are also available which can uproot the *Lantana* bushes. The removal should be completed before flowering takes place. *Lantana* and *Parthenium* are strong light demanders. The cannot come up under closed/dense canopy and in areas occupied by other species. This factor should be utilized to suppress them.

14.5.3 Planting of Legumes, Grasses and top feed trees:

- i) Legumes: The legumes provide nutritious fodder and also improve fertility of soil by nitrogen fixation. Also, while grasses are no longer available for grazing by September-October the legumes remain available for longer periods. Some recommended legumes are *Cajanus scarabaeoides*, *Clitoria ternatea*, *Lablab purpureus*, *Rhynchosia minima*, *Pueraria montana* (Kudza), *Alysicarpus vaginalis*, *Sesbania sesban*, *Stylosanthes humilis* and *Vigna trilobata*. During Kharif season, *Vigna radiata* (moong) *Vigna aconitifolia* (Moth) and *Cyamopsis tetragonoloba* (guar) which can be grown along with grasses.
- ii) Grasses: All the grazing lands in Kathua are poor in quality and occur in degraded areas with poor fertility, sandy or rocky substratum and eroded land and therefore the planting and restocking of forest areas with grasses is necessary. The following grasses are recommended for planting/sowing:

Dichanthium annulatum, Chrysopogon fulvus, Cenchrus cilaris, Cenchrus setigerus and Panicum antidotale.

Planting Methods: At the onset of monsoon rains the seeds of selected species are sown in furrow (in strips of loosened soil) 75 cm apart on

contours. The depth of sowing should be 1 to 2.5 cm only. Three weedings are necessary from July to October.

Contour furrows at 10-15 cm vertical interval or 5 cm horizontal interval help to conserve rain water. Sod planting of grasses in these furrows (50 cm intra row spacing) gives good results.

iii) Planting of Shrubs and Fodder Trees: The shrubs and fodder trees form the most important component in management of rangeland for grazing as most of the animals of nomadic people are sheep and goats, which browse the shrubs. Shrubs and trees provide fodder throughout the year and are less affected by drought conditions than grasses.

The root stocks and stunted shrubs and trees are present in large number in these areas. These should be treated first to regain their vigor. Such stumps should to dressed and all weeds nearby should be removed up to a radius of 30 cm and soil working should be done. The broken and malformed branches should be cut neatly. These operations should be performed in the beginning of monsoon season (June) and at the end of September.

In blank areas and in places where density of naturally available stumps/root stocks are less the artificial panting and sowing should be done. The list of trees and shrubs recommended as shown in Table 14.5.

14.6 Establishment of Short Rotation Fodder Closures:

Short rotation fodder plantations which can be opened for grazing within 3 years of planting should be established in land allotted for grazing and in community grazing lands.

The following are the species recommended for such plantations:

Top Feeds: Acacia nilotica, Acacia catechu, Acacia tortillis, Alibizia lebbeck; Melia azaderach, Grewia optiva, Bauhinia purpurea, Dalbergia sissoo, Parkinsonia aculeata, Ziziphus jujuba, Morus alba, Cassia fistula, Calliandra calothyrsus.

Legumes: The list has been provided in previous pages. **Grasses:** The species have been mentioned in previous pages. **Shrubs:** *Carissa spinarum* (Garna), Ziziphus species etc.

14.7 Cultural Operations

14.7.1 As the main objective is to obtain sustainable fodder within a short period, the tree species should be cut at 2.5 to 3 feet height at the end of 2nd or 3rd monsoon season. In most of the above species the secondary branches will grow. These branches bear abundant leaves and give a bushy look to the trees. This operation is critical and should be done with care so as not to kill the plant. 1 or 2 small branches should be present at the level of cut.

14.7.2 Coppice Farming: The technology involves intensive management of compact blocks of trees that grow fast and coppice after harvesting. The ability to grow from cut stumps makes them versatile. The trees that are most suitable are *Leucaena leucocephala*, Mulberry, *Albizia lebbeck* and *Calliandra calothyrsus*.

14.8 Range Management

14.8.1 The closure should be opened for grazing at the end of third or fourth monsoon season depending on growth obtained. In case of bushes and grasses, grazing can be direct. In case of trees the secondary and tertiary branches should be lopped. But at least 4 top branches including leader shoot should be left untouched. It is better if a cut and carry system is adopted, instead of bringing the livestock inside the closure. In case of Bamboo the culms should not be cut but leaves should be stripped from the culms.

14.9 Rotational Grazing:

- 14.9.1 The area allotted to each Bakerwal/Gujjar should be divided into 2 to 3 blocks and each block should be closed for grazing for at least 2 years.
- 14.9.2 In Bamboo rehabilitation area once the Bamboo planting begins, grazing should be stopped for 5 years. However cut and carry system can be allowed. The Bakerwals and Gujjars should be involved in Bamboo rehabilitation work. During the period supplementary fodder or financial incentives should be provided to them. But the long term objective should be to eliminate grazing completely from Bamboo area.
- 14.9.3 The lopping of trees should be restricted to 2/3rd height from the base. The branches with thickness more than a thumb should not be lopped.

14.10 Soil and Water Conservation

- 14.10.1 In closed areas (and in other parts of this working circle also) soil and water conservation measures should be adopted. This should be done on micro watershed basis. The main function of the watershed is to receive the incoming precipitation and then dispose it off. This is the essence of soil and water conservation. Water conservation technology conserves both the water and soil. The technology attempts to convert surface flow (run off) into sub-surface flow (deep percolation) and reduces the velocity and volume of water going outside the watershed.
- 14.10.2 The engineering based soil conservation technology aimed at safe disposal of run-off water and control of soil erosion is found to be inappropriate under semiarid tropics climate mainly due to high cost and short life under adverse weather conditions. Therefore, for water and soil conservation in forest land, low cost vegetative and local material based techniques should be used. The main

principle is to conserve and augment moisture by adopting in-situ measures and near-site water harvesting and reuse systems.

- 14.10.3 The chief objectives of watershed management in forest area are:-
 - 1. Conserving soil and water.
 - 2. Improving the ability of land to hold water (To improve water table level)
 - 3. Rain water harvesting and recharging.
 - 4. To increase biomass and forest productivity.
- 14.10.4 The entire area of Kathua Forest Division is broken by numerous nallahs. These nallahs/Khads from boundaries between the compartments and within each compartment many gullies and rills commonly occur. The slope in most of the compartments is steep. Therefore the control of gullies is a major challenge. The following are the practical measures feasible in this kandi area:

1. Treatment of sloping lands:

- a) Vegetative filter strips.
- b) Contour vegetative hedges (upto 4% slope)
- c) Contour vegetative hedges supported by trenches/ridges and furrows
 (4% to 8% slope)

2. Treatment of drainage lines:

- (i) Treatment of upper reaches
 - a) Live check dams.
 - b) Brush wood dams.
 - c) Loose boulder check dams with vegetative support.
 - d) Small dug out/sunken ponds to promote moisture regime.
- (ii) Treatment of middle reaches
 - a) Earthen structures with vegetative support pitching using local material.
 - b) Loose boulder structures with vegetative support.
 - c) Dug out ponds with vegetative inlet and outlet for run off management.
- (iii) Treatment of lower reaches

Limited number of dug-out sunken structures for run off management with vegetative inlet and outlet with minimum structural support.

3. Treatment of Gullies in Ravine Lands:

In many of the forest areas especially in Samba and Jasrota Ranges, ravine land is encountered which is extremely difficult to traverse. The reclamation of such areas involves following steps:

a) Retention of runoff in the catchment area. This can be achieved by construction of contour and peripheral bunds.

b) Diversion Channels: These are made to divert the run off coming to the gully head and to dispose off the excess run off at a non-erosive velocity.

c) Stabilisation of gully heads and side slopes. Gully heads are filled with earth and stabilised by growth of grasses. The suitable grasses are *Eulaliopsis binata* and *Saccharum munja*.

d) Gully Bed Treatment: The description is given under drainage line treatment. Plants species recommended for ravine land are:

(i) **Tree species:** *Acacia arabica, Acacia catechu, Dalbergia sissoo, Dendrocalamus strictus, Morus alba, Azadirachta indica, Albizia* **spp. etc.**

(ii) Grasses: *Dichanthium annulatum, Panicum repens, Pennisetum* spp. etc.

4. Plantation Techniques:

In areas with slope below 30% staggered contour trenches of 1.5-6m x 60cm x 45 cm spaced at 3.6m interval are dug in lines. The dug up earth is heaped on the downhill side of the trench. The spacing along the slope varies from 0 m to 4.5 m. Every fifth row is a continuous trench 60 cm wide and 45 cm deep with 30 cm to 60 cm septa at every 3 m interval. The dug up earth is heaped on the downhill side in trapezoidal fashion with 105 cm bottom, 80 cm top and 45 cm height. Grasses are planted on these ridges.

5. Special Engineering Structures for Gully Control

The check dams are recommended to control the velocity of running water along the gullies. Among various types of check dams the rough stone dry packed dams and loose rock dams are suitable for these areas. Abundant amounts of stones are available in gully and nallah beds. These check dams are comparatively less costlier than other structures.

a) Stone Check Dam:

This is constructed in the form of an arch, with the convex side facing the current. The curve to be given to the check dam is drawn by measuring the span and then stretching the tape with double the length of span so as to keep the two ends of the tape at the ends of the span and the centre of this length equidistant from them. Then an arc is drawn by one of the ends of the tape with the middle of the tape as centre. When this has been marked out, the foundation is dug around 1 foot deep and 1 foot wide. The foundation for the wing walls is dug so that they make an angle of 30° with the bank. The foundation of the apron is also dug to about 6 inches. After digging the foundation, the stones are laid in layers, with bigger stones at the bottom. After filling the foundation and laying stones in the first layer, a step of 6 inches is left on the downstream side. In successive layers, steps are left so that top width is gradually reduced. After reaching a height of 2 feet above bed level, a notch is left in the middle. The wing walls and the end portions of the check dam are built to a height which will give the required notch depth. The apron is built of stones on edges. At the back of check dam the dug up

earth, brush wood and stone are piled up to the notch level with a slope 1:1 towards the upstream.

b) Gabion Structures for Soil Conservation

Gabions are large wire mesh boxes of different sizes, rectangular in shape and filled with small clean rocks. They are cheaper in comparison with masonry or concrete structures. Gabion boxes are made out of galvanized iron wire preferably with No. 8 gauge but not less than No. 10 gauge. Hexagonal triple twisted mesh ranging in size from 7.5 cm to 1.5 cm are commonly used. For every 10 meters of finished wire mesh, 13 meters of wire length are required. Diaphragms are used at an interval of about one meter.

14.11 Other measures

- 1) The Social Forestry wing can establish short rotation fodder closures in community lands.
- 2) The farmers should be encouraged to grow multipurpose tree species in their farm land.
- 3) The grazing should be allowed only for committed number of animals (which is around 25000 only)
- 4) The grazing fee collection and other regulations should be implemented strictly on ground.

S. No.	Scientific Name	Common Name
1	Acacia catechu	Khair
2	Acacia nilotica	Kikkar
3	Albizia lebbeck	Siris
4	Albizia procera	Safed siris
5	Anogeissus pendula	Dhau
6	Dalbergia sissoo	Taali/Sissoo
7	Grewia optiva	Dhaman
8	Ficus carica	Anjeer
9	Leucaena leucocephala	Leucaena
10	Carissa spinarum	Garna
11	Dendrocalamus strictus	Baans
12	Syzygium cumini	Jamun
13	Ziziphus jujuba	Ber
14	Bauhinia variegata	Kral
15	Senna siamea	Amaltas
16	Melia azaderach	Mahaneem
17	Celtis australis	Kharak
18	Ficus racemosa	Goolar
19	Toona ciliata	Toon
20	Morus alba	Toot

Table 14.5

Fodder trees recommended for planting in Kathua Forest Division

CHAPTER-XV

Working Plan For Plantation (Overlapping) Working Circle

15.1. General Constitution and Character of Vegetation

15.1.1 This is an overlapping working circle and comprises of blank and degraded forest areas falling in the vicinity of human settlements. Due to excessive biotic pressure these areas have degraded and are now occupied with sparse scrubby vegetation. Broadleaved trees have become stunted and bushy in such areas because of reckless lopping and browsing and regeneration is almost absent. Plantation work is a part of artificial regeneration and has been recommended in Chir, Bamboo, Broadleaf and Rehabilitation-cum-Protection Working Circles. In all these cases plantation is an integral part of total rehabilitation process and many other natural regeneration measures and human intervention are associated with it.

15.2. Special Objects of Management

- 15.2.1 Plantation Working Circle has been constituted in view of the following special objectives:
 - i) To meet the local demand of fuel, fodder and small timber.
 - ii) To reduce the pressure on natural forests by erecting buffer zones between villages and natural forests.
 - iii) To improve site quality and soil conditions of the degraded area.
 - iv) To increase the green cover around the habitations.

15.3. Method of Treatment

- 15.3.1 A mixture of multi-use, local and fast growing species is prescribed to be planted in order to meet the objectives mentioned above. For Shiwalik Chir pine areas, Chir, Khair, Amaltash, Lannea, Amla, Pansar, Sissoo etc. are suitable species as these are natural associates of Chir. Similarly for sub-tropical mixed deciduous forest areas, Khair, Sissoo, Semal, Bamboo, Phulai, and Bauhinia etc. can be grown to meet the requirements.
- 15.3.2 Plantation activities in areas around habitations cannot be successful if the cooperation of local people is not assured. Vegetative fencing like planting of multi-use and non-grazable species e.g. Agave or *Euphorbia* spp. can be resorted to. Social fencing i.e., obtaining the co-operation of local people in the protection and upkeep of plantations should be the backbone of protection work wherever possible.
- 15.3.3 In this context, the Social Forestry Division of Kathua should be involved in execution of works like raising plantations near habitations. The two major components of Social Forestry sector, i.e., RDF (Rehabilitation of degraded

forests) and VWL (Village Wood Lots) can contribute to the works undertaken in this working circle. DFO Social Forestry should formulate the annual plan in consultation with DFO Territorial so that there is proper distribution of work in priority areas.

15.4. Choice of Species

- 15.4.1 Suitable species for plantations have been mentioned in already. Besides these, local species like *Toona ciliata, Olea europaea* subsp. *cuspidata, Grewia optiva, Mangifera indica,* Eucalyptus species etc. can also be grown.
- 15.4.2 Since the objective is to meet the local demand of fuel, fodder, small timber and to create the buffer zones between habitations and natural forests, the involvement of local people becomes imperative, hence the final choice of species to be planted should be that of local people as per their demand as far as areas on the fringe of villages is concerned.

15.5. Nurseries and Nursery Techniques

15.5.1 There are only three nurseries operational in Kathua Forest Division as per data received from the Divisional Office. While centralization of nurseries is required for quality control, for local requirements, smaller nurseries are essential near the sites of plantation. Nursery techniques for various species are already discussed in earlier chapters. For other species recommended, any book on silviculture can be referred for nursery and plantation techniques.

15.6. Annual Treatment

15.6.1 Over the next ten years, the area to be brought under plantation in each Working Circle is given in the following Table:

Working Circle	Area to be planted over ten years	Area to be planted over next twenty years
Chir Rehabilitation WC	1,615 Ha	3,230 Ha
Broadleaf Improvement WC	968 Ha	1,936 Ha
Bamboo Rehabilitation WC	245 Ha	431 Ha
Rehabilitation-cum-Protection WC	1,713 Ha	3,426 Ha

 Table 15.1

 Area to be taken up for plantation in each Working Circle

15.6.2 The figures mentioned in the above table are indicative in nature as far as the time period of treatment is concerned. The amount of area treated in ten or twenty years may be modified at the field level as deemed necessary by the DFO but the total quantum of land treated shall not be less than that given above. An equal area as mentioned above for plantation by artificial regeneration shall be

taken up for assisted natural regeneration as well in each Working Circle. The annual treatment plan involving quantum of work per range and particular areas to be taken up for plantation shall be at the discretion of territorial DFO who will formulate the plan in consultation with DFO Social Forestry Kathua and local village forest committees. However the success of treatment plan shall depend on availability of sufficient funds and desired co-operation of the local people.

15.6.2 Some of the areas prescribed to be taken up on priority basis are the forest and adjoining areas in compartments 18a, 19, 24, 25, 27, 31 and 32 of Kathua range, compartments 26a, 26c, 26d, 46 – 51, 81, 82, 83, 30 – 35, 54 – 62 of Jasrota range and compartments 60/D, 61/D, 62/D, 23/D, 29/D, 30/D, 31/D, 75/B, 76/B, 19/B, 21/B, 22/B, 23/B, 24a/B, 42/B, 44/B, 53/B, 59/B and 61/B of Samba range.

15.7 Method Of Treatment In Forest Area

15.7.1 The species recommended for plantations in forest area should essentially be of several uses. Species for furniture and joinery purposes, for fuelwood, fruit trees, small timber and fodder should be planted depending on local requirements and demand.

15.7.2 Soil and Water Conservation

In the forest area allotted for plantation, the soil and water conservation measures are of utmost importance. Water harvesting structures like ponds and tanks should be used to store water. The entire areas should be managed on watershed principles. The detailed management practices for soil and water conservation are given in Chapter XIV.

15.7.3 Preparation of Site for Plantations

The selected area for plantation should be cleared off all weeds, bushes and shrubs by cut and burn method by middle of June.

Only the valuable species like Sissoo, Khair, Lannea, Phulai, Ficus, Mango, Dhaman, Jamun and other well established trees should be retained. All remaining vegetation should be clear felled and either removed or burnt.

The fencing and planting operations should be done at the beginning of monsoons.

15.7.4 Seed Material

The seeds should be of genetically superior quality. The seeds should be obtained from authentic sources. The seeds can also be collected locally from phenotypically superior trees identified within the state.

15.7.5 Nursery Technology

The standard nursery practices should be followed for each species.

15.7.6 Method of planting, spacing etc.

The plantations can be of either mixed or pure type. If mixed plantations are done, the silvicultural characteristics and growth rates of species used in the mixture should be kept in mind, mainly vertical mixture and horizontal mixtures are followed. In case of vertical mixture (e.g Khair-Sissoo, Semal-Ailanthus), the species should have equal growth rate and both will be at the same canopy height. In case of horizontal mixture the top canopy is occupied by main species and the accessory species is in the middle canopy (e.g Sissoo, Mulberry).

Trench planting methods can be followed. While selecting any method the soil and water conservation should be the objectives and slope of the site also plays a role. As far as possible the planting should be systematic that is either in rows or in squares.

The spacing depends on the species selected and objective of plantation. In case of fuel wood plantations close spacing is desired while if the objective is to obtain timber the under (standard) spacing should be adopted.

15.7.7 Weeding and Cleaning

At least 2 to 3 weedings are must in the first year of planting as this belt has high potential for growth of weeds. The first weeding should be done one month after planting. If sowing is done the first weeding should be after 15 days of sowing. The second weeding is done at the end of two months from the date of planting. The third weeding (and clearing of shrubs) should be done after monsoon period, *i.e.*, in October.

15.7.8 Irrigation

In Kandi area the moisture retention capacity of soil is very less and during summer months, heavy mortality of seedlings can take place. Wherever possible, watering done even in small quantities during first two years produces excellent results. Therefore, during May and June months small quantity of water should be given to the plants during first two years.

15.7.9 Works in Subsequent Years

In the second year the gap filling should be done to replace dead plants. Two weedings (one at the end of monsoon period) and strict protection from grazing and fire is necessary.

15.7.10 Protection

The plantations should be protected from grazing up to ten years. Thereafter also no lopping should be allowed. Fire protection is also necessary.

15.7.11 Tending

The following tending operations are recommended.

- 1. **Pruning:** In order to produce knot free quality timber, the branches should be removed from the major portion of the stem in the initial years. The branches are cut flush with the stem without leaving splinters of branch wood and without damaging the bark. The pruning of lower branches in early stage helps the seedlings to gain height.
- 2. **Thinning:** The thinning in plantations should be decided by the DFO once the plantation is established. In case of plantations established by planting with proper spacing, thinning is recommended during the first 10 years.

15.7.12 Maintenance of Plantation Records

The plantation work in forest areas should be done under the control of single agency for consolidation of work and visible impact. But at present the work is being done by various independent agencies like Territorial Division, Social Forestry Division, MFP Project, Thein Dam Project, Soil Conservation Wing, Eco-Task Force Project etc., without any co-ordination. In most of these cases the sites are selected on their own wishes and conveniences without reference to working plan guidelines. As a result at present the work is scattered and there is no visible impact. Energy and resources are wasted and under-utilized.

In this working plan it is suggested that all agencies should carry out plantations work according to guidelines and in recommended compartments/areas only. The following system is recommended for maintenance of identification of plantation by each agency.

(1) **Plantation Code:-** The plantation or closure should be given a code name which contain following details:

a. Year of Plantation	:	2017
b. Compartment number	:	45
c. Range	:	Jasrota
d. Area of Plantation	:	25 hectare
e. Scheme	:	RDF
f. Plan	:	State
g. Serial number of plantation in that year	:	4
h. Principal species	:	Sissoo

Now this plantation is represented as JCO-45; 17-4/25/RDF-S/Sissoo. The plantation should be indicated on the plantation map (which should be maintained by each planting agency)

- (2) Plantation Journal:- The standard Plantation Journal should be maintained by the Territorial Division and all other sister wings of Forest Department which carry out plantation in forest area.
- (3) Plantation Map:- In addition to plantation journal plantation map should be maintained. This is a copy of Divisional map and on this the plantations carried out each year should be marked. The plantations code should be indicated and attached to the map this will help in tracing the plantation of any agency on the ground for future monitoring.

CHAPTER - XVI

Non-Timber Forest Products (Overlapping) Working Circle

16.1 Introduction

- 16.1.1 The Non-Wood (Timber) Forest Products (NWFP or NTFP) are important elements of modern day practice of forestry. Although the threat of climate change and the advent of synthetic products had caused a drastic reduction in the use of wood for manufacturing industry, it had not led to any reduction on the pressures on forest trees and forest land. Now, as slowly the use of wood shall pick up again, the NTFP shall be a major source of revenue for Forest Departments and the people dependent on forests as well.
- 16.1.2 The planting of multipurpose tree species, shrubs and grasses in fragile ecosystems is desirable as NWFP can be extracted without cutting down the trees. This also helps in maintaining vegetation cover in ecologically sensitive areas (like Kathua Forest Division) to mitigate the ill effects of climate change and unplanned urbanisation. NWFPs also have the advantage of being cultivable in private and agricultural lands.

16.2 General Constitution of Working Circle

A large number of plants yield NWFP and are widely distributed all over the Division. Therefore an overlapping working circle has been constituted covering the entire forest division.

16.3 NTFPs in Kathua Forest Division

The following NWFPs are important in Kathua FD:

- a. Resin
- b. Bamboo
- c. Katha
- d. Medicinal Plants.
- e. Other uses like fruit plants, fiber, fuelwood, fodder etc.
- 16.3.1 An independent working circle has been constituted for Bamboo and Khair has been given special mention in Broadleaf Improvement Working Circle, therefore these are not dealt with again in this working circle. The intention of constitution of this working circle is to inventorise the NWFP yielding species of Kathua Forest Division and to provide general guidelines for their conservation, development and sustainable exploitation.

16.4 Resin

The Resin obtained from Chir pine is an important MFP of Kathua Forest Division which has given substantial amount of Revenue in the past. All the compartments

allotted to Chir Improvement Working Circle were also taken up for Resin Tapping.

16.4.1 General Character of Vegetation

- 16.4.1.1 The general characteristics of Chir crop and information about growing stock of Chir are given in detail in the Chir Improvement Working Circle.
- 16.4.1.2 According to the available records the resin tapping in Chir Forests of Kathua started somewhere in 1970s and continued up to 1992-93 and at present the crop is under rest.
- 16.4.1.3 Initially the royalty contract system was adopted for Resin tapping which was later replaced by wage contract system. Resin was extracted in Kathua Forest Division using the Cup and Lip method of extraction upto 1991-92. In M.S. Jamwal's Working Plan (for Billawar Forest Division 1974 75), one channel was prescribed for trees with girth between 100 cm and 180 cm. Trees above 180 cm girth were prescribed to be tapped with two channels. The Cup and Lip method of extraction resulted in serious damage to the chir trees, as the standards were not adhered to. The deep wounds did not heal due to repeated fire incidences. Many of the damaged trees gradually dried up or broke by wind storms. At present the Chir forest is in a degraded condition and Resin tapping has been a major contributor for this condition.

Table 16.1.
Diameter class wise percentage of stems in the Chir Rehabilitation
working in Kathua Forest Division.

Spp.	Diameter class (cm)									
	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	>90	Total
Chir	5.46	7.28	7.41	5.42	2.52	1.47	0.52	0.18	0.05	30.31
Total	50.07	25.06	12.57	6.68	2.81	1.7	0.65	0.28	0.18	100

16.4.1.4 Table 16.1 shows the percentage distribution of Chir stems in various diameter classes in comparison with the total stems present in the working circle. Chir comprises 30 percent of the total number of stems in the working circle.

16.4.2 Special Objectives

The long term objective is to obtain sustained yield of Resin. In the short term, the growing stock of Chir requires to be brought to some sort of normality regarding diameter and age classes so that resin tapping can be initiated.

16.4.3 Area and Allotment

The constitution of a working circle regarding resin working overlaps that constituted for the working of Chir crop and therefore, all the compartments

allotted to Chir Rehabilitation Working Circle are also involved with the tapping of Resin.

16.4.4 Analysis and Valuation of the Crop

- 16.4.4.1 The detailed information regarding growing stock and regeneration of chir are given in the Chir Rehabilitation Working Circle. The status of Chir crop in this division is very poor as indicated by growing stock and regeneration status (refer Chir Rehabilitation Working Circle). The tappable trees, i.e., trees with DBH 40 cm and above form around 58% of the total number of chir trees in the working circle. However, it must be noted that out of this number around 25% fall in only one class, that of 40-50 cm. If there have to be sufficient number of healthy trees in the mature classes, then a period of rest is recommended for the next ten years so that there are good numbers of trees both in 40-50 diameter class as well as in the next higher diameter classes as well.
- 16.4.4.2 Also, an important point to note is that only 18% of the total stems are occurring in the 20-30 diameter class. Therefore, the future status of the chir crop cannot be jeopardized by putting the available trees to be tapped without making adequate safeguard for the sustained availability of younger trees to replace those tapped. This requires provision of protection for the young trees and increased inputs towards promoting establishment of regeneration.

Table 19.2 Percentage distribution of Chir trees in Chir Rehabilitation Working Circle in Kathua Forest Division

Diameter Classes	20-30	30-40	40-50	50-60	60-70	70-80	Total	
Percentage of Chir Trees	18.03	24.02	24.45	17.87	8.3	7.31	100	

16.4.5 Prescriptions

1 Keeping in view the very low availability of tappable trees it is recommended that Resin tapping should not be practiced for another 10 years in Chir forests of Kathua Forest Division. The crop will continue to be under rest during the period of this plan and after that period review should be done.

2. The detailed prescriptions given for rehabilitation of Chir crop in Chir Rehabilitation Working Circle should be implemented so that sustainable revenue can be obtained from resin tapping in chir forests of Kathua Forest Division.

16.5 Medicinal Plants

The Kathua Forest Division is a habitat for many medicinal plants belonging to the subtropical and Shiwalik ecosystems. These medicinal plants have traditionally been used by the local people for treatments for various ailments as well as for other purposes. These species are distributed all over the division. The forest tract

is suitable for cultivation of many of these species. An inventory of the medicinal plants found in the tract, their local names, parts used and medicinal uses has been given in the Annexures.

16.5.1 Objectives of Management

a. To conserve the medicinal plant diversity of the region and to utilize them on sustainable basis.

b. To cultivate commercially important medicinal plants in forest and non-forest areas.

16.5.2 Management

To fulfill the objectives the following strategies are suggested:

16.5.2.1 Management in Natural Forests

At present none of the medicinal plants mentioned in the annexure are commercially exploitable due to low stocking. Most of them occur naturally in forests. While managing the forests for various other objectives the attempts should be made to retain these species in adequate quantity. As most of them are shrubs, herbs and vines their retention will not interfere in the management practices prescribed for any working circle.

16.5.2.2 Cultivation of Important Species

The Medicinal and Aromatic Plants (MAP) have come up as a promising source of business product in the last decade or so worldwide. The acceptance and increasing use of MAPs, called Botanicals in the West is a very good opportunity for our country. However, the uncertainty regarding the profitability of the crop variant to be grown by farmers puts the entire product cycle at risk. The Forest Department can incentivize and promote the cultivation of proven variants of MAPs as part of agroforestry and JFM initiatives in the forest land.

16.5.2.3 Cultivation of Medicinal Plants in Private Land

The medicinal plants can be cultivated by farmers as an initiative in Agro-forestry. The medicinal plants like *Rauvolfia serpentina*, *Withania somnifera*, *Cymbopogon* spp., *Tagetes* spp. etc can generate assured revenue. Many other plants are useful for treatment of common ailments.

In towns and village the people other than farmers can also grow medicinal plants in house compounds and kitchen gardens. This needs to be encouraged as it will serve as a secure conservation method of medicinal plant diversity apart from immediate benefits to the grower.

16.5.2.4 Medicinal Plants Conservation Areas (MPCA)

The NWFP species can be cultivated in compartments allotted for plantation working circle. The specific sites for each species should be identified by the field staff. The concept of Medicinal Plants Conservation Areas (MPCAs) was an innovation proposed by the Foundation for Revitalisation of Local Health Traditions (FRLHT) – a Bangalore based Non Government Organisation (NGO). It has established 34 MPCAs in South India. The establishment of MPCAs is to create so-called "hands-off-areas" where small patches of land shall be dedicated to MAPs with no interference for any other prescription. However, strict protection of MPCAs as suggested is found to be difficult in the forest areas. Therefore, an appropriate village level organisation like VFCs needs to be put in place to ensure active participation of local village communities for the protection and management of MPCAs which should initially be established at the forest fringe areas. Within the natural forests, the management of the conservation areas should be provided for with adequate funding and monitoring.

In addition, MAP cultivation can also be taken up through establishment of Herbal Gardens and Seed Banks for *ex-situ* conservation and propagation of these plant species.

16.6 Other NWFP Yielding Species

The following are some of the potential NWFP yielding species found in the division. They have full potential for cultivation also.

1. Fruit Trees

Ziziphus jujuba (Ber), *Mangifera indica* (Wild mango) *Phyllanthus emblica* (aonla) and *Moringa oleifera* (Drum stick).

2. Fibre Plants

Agave sisalana is an important fiber yielding plant which can be cultivated in the division. This species comes up under very dry conditions and can generate up to 1800 person days of employment per hectare of plantation. It can also be used for fencing purposes.

3. Lac Cultivation

The Dhaak or Palah tree (*Butea monosperma*) occurs naturally in this forest area in abundance. Since this tree is a host plant for the lac insect, incentivizing lac cultivation can be initiated in this Forest Division using participatory approach.

CHAPTER-XVII

Forest Protection

17.1 General Constitution of the Working Circle

- 17.1.1 The Kathua Forest Division forms the gateway of Jammu and Kashmir state and, at the same time, the last point of exit from the state. The national highway and Railway lines pass through the Division and the two important towns of the area, viz., Kathua and Samba. Almost all the forest products that move out of the State (legally or illegally) have to pass through this Division. Therefore the Division occupies significance with respect to forest protection.
- 17.1.2 Over the years, with the increase in human population, there has been an increase in population of local cattle and that of nomadic Gujjars and Bakerwals as well. Besides, there are various uses of forest products which was noticed in the mushrooming of charcoal bhatties, furniture/joinery units, sawmills etc. in the past in this Division. Due to ecological fragility the forest protection in Kandi area is of immense importance both ecologically and economically.
- 17.1.3 The general principle followed in constitution of this working circle has been explained above. This working circle has been formed for protection of forest wealth by way of regular patrolling in the forest as well as non-forest areas of the division.
- 17.1.4 The pressure on the forests is also very high as there is increase in population and because of the easy money it brings through illegal activity. The working circle extends over the whole of the Kathua Forest Division as the whole of the forests is under severe biotic especially human pressure. The protection can also be from other stresses like fire, soil erosion, and medicinal herbs and firewood collection.

17.2 Special Objectives of Management

- 1. To provide protection of the valuable forests of Kathua Forest Division.
- 2. To prevent free flow of illegal timber.
- 3. To protect the forests against fire.
- 4. To prevent encroachment on forest land.
- 5. To prevent poaching of wildlife.
- 6. Increase social fencing measures through effective JFM programmes.

17.3 Protection Enforcement System

17.3.1 The DFO is in overall charge of the protection of forests in a Forest Division. The Range Officer is entrusted with the responsibilities of enforcing protection measures in the range by way of patrolling and detecting forest offences. He is required to draw damage reports and send them to the DFO to get it sanctioned either for compounding of offence or for prosecution which has to be decided by the DFO. The Block Officer is entrusted with the responsibility of enforcing protection measures in the Block area by way of patrolling and detecting the forest offences. Block Forest Officer is also empowered for accepting the compounding fee from the offenders as well as sending the cases for prosecution. Foresters are directly assisted by the Forest Guards posted under them. The Forest Guards posted in the beats are entrusted with the power of detecting forest offences and they are required to report to the Block Officers under whom their services have been placed.

- 17.3.2 The Forest Protection Force has been created by J & K Government in 1996 with a view to provide maximum protection to natural forests. The gamma unit looks after one forest division which is headed by Deputy Director. He is assisted by Assistant Directors and Inspectors.
- 17.3.3 The new concept of PFM has provisions for formation of Self Help Groups, Forest Protection Committees or Village Forest Committees which are given the responsibility of protection in lieu of the usufructs that they receive from those areas.

17.4 Legal Provisions

Forest is a renewable resource and its management cannot be successful without its protection. There are legal provisions for protection of forests in Jammu & Kashmir Forests Act 1930 and its amendments and Forest Rules. All the forest personnel engaged in the management of forests have been duly empowered for protection of forests. The Divisional Forest Officer is in overall charge for protection of forests in the Division and the Range Officers, Block Officers and Forest guards in their respective protection units to assist him.

17.5 Agencies of Forest Damage

The major factors responsible for Forest damage in Kathua are:

- 1. Grazing and Browsing
- 2. Encroachments
- 3. Illicit felling and transportation
- 4. Forest fire
- 5. Pests and Diseases

These factors are discussed in brief in the following sections.

17.6 Grazing and Browsing

17.6.1 The problem of grazing and browsing has been dealt in detail under Grazing Working Circle. Grazing is the major reason for forest degradation and is a formidable challenge to the entire ecosystem. It has grown into a socio-economic and political problem. Apart from usual damages from overgrazing the following problems are cropping up.

- a) Encroachment of forest area by Gujjars and Bakerwals who have established semi-permanent structures in forest area.
- b) The local landlords are also found involved in attempts to encroach forest land.
- c) The heavy lopping of forest trees and over grazing of glasses is inhibiting seed production and thereby natural regeneration is hampered.
- 17.6.2 The measures to regulate grazing are prescribed in the Grazing Working Circle. The other aspects of damage associated with grazing occurs mainly due to negligence of forest staff. The J&K Forest Act provide sufficient powers to the DFO and the staff to prevent these offences. The legal provisions should be implemented sincerely. The required socio-political environment for such action should be provided by the Government.

17.7 Encroachments

- 17.7.1 Among all the forest offences the encroachment forms the most serious type as in this case the forest land is permanently lost.
- 17.7.2 The forests of this division are under a great pressure because of demand for land. The encroachment is heavy near habitations and around the 'Chaks'. While increase in population is the basic cause of this, the problem manifests itself due to land hunger for commercial, residential or agricultural purposes. This is accomplished singly by one family or collectively by a group of families. In the latter case a number of villagers collectively and in open defiance of law, encroach upon some treeless land or even land with scattered trees in forest area and start cultivating it and make their huts on it. It has been observed that this collective encroachment is usually done with the direct or indirect connivance or even under patronage of politically influential persons. Like in other divisions this problem is existing in Kathua Forest division also. The following are the reasons for encroachment problems in Kathua.
 - (a) The lack of proper boundary inspection and thus delay in detection of cases of encroachment.
 - (b) Incomplete Demarcation records and poor state of Demarcation line and boundary pillars.
 - (c) Discrepancies in revenue and forest records.
 - (d) Absence of alternative employment opportunities for the landless or the people with very less land.
 - (e) The policy of allotment of compartments for grazing to Gujjars and Bakerwals.
 - (f) Negligence and/or connivance on part of Forest staff and Revenue staff.
- 17.7.3 The absence of clear policy of Government and other legal difficulties also present a way to unscrupulous persons to indulge in encroachment. The Government policy is that anybody who has the 'Girdawari' of 1971 CE for any land shall be

treated as legitimate owner. This resulted in forest land encroachers obtaining certificates in connivance with Girdawars and Patwaris to the effect that land in question was occupied before 1971, even if the land (forest land) has been occupied recently.

- 17.7.4 The Jammu & Kashmir Forest Act provides adequate legal powers to DFO to control encroachments. The J&K Public Premises (Eviction of Unauthorised Occupants) Act. 1959 provides for summary eviction of encroachers by DFO. The notification SRO-403 of 1962 appoints DFO as an Estate Officer for exercising this power.
- 17.7.5 The under utilization of legal powers by DFO (mainly due to existing Socio-political environment) delay in reporting on the part of lower staff, non-cooperation of revenue staff, incomplete demarcation records and sorry state of demarcation line have contributed to the growth of this problem.

The following steps are suggested to minimise the problem of encroachments.

- 1. The renovation of demarcation line of the Division should be carried out at an earliest.
- 2. The Gujjars and Bakerwals should not be allowed to construct semi permanent/permanent structures in areas allotted for grazing.
- Along the boundaries of chaks existing in the middle of compartments, 1 to 2 feet high bunds with locally available boulders should be constructed. This is also necessary along the boundaries of villages and forests.
- 4. Closures and plantations should be carried out in areas of high biotic interference and fencing should start right from the forest boundary.
- 5. Regular patrolling and early reporting by the Forest staff is of immense importance. However due to cumulative effect over the years the encroachment problem has grown enormously and an intensified campaign at the state level by the Department is necessary. The required congenial socio-political environment should be created.

17.8 Illicit Damage and Smuggling

17.8.1 The economically important species occurring in Kathua Forest Division are Khair, Chir, Shisham, Bamboo, Semal, Mango and many other broadleaf species. The industrial use of wood was largely for Sawmills and Furniture or joinery making units. The establishment of sawmills was brought under regulation with the issuance of SRO-103 of 2012 Sawmill Regulation Rules. In most of the cases, illicit damage takes place domestic use by local people, most commonly for firewood. To prevent the illicit damage the following measures are suggested.

- 1. Intensive patrolling of the area. The checkposts at Penthi in Samba, Anna Danga at Jasrota and Mannu at Kathua need to be renovated and retrofitted to serve as control rooms for fire protection and patrolling besides working as checkposts.
- 2. Whenever cases are registered they should be pursued vigorously till a logical conclusion is reached in the court.
- 3. Periodic checking of saw mills and other wood based industries.
- 4. Creation of mobile check posts along those (Khads) points during the main smuggling season. Temporary huts may be constructed at these Khads with 2-4 guards on duty.
- 5. The combing of forest compartments by specially formed squads composed of forest officers and personnel from Forest Protection Force periodically is necessary.
- 17.8.2 This Division had witnessed massive uncontrolled mushrooming of charcoal bhatties, furniture making units and saw mills and demand for Khair wood in the near past. With this, illicit damage has assumed larger proportions over the years and has become commercial. These aspects are discussed in following sections.

17.9 Charcoal Production

- 17.9.1 Charcoal production has become a major economic activity in the Kandi region. The charcoal bhatties have now been brought under regulation, although a large number of these still function in the area. These kilns are established mostly on Revenue lands, but these are operated at smaller scale illegally in villages and by nomadic graziers inside forests. Officially it is assumed that supply of wood to these kilns comes from non-forest land but there are no reliable means to refute the allegations that forests are a major source of wood to these Bhatties. Almost all types of wood are used in these kilns. The people transport firewood from small trees and shrubs manually (Headloads) and through camels to the kilns from adjoining forest area. Many instances are quoted wherein big trees and even chir are illicitly used for charcoal production.
- 17.9.2 A report on survey of charcoal bhatties prepared by the Resources Survey Division in 2003-04 reported 822 bhatties operating in Kathua Forest Division. At that time the Forest Department had no say over the business as it only had power to issue transport permission for the firewood. Now with registration of these units with the Conservator of Forests (Territorial), the setting up and operating of these units has been brought under some sort of control.
- 17.9.3 At present, there are 15 charcoal bhatties in Kathua range, 47 in Jasrota range and 2 in Samba range which are registered with the Conservator of Forests of East Circle as per SRO 295 of 2006. The following measures are suggested for regulating charcoal kilns:

- 1. In any set of given circumstances, the only foolproof way to control damage to forests is to patrol the forests regularly and sincerely by the staff. Stringent action should be taken against people causing damage to the forests.
- 2. The person applying for establishment of charcoal kiln should be made to declare the source from where the wood for the kiln would be procured and the unit holders should be encouraged to set up common firewood plantations for ensured and cheap supply of firewood.

17.10 Khair Smuggling

- 17.10.1 *Acacia catechu* is one of the most economically important species occurring in Kathua Forest Division. Katha is extracted from the heart wood of this tree and is used largely in pan masala manufacturing industrial units, and on a small scale for use as an ingredient in paan (betel leaf). The Kutch is obtained as a by product of preparation of katha and is used as a dye. The Khair wood is therefore in high demand in the markets of Jammu and Punjab.
- 17.10.2 Presently all green felling of Khair trees stands suspended in compliance to the Hon'ble Supreme Court decision dated 10-05-1996 in writ petition No. 171/96 of Court No. 3. This applied to Khair in Revenue lands also, but this has been amended with the passage of the Jammu and Kashmir Non-Forest Land Khair Trees "*Acacia catechu*" (Management Plan) Rules, 2016 issued under SRO-111 on 31 March, 2016. These Rules have made the restrictions imposed on felling of Khair trees legal in Proprietary lands as regulated under the said rules. The felling of Khair trees is still not permitted in Non-forest lands which are not Private or Milkiyat lands, except dead and dry trees. The revenue realised by disposal of such trees shall have to be remitted into the State Treasury.
- 17.10.3 The Katha manufacturing units of the State utilizing Khairwood shall be governed by the J&K Wood Based Industries (Registration and Regulation) Rules, 2012 as a primary wood based industry.

17.11 Forest Based Industries

- 17.11.1 There are a number of forest based units operating in the area like Saw mills, Joinery/furniture making units, Charcoal Bhatties and Willow cleft (Cricket bats) making units. The number of registered saw mills has decreased from 89 in 1996 to 86 in 2015. Of these, 45 are registered in Kathua range, 32 in Jasrota range and 9 in Samba range. Out of the total of 86 units, 16 are functioning within industrial areas, 32 licences have been given to operate sawmills within municipal limits while the rest (38 units) are functioning within 8 km of the forest boundary. Most of these saw mills depend on private sources for their raw material supply.
- 17.11.2 Charcoal making is a major economic activity in this Division and all the operations are wood based. The charcoal bhatties are to be mandatorily registered with the Government after the issuance of SRO 295 of 2006. The

furniture/joinery industries or Charcoal Bhatties provide much scope for agro forestry in the area which can bring substantial income to the farmers and the state. This shows that there is much scope for agro-forestry in the region.

17.11.3 However, as discussed in above sections, forest based industries can have severe negative impacts on the health of the natural forests if these are not regulated by law or if the law is not effectively implemented. Kathua FD has been at the receiving end of such incidents in the past when the forests suffered massive smuggling and illicit damage events. With the passage of regulatory instruments like Sawmill regulation, Charcoal regulation, etc., a large number of such activities were brought under some semblance of control.

17.12 Forest Fire

17.12.1 In Kathua Forest Division the forest fire incidents are a regular phenomenon. The forest fire causes substantial loss by destroying regeneration, burning of chir trees, reducing moisture content of soil and affecting other vegetation and wild life. Repeated fires arrest progressions of vegetation by process of degradation. They also denude soil paving way for massive soil erosion and siltation of dams, besides causing atmospheric pollution. Timely prevention and suppression is the key to fire control. Guidelines for prevention and control of forest fires have been issued by Government of India in letter no 9-6/99-FPD of Ministry of Environment and Forests.

S.No.	Year	Kathua Range	Jasrota Range	Samba Range	Total
1	2004-05	10.12	10.46	3.84	24.42
2	2005-06	0	2.12	8.3	10.42
3	2006-07	15.4	4.35	4.8	24.55
4	2007-08	0	7.4	0	7.4
5	2008-09	1.9	1.1	1.8	4.8
6	2009-10	5.15	180.41	13.4	198.96
7	2010-11	7.5	5.4	0	12.9
8	2011-12	0	0.1	0	0.1
9	2012-13	5.8	0.79	10	16.59
10	2013-14	1.1	4.42	0.55	6.07
11	2014-15	30	2.45	0.5	32.95
Total		76.97	219	43.19	339.16

Table 17.1 Range-wise details of area affected by forest fires in Kathua Forest Division (figures in hectares)

17.12.2 The major causes of forest fire in Kathua Forests are:

 Deliberate- local people put fire to the forests for collection of small timber and in order to encourage the growth of grasses in next season. Fires started by occupants adjacent to forests when they burn slash for land clearing. Incendiaries willfully set fire for burning vegetation either for collection of NWFP or for hunting lesser animals or by the graziers for getting new flush of grass. Fires caused by the unemployed youth seeking employment as firewatchers are also common.

- 2. Unintentional- usually due to negligence on part of villagers and other travelers in forest area, fire incidents occur. Fires caused by trespassers and forest users by careless flinging of burning cigarette butts and matches on to the forest floor. Fires caused by campers in forests who do not put out campfires and fires lit for cooking, before leaving.
- 17.12.3 The surface and ground fires are common types but occasionally crown fires are reported in chir forests. The statement of area burnt due to forest fires in the last ten years is given in Table 17.1.

17.12.4 Fire management

The objectives of formulating a fire management strategy are as follows:

- i. To promote conservation of biodiversity and arrest the degradation of forest lands.
- ii. To improve the sustainable production of timber and non timber forest produces in forest lands.
- iii. To maintain soil cover and prevent soil erosion.
- 17.12.4.1 Forest fire management assumes great significance as forest fires have a profound impact on biodiversity and productivity of forest lands. Considering the permanent damage a forest fire makes to the forest and environment, even if it is on a smaller intensity, ecological and social impacts of it are hard to quantify. Often forest fires are not reported and even when reported, the losses are under-estimated as the responsibility of making good the losses are imposed on the forest officer in the field position and they are neither adequately trained to perform fire prevention and fire fighting activities professionally, nor do they have the knowledge of procedural issues in reporting fire cases. Forest Department often fails to project the actual losses due to forest fire and hence the Government is not giving sufficient funds to prevent loss due to forest fire. This, in turn, affects the efficiency of the system.
- 17.12.4.2 In view of the issues presented above, the Forest Department has now formulated Fire Management Plan prescribing essential components required for the plan, based on which Division level plans have been drawn up for the project period. This working plan describes briefly the salient features of a fire plan and recommends implementing it successfully.

17.12.5 Time and Source

17.12.5.1 Fires in the forests start from middle of April continuing up to arrival of monsoon to this tract (either second fortnight of June or upto end of July) every year. The interface of the forests with the human interests in enclosures and among the peripheral dwellers has increased with the increase in boundary length and these are the sources of fire. Farming, rehabilitation, Gujjar and Bakarwal settlements and encroachment areas in and around the forests are the sources of most of the forest fires.

17.12.6 Fire Management Planning

- 17.12.6.1 Fire management plans are prepared for each Division. The Range should be treated as the unit for planning with support maps at 1:50000 or larger showing details of relief and features which are having a bearing on fire, details of which are enumerated in the standard format supplied.
- 17.12.6.2 Annual action plan should be prepared based on the strategic plan for protecting the forests from fire. Planning should be prophylactic rather than curative, the concern should be for preventing fire. More emphasis should be given to development of a preventive strategy rather than control.
- 17.12.6.3 Planning should be location specific, identifying clear, measurable, cost effective and achievable goals for each, specifying responsibilities as regard to detection, communication, organisation and control of fire. Planning should be done after prioritization having due regard to the resources available. Planning should be more intensive for areas, which are more fire prone.
- 17.12.6.4 Wherever possible, participatory fire management strategy should be evolved based on the broader guidelines issued on this aspect. No plans will be approved without this component in future. For prevention of fire and for minimizing fire damage, 'preventive burning' should be planned and strategy laid out. Undue and unwise rigidity regarding the width of fire lines should be dispensed with and a need based strategy for this prescribed for different areas. Use fire as a management tool in protection and habitat management for wildlife.
- 17.12.6.5 Command structure with unity of command should be specified for each strategy. Illustration of this and positioning of equipment should be annexed to the plan for quick, efficient and on the spot organisation of fire fighting teams. Data should be gathered on the sources of secondary support such as the voluntary fire fighters, NGOs, organisation etc.
- 17.12.6.6 Details of the resources like man power, vehicles, wireless etc available with other wings of Forest Department and also those with other departments like Fire force, Meteorology etc. should be tapped during fire season.
- 17.12.6.7 Fire safety measures should be described in the plan and briefing on fire should essentially include briefing on fire safety also. Unsafe and careless fire fighting strategy will not only be hazardous or even fatal to the men at the fire front, but also will impede their efficiency in fire situations resulting in more areas being destroyed by fire.

17.12.7 Fire Protection Strategies

17.12.7.1 The Kathua Forests are protected from forest fires by Law. Although the J&K Forest Act prohibits certain activities responsible for forest fires and makes it binding on the local people to co-operate in case of forest fire occurrence, practically the legal protection is found to be a inadequate in controlling forest
fires. This is mainly because of lack of awareness among people and lack of resources on the part of Forest Department.

- 17.12.7.2 In this plan the areas are prioritised based on economic importance of species and vulnerability to fire for taking fire protection measures. The order of priority is shown below:-
 - 1. The Entire Chir Area.
 - 2. The Bamboo Compartments.
 - 3. The compartments adjacent to roads.
 - 4. The compartments adjacent to villages.
 - 5. All other compartments.

Apart from this the plantations within each compartments should be protected from fire on priority basis.

17.12.7.3 The following area the measures suggested for forest fire control:

1. Preventive Measures

a) Educating the local people and securing their co-operation as forest fire prevention is not possible without the co-operation of local people. Forest Department should create public awareness through radio, TV programmes and public meetings in villages etc.

b) Along with prevention the legislative measures including punitive steps should be taken wherever co-operation is not received or mischief is done by the local communities.

c) Incentives and awards should be given to villages or persons helping the Forest Department.

d) In susceptible areas preliminary training can be given regarding fire fighting operations to the selected villages.

2. Controlled Burning

The highly vulnerable compartments (with high amount of debris) and road side areas should be burnt to reduce the quantity of inflammable material before the fire season, the following are the prescribed areas for this purpose.

- 1. Resin tapped areas.
- 2. Plantations and closures.
- 3. Bamboo areas.
- 4. Naturally regenerated areas.
- 5. Areas adjoining villages and roads paths.

3. Permanent Structures to Control Fire

In economically important compartments, plantations, bamboo areas and in those areas where fire incidences are noticed regularly permanent fire breaking green belts should be raised.

(a) In plain areas trenches (2 to 4 feet) may be dug with planting of fire resistant species like *Agave sisalana* on the bunds. This is recommended specially for valuable plantations, sanctuary areas and biodiversity rich compartments.

(b) In other areas the planting of *Agave sisalana* should be taken up along the borders

4. Fire lines

I. Fire lines of 2 to 4 meters in width are recommended for all the forest areas. The fire lines should be completed before March 31 St every year.

II. Remedial measures. The remedial measures have following three steps: Pre-suppression, Actual suppression and Post suppression.

A. **Pre-suppression:-** This has following steps.

(a) **Fire Detection:-** The early detection of fire helps in controlling it in the initial stages. The early detection is possible by following methods.

1. Co-operation by the public who can report fire occurrence to the authorities. In each Range selected villagers should be cultivated as informers.

2. Ground Patrolling:- During the months of April, May, June and early July the regular ground patrolling should be conducted. For this purpose patrolling parties should be constituted and provided with vehicle and communication equipments.

3. In important areas fire watches should be engaged for at least the period from April to June on casual labour basis.

4. Look Out System:- The construction of low cost watcher huts towers at strategic locations are suggested. Each hut should be provided space for 2 forest guards. The guards should be provided binoculars and if possible wireless equipments.

(b) **Communication:-** Once the fire is detected the information should be sent to the fire fighting squad through Runners, Telephones or Wireless network.

Fire Fighting Squad and Materials

At the Range Office or Divisional Office the fire fighting squad should be formulated during the fire season. The squad should be headed by a RFO. The team should be in such a situation to organise itself within a short period.

The fire fighting equipments like tools, water (for drinking and for extinguishing fire) food and lighting arrangements should be ready. The vehicles like Tractors, Jeeps, Trucks can be used for carrying men and material.

B. Actual Suppression:- The actual suppression of fire can be done by following methods.

1. In case of small areas, spraying water, throwing soil and beating with green branches can be practiced.

2. The fuel-breaks can be created at a distance from the fire so that spreading is prevented.

3. Counter Fire. It is a process of encircling the advancing fire by a burnt strip. When the fire is fierce and men can't stand near the fire this method is suitable. It is also suited to hilly terrain. Usually a cleared line is used as a base to counter fire.

C. Post Suppression

After suppression of the fire the fire from smouldering materials should be extinguished with the help of water or earth. Alternatively, such sites should be isolated by cleaning surrounding areas.

The survey and reporting of area burnt and damages caused is very important from the point of drawing attention of the Government towards fire protection. The reporting should be delinked from liability so that staff reports actual damage sincerely.

17.13 Pests and Diseases

- 17.13.1 The pests and diseases form an important part of biotic factors affecting forest tree species. They cause damage to forest trees and also to the seedlings in nursery.
- 17.13.2 Usually forest managers ignore the pests and disease. But the recent epidemics of Sal borer in Madhya Pradesh and Deodar defoliator in Himachal Pradesh are stern warnings to forest managers. It is very important to monitor forest pests and diseases in each division.
- 17.13.3 In nurseries and plantations the insect pests causes serious damage and is a common occurrence every season. The negligence leads to loss of precious

resources and time. In forest and in plantations due to high cost and environmental pollution the chemical control measures should not be adopted on routine basis. Only if the problem is serious should chemical control be resorted to. However, the cultural measures can be practiced on regular basis.

17.13.4 Diseases

17.13.4.1 Some important diseases occurring in prominent tree species of Kathua Forest Division are listed as follows:

S.No.	Tree species and diseases	Pathogen
1	Root rot of Chir pine	Helicobasidium and Polyporus schweintzii
2	Root rot of Khair	Ganoderma leucidum and Polyporus gilvus
3	Root rot of Sissoo	Ganoderma leucidum and Polyporus gilvus
4	Root rot of Siris	Clitocybe tabescens
5	Wilt of Sissoo	Fusarium solani
6	Bamboo leaf rust	Puccinia gracilenta
7	Khair leaf rust	Ravenelia tendon
8	Sissoo leaf rust	Marevalia chrox

Table 17.2Some common pathogens of tree species in Kathua Division

17.13.4.2 Disease Management Practices

The disease management is nothing but the selection and use of appropriate techniques to suppress diseases to a tolerable limit. The management aims at increasing productivity and reducing cost of production. The main management practices employed for the control of forest diseases are. Quarantine regulations, choice of species. choice of planting site, sanitation, removal of alternate hosts, silvicultural and other cultural practices, solarisation, chemical control measures and use of resistant plant material.

Long rotation periods and low value per unit area of forest species make the use of chemicals and rotation in disease management difficult options. However in forest nurseries and plantations the intensive management practices can he adopted.

CHAPTER-XVIII

Participatory Forest Management

18.1. Introduction

The involvement of local communities in rehabilitation and management of degraded forest areas is perceived to be vital for conservation of forest resources and sometimes is a precondition imposed by funding agencies. Most of the forest area in Kathua Forest Division needs rehabilitation. The greater part of this tract provides a great opportunity for involvement of people in rehabilitation of forest area on micro- watershed concept. The potential that exists for cultivation of *Dendrocalamus strictus* which is a multipurpose early return yielding commercial species provides a favourable opportunity for successful Participatory Forest Management. Further the rural people in the area are well aware of importance of forests and are readily willing to participate in rehabilitation efforts.

18.2. Participatory Forest Management in J&K

The Jammu and Kashmir Government through SRO 17 of 12-1-1999 has amended the J&K (RDF and Village Plantation) Rules, 1992. The amendment provides for constitution of Village (Rehabilitation of Degraded Forests) committee for each village or group of villages for the purpose of protection and management of degraded forests. In these Rules the detailed organizational structure of village (RDF) committee, its functions, mode of working, agreements to be executed between the committee and Forest Department, mutual responsibilities and usufructory benefits distribution etc have been given. Therefore, all the legal provisions necessary for operating JFM are adequately available. Salient features of these rules are:

- (i) Composition: There shall be constituted a Village Forest Committee in each village for the purpose of protection and management of degraded forests. One adult male/ Female member of each independent household residing at the edge of degraded forests shall be the member of the committee. Each village committee shall have an executive committee of eleven members (including at least two women and two members of SC/ST/OBC). The members of executive committee shall be elected annually. The executive shall elect of its members as president and one treasurer. The concerned block forests shall act as Member Secretary.
- (ii) **Meetings:** The Member Secretary of executive committee shall convene at least four meetings of executive committee and two meetings of General body in a calendar year.
- (iii) **Agreement:** The village committee shall enter into a agreement with the DFO in terms of conditions agreed upon by the bodies.

- (iv) Functions: The committee shall assist the department in the executions of works of protection, Plantations and prevention of trespass, encroachment, grazing theft etc. and inform the forest officials of any person attempting trespass or willful damage. The committee shall also assist the forest officials in distribution of usufruct amongst committee members.
- (v) Sharing of harvest: The committee in consultation with all members will determine how to share a minimum 25% of the proceeds from the first major harvest from the plantation in kind or sale proceeds of produce of plantation of degraded forests amongst members after deducting the cost incurred by the department of raise, protect and maintain the plantation.
- (vi) **Works:** The contents of the works to be under taken shall be decided in consultation with the village committee.
- (vii) **Usufructury benefits:** The block forester in consultation with executive committee and with the approval of DFO will distribute among beneficiaries their share of usufruct from the final harvesting, not before the crop attaining the age of ten years. The members shall be entitled to collect free of royalty, without causing any damage to plantations, grass, fodder, dry fallen wood, pruning, thinning etc., with the permission of block forester.

18.3. Forest Development Agency (FDA)

The Forest (Territorial) Department and the Social Forestry Department in Kathua have been associated with the FDA scheme under several pilot projects and a dedicated project as well. The Social Forestry Project has achieved considerable success as far as plantation works are concerned in Kathua. However, the Forest Department has not been able to match the pace as is evident in the physical achievements of Forest Department under FDA for the last ten years, presented in Table 18.1. The status of works for Social Forestry Department are discussed separately.

S. No.	Year	Number of closures	Area treated (Ha.)	Plantation (in nos)
1	2004-05	5	34	17824
2	2005-06	12	290	0
3	2006-07	2	50	45000
4	2007-08	0	0	0
5	2008-09	0	0	0
6	2009-10	0	0	0
7	2010-11	2	40	0
8	2011-12	0	0	0

Table 18.1.Physical achievement of the FDA scheme in Kathua Forest Division.

S. No.	Year	Number of closures	Area treated (Ha.)	Plantation (in nos)
9	2012-13	7	183	0
10	2013-14	4	63	29170
11	2014-15	3	45	0
	Total	35	705	91994

18.4. Village Forest Committees

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 total number of VFCs operating in Kathua are 34 out of which 16 are in Jasrota range, 11 in Kathua range and 7 in Samba range respectively.

18.5. Entry Point Activity

The Entry Point Activity (EPA) made the programme very successful in the state. The small requirements of the people are being met by the EPA of the NAP. As the people are residing in difficult areas, the Forest Department can step in to fulfil their local demands like construction of small bridges, paths, community halls and other basic facilities. The EPA is very useful in addressing their demands.

18.6 Social Forestry in Kathua Forest Division

- 18.6.1 The Social Forestry Division-Kathua has made some headway in involvement of people in its afforestation drive but in most of these cases the afforestation work was in community lands and other non-forestry areas. The success that has been achieved in establishment of plantations was significant. However, the project could not capitalise on the successful plantations and enrolment in VFCs insofar as the distribution of usufructory benefits is concerned.
- 18.6.2 The Division was involved in the formation of 33 closures measuring a total of 566 hectares from 2011-12 to 2014-15. In 2012-13 and 2013-14, an additional 26 VFCs were involved by the Social Forestry Division Kathua in the distribution of 3816 quintals of grass, 14307 quintals of fuelwood and 3660 quintals of fodder. The range wise details could not be obtained for these two years.
- 18.6.3 The economic benefits that were thought shall be accrued were not distributed. Due to lack of thought applied at decision-making levels and also at executive levels, the entire movement has failed to take off as an alternative livelihood measure and has become limited to distribution of fuel and fodder only. Mere distribution of firewood and grass does not constitute the spirit of the social or participatory forestry movements. Even the fodder distribution is alarmingly meagre given the tremendous pressures the forests of these Divisions face.

18.6.4 After the initial phase when the Social Forestry project took off in the state as well as in Kathua Forest Division, the whole program has reached a plateau as far as distribution of usufructory benefits is concerned. In fact, as evident from the perusal of Table 18.2, the benefits as envisaged in the social forestry project were never distributed among the villagers in terms of monetary profits.

The range-wise statement of VFC details from FY 1982-83 to 2010-11 of the Social Forestry Division, Kathua is shown in the following table:

Social Forestry Division Kathda from 1982-85 to 2010-11.						
Range	Number of beneficiaries	Grass distributed (Qtl)	Fuelwood distributed (Qtl)	Fodder distributed (Qtl)		
Kathua						
Up to 2000-01	539	818	568			
2000-01 to 2010-11	573	784	533			
Hiranagar						
Up to 2000-01	444	1265	693			
2000-01 to 2010-11	105	268	190			
Basohli						
Up to 2000-01	934	1730	781	781		
2000-01 to 2010-11	615	818	538	575		
Total (1982-83 to 2010-11)	3210	5683	3303	1356		

 Table 18.2

 Statement showing Range wise distribution of usufructs through

 Social Forestry Division Kathua from 1982-83 to 2010-11

18.7 Agroforestry

- 18.7.1 Agro-forestry can boost the production of fodder, fuel wood, timber and fruits from dry lands of Kandi area. It can provide stability to resource poor small and marginal farmers of this area as the rainfed agriculture is risk prone and productivity is low (it is about 1 q/ha of wheat and 10 q/ha of Maize). The population of humans and livestock has increased at a logarithmic rate and the pressure on forests for biomass is increasing day by day. The forests in the present conditions are not capable of supporting such a large population. Therefore to supplement the fodder, fuel wood and small timber and to reduce pressure on forestry agro-forestry should be encouraged in this area.
- 18.7.2 Apart from decreasing pressure on forests the agro-forestry helps in utilisation of off-season precipitation, conservation of soil and water, recycling of nutrients from different layers of soil and in generation of additional revenue and employment to the farmers.
- 18.7.3 Combining agroforestry with PFM in this region will have the effect of increasing the production of fodder, fuelwood and small timber in non-forest lands (farms) and thereby decreasing pressure on forests. It will also lead to increase in the

income of small and marginal farmers in the area. It can help boost reduce pressure on natural forests by ensuring supply of raw material to furniture marking units and charcoal bhatties.

18.7.4 Hence, the following agro-forestry systems are recommended in this area:

1) Agri-silviculture: In this system agricultural crops are grown between the rows of trees. The adoption of scientific agronomic practices are necessary. The farmer can obtain wood, food and fodder from the limited land resources.

The multipupose tree species suited for this purpose include:

- a. Albizia lebbeck
- b. *Ailanthus excelsa*
- c. *Grewia optivia*
- d. *Melia azaderach*
- e. Bauhinia variegata
- f. Morus alba
- g. Aegle marmelos

In irrigated fields below the national highway, farmers can grow developed varieties of poplar and eucalyptus.

2) Multipurpose Tree Production System

In Kandi area in most of the cases every farmer is having a part of land which is not suitable for cultivation of agricultural crops. Such lands can be utilized for planting multipurpose tree species which provide wood, fruits, fodder and fuel wood.

The tree species found suitable to Kandi area are:

- a) *Acacia catechu*
- b) Acacia nilotica
- c) Ailanthus exelsa
- d) Albizia lebbek
- e) Azadirachta indica
- t) Bauhinia purpurea
- g) Dalbergia sissoo
- h) Melia azadarach
- i) Morus alba
- j) Bamboo etc

Apart from above two systems of agro-forestry the farmers can also practice. Silvi-pastoral system and Agri-horticultural system with fruits trees like Ber, Jamun, Karonda, Amla, Bael and pomegranate apart from other cultivated fruit trees.

18.7.5 Role of Forest Department

The Forest Department should promote agro-forestry in the area and help in its intensification. The prosperity of agro-forestry is directly related to forest conservation. In this regard the following guidelines are given:

- i. The seedlings of species preferred by farmers should be raised by Social Forestry and Territorial Divisions.
- ii. The plants should be made available to the farmers at subsidised cost at door steps during the planting season.
- iii. Wide publicity should be given about agro-forestry practices and benefits through radio and television media, public meetings, pamphlets etc.
- iv. The department should device a policy where in each tree cultivator should be registered and a nominal incentive should be given for each plant be grows in his land at least up to 3 to 5 years.
- v. The furniture and other wood based industries in the area should be asked to have a financial collaboration with the willing farmers for cultivation and supply of raw materials.
- vi. The medicinal plants and flowering plants are suitable for cultivation in this area. These have high market value and can be grown in farmers fields. The Department should provide technology package (including supply of seed material) and marketing linkage to the farmers.

CHAPTER- XIX

Wildlife Management

19.1 General Description of Wildlife

19.1.1 The wildlife of the tract has been discussed in detail in Chapter II. The forests of this region are remnants of dense subtropical forests which used to serve as game preserves for the royalty during earlier times. However, with increase of human population growth, their demands of land for agriculture and urbanisation increased tremendously thereby decreasing the amount and quality of land available for forests and consequently, for wildlife.

19.1.2 Flora:

According to Champion and Seth classification (1968) the forests of this area are classified under Lower Shiwalik Chir Pine forests (9/C1a) and Northern dry mixed deciduous forests (5B/C2). The degradation stages of 5B/C2 *viz* Dry Bamboo brakes (DS1) and Dry deciduous scrub (DS2) are also found in patches.

Khair, Sissoo, Kembal, Semal, Sins, Toon, Amaltash, Kamla, Kikkar and Ficus are the important broad leaved trees found in the sanctuary. Bamboo is the most important component in the understory.

Garna, Santha, Brainkar and Ber are important shrubs in the sanctuary Bauhinia, Dioscorea, Ichnocarpus and Ceasalpinia are some of the climbers noted. On the lower edges of the hills the weeds like *Lantana* and *Parthenium* have occupied blank areas.

19.1.3 Fauna :

According to the reports the animals present in sanctuary area are Leopard, Nilgai, Spotted Deer, Barking Deer, Rhesus monkey, Wild Boar, Jackal, Hare, Porcupine and Mongoose. A detailed list of animals as well as birds existing in the forests of this area has been given at the beginning of the document and the relevant details are discussed in Chapter – II.

19.2 Objective of Management

19.2.1 The chief objective of wildlife management in this area is to protect and preserve the wildlife of the tract.

19.3 Method of Treatment

19.3.1 For the proper and scientific management of the wildlife it is essential to know the number, distribution, habit and habitat of various wildlife species found in this area. For this purpose census of the wildlife should be carried out with the help of latest techniques and an inventory be prepared giving details like the status of the species reported as per IUCN Red Data List.

- 19.3.2 General communication and extension in both Forest and Wildlife Departments should be strengthened to make people aware of the wildlife present in these areas. Information regarding act and rules related with wildlife protection should be easily available and guidelines and operating procedures in case of any incident involving wildlife should be widely publicized among students in particular and public in general. Wildlife protection committees should be constituted in forest fringe villages.
- 19.3.3 Various development works for the development of habitat should be taken up. Such works are construction of water points, water holes, watch towers, bridle paths etc. Plantation of local species should be taken up in the gaps and effective measures for controlling the forest fires should be taken up.
- 19.3.4 The National Forest Policy (1988) has given the mandate to the Forest and Wildlife Departments to maintain the biological diversity. Since the forestry operations have the potential of changing forest conditions and therefore, habitats in a variety of ways hence, there is need to change traditional outlook in forestry especially in managed forests. This new approach to managed forests relates to issues pertaining to micro and macro habitats, their retention and ecological importance.
- 19.3.5 The micro habitat elements include snags, den trees, tall and large crowned big old trees, trees with flaking and splitting bark, fallen trees, partially submerged (in streams) fallen trees, large hallow logs etc. Current research and management experience suggests retention of ten snags of large size per hectare in randomly distributed pattern. Similarly, five large hollow logs randomly distributed on forest floor per hectare should also be retained. Trees partially fallen in streams should be kept in spate category. Large-sized tall old trees with large spreading crown ought to be retained as well.
- 19.3.6 As far as possible, exotics should be avoided in the interest of native plants. In case it is unavoidable, exotics can be planted in suitable admixture with native species.
- 19.3.7 Treeless openings in all the cases should not be treated as blanks. They need to be managed for their associated characteristics, structural and biological attributes as well as ecological functions.
- 19.3.8 Caves, dens and overhangs are used by various species *e.g.* carnivores likes leopard and bear use such sites for shelter and breeding places. All the management activities in the forests should be planned and executed in such a way that these sites are not disturbed.
- 19.3.9 No markings of any nature should be carried out in a strip of width of at least 100 meters on either side of all streams/ channels of consequence in view of their biological, ecological and watershed values.

19.3.10 Man-animal conflicts must be managed by both forest and wildlife departments in coordination. The Department of Wildlife Protection may create control rooms in interior areas so that the persons posted in these places can reach the conflict places at an earliest. The Wildlife Department can provide the cages, nets, tranquillizers, drugs and vehicles for mobility to the field staff for effectively managing the conflicting situations. The issue of compensation in case of mananimal conflict should be handled with empathy and payment of such compensation should be prompt to provide confidence to the local population

19.4 Protected Areas

19.4.1 Jasrota Wildlife Sanctuary

- 19.4.1.1 In Kathua Forest Division only one wildlife sanctuary is present. The Jasrota Wildlife Sanctuary lies on the Bank of River Ujh near Jasrota Village. The Sanctuary derives its name from the Historic Jasrota Fort. Earlier it was declared as a Game Reserve under the provisions of the Game Act of 1942 by the Maharaja of Jammu and Kashmir. Most probably this area was a Rakh of rulers of Jasrota principality even earlier. The ruins of the Jasrota Fort stand in the sanctuary even today. The Sanctuary came under the administrative control of the Department of Wildlife Protection in 1984.
- 19.4.1.2 The Jasrota Wildlife Sanctuary comprising of compartments 1 to 6 of Jasrota Range was notified in March, 1987. It covers an area of 10.04 square kilometres. The area sustains a variety of fauna like Barking Dear, Wild Boar, Rhesus Monkey, Jackal, Porcupine, Red Jungle Fowl, Peafowl, Python, Cobra and turtles. Cheetal (Spotted Dear) is the key mammal species and Leopard is the only big cat found here. The area statement of compartments forming the Sanctuary is given in Table 19.1.

(in needar cs)						
Commenters out	Area (ha)					
Comparimeni	Chir	Broadleaf	Bamboo	Scrub	Blank	Total
1/J	5.14	74.95	113.06	0.00	0.00	193.15
2/J	0.00	53.02	35.60	0.00	0.00	88.62
3/J	0.00	31.24	37.25	81.71	0.00	150.20
4/J	0.00	99.67	15.69	34.15	0.00	149.51
5/J	0.00	46.29	0.00	75.08	0.00	121.37
6/J	0.00	47.26	10.27	0.00	0.00	57.53
Total	5.14	352.43	211.87	190.94	0.00	760.38

Table 19.1 Area (computed using GIS) of compartments of Jasrota Wildlife Sanctuary (in hectares)

19.4.2 Thein Conservation Reserve

19.4.2.1 Conservation Reserves can be declared by the State Governments in any area owned by the Government, particularly the areas adjacent to National Parks and Sanctuaries and those areas which link one Protected Area with another.

Conservation Reserves are declared for the purpose of protecting landscapes, seascapes, flora and fauna and their habitat. The rights of people living inside a Conservation Reserve are not affected.

19.4.2.2 The Thein Conservation Reserve was notified in 1981. Since the notification mentioned only the physical boundaries of the proposed Reserve, the project ran into hurdles when it came to handing over the area from Forest Department to Wildlife Department as entire compartments were not involved, but the boundaries passed across part of the compartments. This was resolved in the year 2012 when the area under compartments 10, 11, 12, 13, 14 and 16 of Kathua range amounting to 1,890 Ha as calculated from previous data were handed over to Wildlife Department. These compartments are located along the Ranjit Sagar Dam and lake and provide a picturesque environment. The usual flora and fauna are encountered here as well, as discussed in detail in Chapter – II. The details of the area under these compartments is shown in Table 19.2 below.

Table 19.2
Area (computed using GIS) of compartments of Thein Conservation Reserve
(in hectares)

Comportment	Area (ha)					
Compartment	Chir	Broadleaf	Bamboo	Scrub	Blank	Total
10/K	281.01	154.08	0.00	0.00	0.00	435.09
11/K	148.09	47.94	0.00	0.00	0.00	196.03
12/K	197.47	445.16	0.00	0.00	0.00	642.63
13/K	197.51	318.88	0.00	0.00	0.00	516.38
14/K	91.34	478.47	0.00	0.00	46.37	616.18
16/K	0.00	0.00	0.00	380.86	0.00	380.86
Total	915.41	1444.46	0.00	380.86	46.37	2787.17

CHAPTER-XX

Miscellaneous Regulations

20.1 Buildings

- 20.1.1 The buildings that are presently maintained by the Kathua Forest Division are enlisted in Appendix VI. The buildings from amongst those already constructed which need to be taken up for immediate repairs and renovation are:
 - 1. BO Residential Quarters at Kathua
 - 2. Control Room at Kathua
 - 3. Nagri Checkpost at Kathua
 - 4. Budhi Checkpost at Kathua
 - 5. Head Clerk Residential Quarter at Kathua
 - 6. Clerk Residential Quarter at Kathua
 - 7. Driver Residential Quarter at Kathua
 - 8. Seed Store at Harya Chak
 - 9. Harya Chak Checkpost
 - 10. Watcher hut at Bein in Jasrota
 - 11. Watcher hut at Surara in Jasrota
 - 12. Mali hut at Pathwar in Jasrota
- 20.1.2 In addition to the list given above, guard huts and B.O. huts should be constructed at each beat and block headquarters. Also, it was observed during field visits during the sampling work that not even basic accommodation is present inside forest areas for inspection purposes. In case of Jasrota range, the Range headquarters are situated at Hiranagar, which is more than 6 km from the nearest forest boundary. It would be in the interest of administrative efficiency if quarters providing basic accommodation facilities for officers like inspection huts/bungalows are constructed inside the forest for inspection purposes and also for effective supervision and monitoring of development and plantation works.

20.2 Demarcation and Consolidation

20.2.1 The greatest difficulty in estimating the extent of encroachment of forest land is the non-existence of demarcation boundary indicators on the ground. There is also a misunderstanding among villagers about the closures as they feel that fencing around closures marks off the forest boundary and thus the area outside the fence is not forest land which they then start bringing under cultivation.

- 20.2.2 Demarcation work has been started by the Department and it is hoped that soon Kathua Forest Division would be taken up. This would create a baseline for the forest areas which are in the Department's control and which can be released from encroachment with the least effort. These forest areas should be immediately taken under firm control by installing R.C.C boundary pillars. The pillars should be serially numbered and their forward and backward bearing, and distance from neighboring pillars should also be recorded.
- 20.2.3 Permanent bench marks need to be surveyed and fixed to make demarcation line permanent. Demarcation file of each compartment has to be updated and built up with help of revenue records in cases where demarcation record is not available. For the safety of demarcation records, *Muhafiz Khana* was established at Jammu and the demarcation files deposited there. The process of uploading of demarcation files in electronic form for storage and retrieval has also been done.
- 20.2.4 Every Forest Guard and Forester should inspect the respective boundaries (demarcation lines) of their Beats and Blocks at least once in every year and submit a certificate to this effect. The Range Officer and DFO can check some percentage of demarcation line randomly. In order to facilitate the inspection of demarcation line, inspection paths should be constructed all along this line. It will also act as buffer for possible encroachment as well as function as a fire line.
- 20.2.5 It is important to mention here that due to non-existent demarcation line, large scale encroachment and other factors mentioned above, several difficulties were faced in the layout of boundaries at the time of field work of this plan. The correct boundary of compartments is not possible to be located at all times especially when the boundary described is a demarcation line. Hence stock maps may not show exact boundaries in such areas. After completion of demarcation work, necessary corrections can be made on ground as well as on maps.
- 20.2.6 Inside the forests, there are large number of scattered small chaks. Productivity of these chaks is very low. Whenever possible these chaks may be acquired on payment of usual compensation and the population shifted out of the forest area so that forest land is consolidated.
- 20.2.7 The basic requirement for control of encroachments is that the beat guards should be aware of the forest boundaries in their respective beats. Each guard should have a copy of the beat map which should indicate the location of boundary pillars. Beat officers should also have effective means of communicating forest damage and encroachment incidents to Range or Division Control Centres and requisition help as required.

20.3. Roads, Paths and Bridges

20.3.1 Construction of foot paths all along demarcation line has been suggested in a section above. Emphasis should be on the maintenance of existing footpaths/roads as several of them are actually compartment boundaries and is

these are not maintained, it may lead to various issues in the future. Some more inspection roads should be constructed as suggested above, especially in Chir forests as these paths serve as fire lines.

20.4. Fire Protection

- 20.4.1 Chir forests falling in sub-tropical zone are highly susceptible to fire especially during long dry spells in summers and winters. The proper regeneration of chir forests is very much dependent on strict fire control especially in areas where crop is open and established regeneration in inadequate.
- 20.4.2 Control burning should be done in every chir forests in February i.e. before the start of resin tapping season. If it is not possible to carry out control burning in entire fire sensitive forests, a belt of sufficient width can be control burnt around important natural regeneration areas. In fire-prone areas, 15 m wide fire line should be maintained on all ridges and prominent spurs in chir areas.
- 20.4.4 Details of fire protection have already been discussed in proceeding chapters. The recommendations for fire control should be implemented strictly.

20.5. Soil Conservation

- 20.5.1 The problem of soil erosion is very serve in this area. A soil conservation range is existing in this division to tackle this problem besides a District Soil Conservation Officer appointed by the Directorate of Soil Conservation. Various soil conservation works executed by these agencies include fencing of denuded areas, sowing and planting of enclosed areas, construction of check dams and other soil and water conservation structures.
- 20.5.2 Detailed land use survey of this tract should be done. Data regarding soil character and degree of erosion in different areas should be collected. Micro watersheds requiring treatment on priority basis should be selected and treatment plan on integrated watershed basis should be prepared. Lands up to 33% slope may be cultivated with agricultural crops using agronomic practices like contour farming, mulching, inter-cropping with legumes and high yielding seeds, use of fertilizers, manure etc.
- 20.5.3 Lands having 33% to 50% slope can be utilized for horticulture whereas those with more than 50% slope should be brought under permanent vegetation of fuel, fodder and timber species. Such plantations should be supplemented with soil conservation measures like contour trenching, staggered trenching, gully plugging, etc.

20.6. Illicit Damage

20.6.1 Illicit damage in the form of illicit cutting of trees for fuel, fodder, timber and MFP and in the form of encroachment is rampant in this tract like any other division of the State. The Department should make arrangements for adequate supply of

timber and firewood to the local inhabitants to put some check on the damage caused by them for domestic needs. However, encroachment is difficult to be tackled without strong will and firm back-up from higher authorities and bold policy decisions by the Government as it has become commercial in nature amid great increase in land values.

20.6.2 The Forest Protection Force is headquartered at Kathua town. Effective utilization of this force shall contribute a lot in controlling the illicit damage. However, the personnel should be provided effective means of communication and mobility. Control Centres should be set up and efforts coordinated between the Forest Protection Force and the Forest Division.

20.7. Forest Nurseries

The detailed list of nurseries existing in this division has been given in Appendix V. Further, details of nursery techniques have already been given in relevant chapters. More nurseries especially temporary nurseries at project sites have to be established during the plan period. Some important aspects of nursery techniques are reproduced again as under:

- i) Around 10 square metres of nursery space are required to prepare planting material to plant one hectare area.
- ii) The nursery soil should be preferably deep sandy loam prepared as a mixture of soil, sand and manure in ratio of 6:3:1.
- iii) In case of prickings into bags, usually 2500 bags are kept in each sunken bed for planting one hectare area at the spacing of 2m x 2m.
- iv) An assured water supply is the foremost requirement of any nursery site.
- v) Seeds should be thoroughly ripened before sowing.

20.8. Compartments, Beats and Blocks

- 20.8.1 The statement showing the compartment-wise breakup of beats, blocks and ranges is shown in Appendix-IV. The compartments 8/K, 9/K, 10/K and 11/K of Kathua range have been affected by the construction of the Ranjit Sagar Dam and have been partly submerged in the lake. The new boundaries have accordingly been digitized based on satellite imagery and the new areas reflected in the estate area statement. Also, the compartments 10/K, 11/K, 12/K, 13/K, 14/K and 16/K measuring a total of 2,787 ha have been handed over to the Wildlife Department as Thein Conservation Reserve. The detailed breakup of area of these compartments has been provided in the Estate Area Statement in Appendix-III.
- 20.8.2 The Samba range is composed of compartments in two series i.e., Devak series (1/D to 7b/D, 23/D and 26/D to 63/D) and Basantar series (1/B to 82/B) based on watershed principles. It has been noted with concern that in most of the cases,

the field staff were oblivious of this distinction. Even in the previous working plans, the lists of compartments comprising beats and blocks omitted mentioning the distinctive /D and /B terminology with the result that even the composition of blocks and beats is not clear. To add to the confusion, the administrative blocks also feature one "Basantar" Block in which all the compartments are of /D-series. To resolve this confusion, it is recommended that Block and Beat maps provided with this plan be made available to the field staff and an orientation workshop be held in which the entire executive staff from Range Officers to Guards be acquainted with the administrative units, the watershed based series, and the necessity of preserving the nomenclature of compartments as unique identity. It is also suggested that the name of the administrative block "Basantar" may be changed so that unnecessary confusion is avoided. The composition of Samba range is again reproduced in Table 20.1 below.

Table 20.1

Range	Block	Beat	Compartments
		Goran	37/B to 39/B and 42/B to 47/B
	Goran	Leaki	72/B to 82/B
		Jar Jareli	64/B to 71/B
		Sumb	49/B to 63/B
	Samam	Soram	30/B to 36/B and 40/B
	Soram	Samotha	22/B to 24b/B, 41/B and 48/B
		Jeer	19/B, 20/B, 21/B, 25/B to 29/B
Samba	Kali	Leani	13/B to 18/B
Samba		Bharatgarh	1/B, to 10/B
		Bagooni	11/B, 12/B
		Mansar Nali	36/D to 47/D
		Mohar Garh	23/D, 26/D to 35/D, 48/D to 56/D
		Durie	57/D, 58/D
		Nandni	59/D and 60/D
	Basantar	Khirdi	2/D, 3a/D, 3b/D and 4/D
		Bee Kameela	61/D, 62/D, 63/D
		Labli	1/D, 5/D, 6/D, 7a/D, 7b/D

Compartment-wise composition of beats and blocks in Samba Range.

- 20.8.3 The compartments in Kathua range are numbered as 1 to 4 and then from 8 to 38. The compartments 1 to 4 exist on the southern boundary of the range and form a part of a series of compartments continuing as a belt from Kathua to Jasrota ranges composing the erstwhile "Bamboo compartments".
- 20.8.4 The compartments 1 to 6 in Jasrota range now form the Jasrota Wildlife Sanctuary. Earlier, compartments 1 to 15 on the southern edge of Jasrota range formed part of the above mentioned "Bamboo compartments" and the numbering of the compartments of Jasrota range again started from 13 onwards from the northern part of the range. To resolve this confusion, the compartments 12 to 15 on the southern side were renamed as 12a, 12b, 12c and 12d by the

previous WPO. Since this resolves the issues admirably, it has been decided to continue the same scheme in this working plan as well.

20.9. Maps

20.9.1 Boundaries of the compartment/sub-compartments have been digitized using copies of Survey of India Toposheets georeferenced and mosaicked to cover the whole area of the Division, Previous Working Plan maps, IRS-1D LISS-IV satellite imagery obtained from PI Division and contour map prepared from SRTM data keeping the Compartment Descriptions of the Previous Plan as reference. Following maps have been prepared and are being submitted with the Draft Plan.

a. Working Plan Maps. Three working plan maps, one for each range, have been prepared on 1:50,000 scale showing boundaries of compartments, sub-compartments, ranges and divisions and are submitted in two sets each.

b. Stock Maps. Consolidated stock map of the Division prepared on 1:50,00 scale and are submitted (three copies). Individual Compartment/Sub-compartment stock maps have been prepared on 1:15,000 scale and are submitted in range wise sets.

c. Management Maps. Management map of the entire Division has been prepared n 1:50,000 scale showing allotment of compartments to the various working circles and submitted in three copies. Management maps of the individual Ranges on 1:50,000 scale are submitted in two sets each.

20.10. Compartment Descriptions

20.10.1 Compartment description forms were checked for mistakes and re-typed. A few compartment descriptions were missing and have been written for these compartments anew. Three copies of each compartment description arranged/filed range—wise are being submitted. Compartment History Files have been prepared individually for all compartments. Each file containing stock map of the compartment, compartment description and blank sheets is being submitted.

20.11. Draft Plan

20.11.1 The draft working plan for the period 2017-2027 is being submitted in duplicate.

CHAPTER-XXI

Staff And Labour Supply

21.1 Establishment

- 21.1.1 The present staff strength of the present Kathua Territorial Forest division is given in Chapter V and is considered sufficient to cope up with existing work load.
- 21.1.2 In view of the multifarious activities of the department, modernization of infrastructure is required to be done in this division. It includes a good communication network i.e. telephones and internet connecting divisional office with range offices and check posts.
- 21.2.1 As already mentioned, the Kathua Forest Division has been further bifurcated and Kathua and Samba Forest Divisions have been formed. Kathua FD now has two ranges, Kathua and Jasrota. The existing Kathua range is quite a truncated version of what it used to be prior to 1981. Compartments 8, 9, 10 and 11 have been affected by formation of the lake at Ranjit Sagar Dam. Compartments 5,6 and 7 were already transferred from Kathua Forest Division earlier. Now, compartments 10, 11, 12, 13, 14 and 16 have been transferred to Wildlife Department for establishment of Thein Conservation Reserve.
- 21.2.2 Compartments 1 to 6 of the Bamboo compartments of Jasrota range have been transferred to the Wildlife Department for formation of the Jasrota Wildlife Sanctuary. The detail of existing blocks, beats and compartments is given in Annexure-IV.

21.2 Labour Supply

- 21.2.1 Availability of labour for forestry works is not a problem in this area except during the periods when local people get busy in agricultural works like hoeing, sowing, cutting, harvesting etc. In addition to the local labour, adequate force of labour comes from other states as well.
- 21.2.2 Labour engaged in various forestry operations like bamboo working, cultural operations, nursery preparation, fire control etc. should be trained properly.

CHAPTER-XXII Control

22.1. Control Forms

22.1.1 According to standard procedure, following control forms are prescribed to be maintained.

a) Control Form "A"

It is maintained in standard form for recording major markings and other subsidiary markings done in Chir Working Circle and Bamboo Working Circle, separately for the two working circles. In this form volume marked and prescribed yield is noted and plus minus account shown in annual abstract. The balance is carried to the next year.

b) Control Form "B"

It is to be maintained in the standard form for yield realised from the unallotted area of the Chir Working Circle.

c) Control Form "C"

It is to be maintained to record the progress of regeneration works in respect of areas taken up for artificial regeneration. Only when such an area is adequately regenerated, it is to be written off from this form.

d) Control Form "D"

This control form indicates proposals of territorial DFOs for marking during next three years. It is submitted to the Conservator of Forests, Working Plan and Research Circle, through CF (Territorial), every year in January who will convey his approval after consultation with the Chief Conservator of Forests by March of the same year.

22.2. Compartment Histories

22.2.1 The compartment history book shall contain complete record of all the major events that happen in the compartment e.g. volume marked and out turn obtained, details of cultural operations, status of regeneration, damage due to fire, insect-pest attack, encroachment etc. An officer, not below the rank of Range Forest Officer should make an entry summarising the details of operations and other events in the compartment history book at the close of every year and send a copy to the DFO. The DFO should maintain the compartment histories on the basis of information given by Range Officers and a copy of same should be sent to the Conservator of Forests, Working Plan & research. It is unfortunate that such

an important record is not being maintained in the territorial divisions. In Kathua Forest Division, these records are not being maintained.

22.3. Divisional Journal

21.3.1 This is an important document which should be maintained in the division and updated regularly. It should contain the detailed records of important information of all kinds like regeneration, plantation, soil conservation works, their success or failure and reasons thereof, seed years, disease, Insect –pest attack, statistics of timber and fuel wood out turn, contracts, bridges, roads, buildings, meteorological data etc. On the analogy of Divisional Journal, records must be maintained at range and block levels.

22.4. Guard Books

22.4.1 Maintenance of guard books have by and large remained neglected. Each guard book must contain an enlarged working plan map of respective beat. The number of chaks and number of boundary pillars on the outer line as well as that in chak boundaries should be clearly marked, numbered and entered in the guard book. The beat maps, boundary description number and name of compartments, chaks etc should be entered in the guard book. The damage cases, encroachments, fire incidences etc should also be entered. All these things should be checked periodically by Block Officers, Range Officer (once in a month) and DFO (once in six months).

CHAPTER-XXIII

Financial Forecast And Cost Of The Plan

23.1. Introduction

The annual expenditure of Kathua Forest Division has been more than annual Revenue since a very long time (Table 23.1). The Resin extraction was stopped in 1992-93 and the Khair markings were stopped in 1991-92 which were the main Revenue sources to the Division. Low plan fund allocation in forestry, unplanned management, poor protection and poor supervision are reasons for decreasing Revenue over the years.

23.2 Revenue and Expenditure

Table 23.1 shows the revenue and expenditure of the division from FY 2000-01 to FY 2015-16. The expenditure has been consistently on the higher side than the revenue generated. A large part of the expenditure is spent on the salaries of staff and wages of helpers and other non-regularised workers.

Table 23.1

Revenue and expenditure of Kathua Forest Division from

S. No.	Year	Revenue (In Rs)	Expenditure (In Rs)
1	2000-01	55,79,187.96	1,82,47,329.00
2	2001-02	27,88,272.63	1,96,01,319.00
3	2002-03	26,22,973.58	2,09,27,531.16
4	2003-04	34,53,048.92	2,22,55,259.76
5	2004-05	46,40,205.09	2,24,50,646.00
6	2005-06	45,22,517.31	2,19,61,456.00
7	2006-07	20,71,793.07	2,80,77,349.00
8	2007-08	27,04,802.19	2,62,87,015.00
9	2008-09	25,35,667.57	2,96,78,319.00
10	2009-10	88,57,346.38	3,91,00,335.00
11	2010-11	76,99,766.55	4,21,22,155.00
12	2011-12	83,46,429.24	5,78,80,933.00
13	2012-13	1,23,26,188.00	6,86,88,435.00
14	2013-14	1,19,68,255.00	6,15,47,583.00
15	2014-15	1,30,84,185.00	6,58,17,038.00
	Total	9,32,00,638.49	54,46,42,702.92

2000-01 to 2015-16.

23.3 Future Revenue

Resin extraction has not been recommended in this Working Plan. The Khair and Bamboo crops cannot give much revenue due to their degraded condition. Therefore revenue from forest produce is not possible until the forests are rehabilitated and in a position to generate sustained profits. Already, the conditions have started to show an improved outlook. This is a crucial time for due care to be taken that regeneration comes up and gets established, and the conditions of the natural forests are improved. Till such time as the forests start generating outturn and profits, working of Bamboo, collection of grazing fees, agroforestry and medicinal plant cultivation and extraction and issuing of TPs can provide some revenue.

23.4. Cost of the Plan

23.4.1 The total expenditure incurred on the revision of this working plan works out as under:-

S.No	Division	Financial Year	Amount (Lakh Rs.)
1	Kathua FD	2010-11	3.24
2	Kathua FD	2011-12	5.99
3	Kathua FD	2012-13	0.60
4	Kathua FD	2013-14	0.97
5	Resources Survey Division	2014-15	1.87
6	Resources Survey Division	2015-16	7.50
7	Resources Survey Division	2016-17	1.50
	TOTAL		21.67

 Table 23.2 Year-wise fund expenditure for Working Plan exercise

23.4.2 The total expenditure in the revision of the plan was **Rs. 21.67 lakh** for an area of 45121 Ha., which works out to Rs. 48.03 per Ha.

23.5 Future Expenditure

23.5.1 Non Plan Expenditure

The estimated expenditure of Kathua Forest Division under Non-Plan head, for next 10 years (keeping in view the escalation involved) is worked out as under:

Items	Amount (in Lack Rs)
Salary, TE, OE, POL, Buildings, Firewood, Timber,	10,000
Miscellaneous etc.	

23.5.2. Plan Expenditure

As per the plantation scheme given in the earlier chapters, the major component of Plan or Capital expenditure are artificial regeneration, aided natural regeneration and subsidiary silvicultural operations. The forecast for future expenditure in the Division over the next 20 years for forestry development schemes are therefore worked out Working Circle wise as follows:

a. Chir Working Circle

(60% of the total area of 16,153 ha to be treated in next 20 years.)

Component	Area (Ha)	Average cost per hectare (Lakh Rs)	Amount required (Lakh Rs)
Artificial Regeneration (AR) @ 20% of the working circle's area	3,230	2.00	6,460
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	3,230	1.00	3,230
Silvicultural Operation @ 20% of the working circle's area	3,230	0.50	1,615
Total (60% of the total area)	9,692		11,305

b. Broadleaf Working Circle

(60% of the total area of 9682 ha is to be treated in next 20 years.)

Component	Area (Ha)	Average expenditure per hectare (Lakh Rs)	Amount required (Lakh Rs)
Artificial Regeneration (AR) @ 20% of the working circle's area	1,936	2.00	3,872.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	1,936	1.00	1,936.00
Silvicultural Operation @ 20% of the working circle's area	1,937	0.50	968.00
Total (60% of the total area)	5,809		6,776.00

c. Bamboo Working Circle

Component	Area (Ha)	Average expenditure per hectare (Lakh Rs)	Amount required (Lakh Rs)
Artificial Regeneration (AR) @ 20% of the working circle's area	431	2.00	862.00
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	431	1.00	431.00
Silvicultural Operation @ 20% of the working circle's area	430	0.50	215.50
Total (60% of the total area)	1,292		1,508.50

(60% of the total area of 2153 ha is to be treated for next 20 years)

d. Rehabilitation Cum Protection Working Circle

(60% of the total area of 17133 ha is to be treated for next 20%	vears)
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Component	Area (Ha)	Average expenditure per hectare (Lakh Rs)	Amount required (Lakh Rs)
Artificial Regeneration (AR) @ 20% of the working circle's area	3,426	2.00	6,853
Aided Natural Regeneration (ANR) @ 20% of the working circle's area	3,426	1.00	3,426
Silvicultural Operation @ 20% of the working circle's area	3,428	0.50	1,713
Total (60% of the total area)	10,280		11,992

The Total Plan expenditure thus is projected to be Rs. 31,581.50 lakhs for next 20 years, while the Annual Plan expenditure would be Rs. 20,189 lakhs

23.5.2 As already mentioned is preceding chapters, all the departments/ wings involved in forestry and soil conservation works should work in tandem to achieve the desired physical as well as financial targets. Further in order to achieve the said physical and financial targets, more centrally sponsored schemes and externally aided projects need to be launched since the most of the investment has to be made for the rehabilitation of the degraded areas which are quite abundant in this forest division. Also, demarcation work has to be completed on highest priority.

APPENDIX-I

Statement of area according to information given in form-1 of Kathua Forest Division

щ	Year of	Forest			Area		No of	No of	Area of Chak				No of
#	Demarcation	Forest	Acre	Kanal	Marla	Hectares	Pillars	Chaks	Acre	Kanal	Marla	Hectares	Chaks
	RANGE KATHUA												
1	20-06-1983	Bera Naal	160	2	15	64.89	31		6	7	10	2.81	15
2	12-11-1984	Jasu garh	3311	1	8	1340.01	253		6	6	0	2.73	12
3	20-06-1983	Seri kotla	223	4	7	90.47	52		0	0	0	0	-
4	24-11-1985	Baira	871	1	5	352.55	112		794	1	5	321.39	27
						0			77	6	8	31.49	
5	26-07-1985	Domar	2847	0	0	1152.17	417	15	52	0	0	21.04	106
6	13-09-2000	Kanara	1502	2	10	607.98	132	5	18	3	6	7.45	39
7	13-09-2000	Salahar	119	7	13	48.55	54					0	
8	13-09-2000	Tridwan kashowri	778	0	11	314.88	103	2	30	3	13	12.33	14
9	13-09-2000	Dhanor Nonal	281	5	4	113.98	103					0	
10	13-09-2000	Dhanorie Tridwan	370	3	12	149.92	149					0	
11	13-09-2000	Dana-dhanor	104	7	3	42.45	32					0	
12	13-09-2000	Maha	111	6	16	45.27	23					0	
13	13-09-2000	Karroh	872	4	11	353.12	199	1	8	1	1	3.29	22
14	13-09-2000	Sawala Dhamni	254	2	11	102.92	72					0	
15	13-09-2000	Bardui	521	2	2	210.95	104					0	
16	13-09-2000	Rakh Jalphar	602	0	0	243.63	68					0	
17	13-09-2000	Paryag Bar	194	0	0	78.51	45					0	

ш	Year of	Famat			Area		No of	No of		No of			
<i>#</i>	Demarcation	Forest	Acre	Kanal	Marla	Hectares	Pillars	Chaks	Acre	Kanal	Marla	Hectares	Chaks
18	13-09-2000	Salahri Forest	882	5	2	357.2	289					0	13
19	13-09-2000	Bohra Forest	387	0	0	156.62	21					0	
20	13-09-2000	Sangan	113	4	5	45.95	34					0	
21	13-09-2000	Jothana	2644	6	17	1070.36	248	10				0	95
22	13-09-2000	Bindli	1152	4	12	466.44	171	11	90	2	12	36.55	91
23	13-09-2000	Gomel	886	7	8	358.93	252	8	18	2	5	7.4	73
24	13-09-2000	Rajnala	1756	7	16	711.04	152	11	91	3	12	37.01	87
25	139-2000	Janglote	1492	1	4	603.86	466	1				0	5
26	02-06-1983	Androta	683	3	3	276.57	115	6	72	0	18	29.18	52
27	13-09-2000	Bhoran	757	0	0	306.35	173	8	2	4	0	1.01	
	RANGE JASR	OTA											
1	20-09-2000	Jasrota No. I	648	16	0	263.05	94					0	
2	20-09-2000	Jasrota No. II	1463	4	11	592.3	106	2				0	
3	20-09-2000	Kodi Bagni	1454	0	0	588.43	162	3	15	1	1	6.12	
4	20-09-2000	Bhaya sallan	1322	3	16	535.2	172	3	21	5	11	8.78	
5	20-09-2000	Mastgarh	2328	0	0	942.13	159	17	242	7	5	98.3	143
6	20-09-2000	MahaDev Nal	732	2	1	296.34	138	8				0	89
7	22-09-2000	Dramani	182	0	0	73.65	37	1	2	7	0	1.16	6
8	22-09-2000	Kohli Koppar	1256	0	0	508.3	138	9	45	0	0	18.21	63
9	22-09-2000	Panjooth	1182	0	0	478.35	213	7	68	1	19	27.62	71
10	22-09-2000	Thein	133	0	0	53.82	30					0	
11	22-09-2000	Maltha Forest	482	2	8	195.18	82	2	8	4	4	3.45	11
12	22-09-2000	Dinga Amb				0						0	

щ	Year of	Ferrent			Area		No of	No of	Area of Chak			No of	
#	Demarcation	Forest	Acre	Kanal	Marla	Hectares	Boundary Pillars	Chaks	Acre	Kanal	Marla	Hectares	Chaks
13	22-09-2000	Katehar	823	0	0	333.06	96					0	
14	22-09-2000	Tehra Porth	803	0	0	324.97	119	6	59	4	7	24.1	46
15	22-09-2000	Bera Forest	1353	0	0	547.55	163	11	95	4	8	38.67	79
16	22-09-2000	Gurha Panditian	1055	0	0	426.95	93	3	7	5	4	3.1	36
17	22-09-2000	Chaggli Dhar	454	0	0	183.73	154	1	2	5	12	1.09	7
18	22-09-2000	Dinga Amb Katli	611	0	0	247.27	100	3	17	7	8	7.25	19
19	22-09-2000	Katli Chelak	341	0	0	138	83	1	8	3	7	3.41	10
20	22-09-2000	Ratwana	133	0	0	53.82	34	1	1	0	0	0.4	4
21	22-09-2000	Kirmachi	455	0	0	184.14	89	3	30	1	6	12.21	28
22	22-09-2000	Surrara - I	540	0	0	218.54	46	2	3	4	17	1.46	9
23	22-09-2000	Surrara Kotla Forest	1757	0	0	711.05	141	5	28	14	5	12.05	35
24	22-09-2000	Nonath Forest	1020	0	0	412.79	97					0	
25	22-09-2000	Said Kootah	1465	3	4	593.04	285	13	54	0	19	21.9	86
26	22-09-2000	Naro-Da-Langa	396	0	0	160.26	78					0	
15	22-09-2000	Bera Forest				0						0	
16	22-09-2000	Gurha Panditian				0						0	
	RANGE SAMBA												
1	23-09-2000	Sorham	2076	0	0	840.15	109	16	83	0	10	33.61	150
2	23-09-2000	Kali-Purani	4450	15	0	1801.65	62	8	556	2	11	225.14	49
						0			3	0	14	1.25	
3	-	Daboh Nandne	666	0	0	269.53	48	1				0	10
4	-	Bree kamila	1366	0	9	552.84	40					0	

# Year of		Forest			Area		No of	No of		No of			
#	Demarcation	Forest	Acre	Kanal	Marla	Hectares	Pillars	Chaks	Acre	Kanal	Marla	Hectares	BPS of Chaks
5	-	Goran Dhar	4667	0	0	1888.71	419					0	176
6	-	Belian Blater	3149	0	12	1274.41	74					0	
7	-	Dogotor	207	0	0	83.77	36					0	13
8	-	Lovely	101	3	5	41.04	58					0	5
9	-	Bharatgarh	3351	0	0	1356.13	212					0	139
10	-	Leyani Bagooni	4395	0	0	1778.63	166					0	
11	-	Mohargarh	4949	0	0	2002.83	334					0	147
12	-	Kupri Multh Nud	170	5	3	69.06	27					0	
13	-	Keyani	219	0	0	88.63	47	1				0	7
14	-	Keyarri	9	18	0	4.55						0	
	Total					30779.42						1062.96	

APPENDIX-II

Estate area statement of Kathua Forest Division

S	Dongo	Comp -	Dlask	Deat	Area (in hectares) as per GIS						Previous	Working Cirolo
No	Kange	artment	DIOCK	Deat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
1	Kathua	1/K	Budhi	Budhi	0.00	164.24	0.00	61.83	7.73	233.80	Biodiv Cons WC	Bamboo Rehab WC
2	Kathua	2/K	Budhi	Budhi	0.00	214.46	0.00	65.15	5.43	285.04	Biodiv Cons WC	Bamboo Rehab WC
3	Kathua	3/K	Budhi	Barwal	0.00	0.00	340.79	0.00	33.19	373.98	Bamboo I WC	Bamboo Rehab WC
4	Kathua	4/K	Budhi	Barwal	0.00	0.00	331.57	0.00	0.00	331.57	Bamboo I WC	Bamboo Rehab WC
5	Kathua	8/K	Basantpur	Manu	29.24	155.07	0.00	0.00	0.00	184.31	Khair I WC	Broadleaf Imp WC
6	Kathua	9/K	Basantpur	Thein	97.93	211.82	0.00	0.00	0.00	309.75	Khair I WC	Broadleaf Imp WC
7	Kathua	10/K	Basantpur	Thein	281.01	154.08	0.00	0.00	0.00	435.10	Chir I WC	Thein Cons Res
8	Kathua	11/K	Basantpur	Thein	148.09	47.94	0.00	0.00	0.00	196.04	Grazing WC	Thein Cons Res
9	Kathua	12/K	Basantpur	Thein	197.47	445.16	0.00	0.00	0.00	642.62	Bamboo I WC	Thein Cons Res
10	Kathua	13/K	Basantpur	Nora	197.50	318.88	0.00	0.00	0.00	516.39	Grazing WC	Thein Cons Res
11	Kathua	14/K	Basantpur	Tank di Garhi	91.34	478.47	0.00	0.00	46.37	616.18	Plantation WC	Thein Cons Res
12	Kathua	15/K	Basantpur	Tank di Garhi	49.58	618.82	0.00	65.45	24.79	758.65	Plantation WC	Rehab/Prot WC
13	Kathua	16/K	Basantpur	Nora	0.00	0.00	0.00	380.86	0.00	380.86	Grazing WC	Thein Cons Res
14	Kathua	17/K	Basantpur	Dhana Dhanore	0.00	576.05	0.00	60.69	0.00	636.74	Khair I WC	Broadleaf Imp WC
15	Kathua	18a/K	Basantpur	Dhana Dhanore	0.00	402.09	0.00	168.24	0.00	570.33	Khair I WC	Broadleaf Imp WC
16	Kathua	18b/K	Basantpur	Dhana Dhanore	0.00	407.56	38.82	189.22	0.00	635.60	Bamboo I WC	Rehab/Prot WC
17	Kathua	19/K	Basantpur	Dhana Dhanore	0.00	48.02	0.00	288.11	73.83	409.96	Grazing WC	Rehab/Prot WC
18	Kathua	20a/K	Basantpur	Nora	0.00	0.00	0.00	130.28	0.00	130.28	Khair I WC	Broadleaf Imp WC
19	Kathua	20b/K	Basantpur	Nora	0.00	296.25	0.00	0.00	67.42	363.67	Khair I WC	Broadleaf Imp WC

S	Damas	Comp -	Dlask	Deat	Area (in hectares) as per GIS						Previous	Warking Circle
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
20	Kathua	21a/K	Basantpur	Tank di Garhi	0.00	395.97	0.00	0.00	44.67	440.65	Plantation WC	Rehab/Prot WC
21	Kathua	21b/K	Basantpur	Tank di Garhi	0.00	230.89	0.00	0.00	53.54	284.43	Plantation WC	Rehab/Prot WC
22	Kathua	22/K	Basantpur	Tank di Garhi	475.99	360.14	0.00	0.00	0.00	836.13	Chir I WC	Chir Rehab WC
23	Kathua	23/K	Basantpur	Tank di Garhi	17.44	311.02	0.00	0.00	34.88	363.34	Plantation WC	Rehab/Prot WC
24	Kathua	24/K	Janglote	Dilwan Dole	0.00	32.44	0.00	416.70	0.00	449.14	Khair I WC	Broadleaf Imp WC
25	Kathua	25/K	Janglote	Dilwan Dole	0.00	414.33	0.00	0.00	0.00	414.33	Khair I WC	Broadleaf Imp WC
26	Kathua	26/K	Janglote	Janglote II	0.00	679.31	0.00	0.00	0.00	679.31	Khair I WC	Broadleaf Imp WC
27	Kathua	27/K	Janglote	Janglote I	14.64	342.56	0.00	0.00	0.00	357.20	Khair I WC	Broadleaf Imp WC
28	Kathua	28/K	Budhi	Sundri Kote	49.89	714.72	0.00	0.00	0.00	764.61	Plantation WC	Rehab/Prot WC
29	Kathua	29a/K	Basantpur	Tank di Garhi	653.05	0.00	0.00	0.00	0.00	653.05	Chir I WC	Chir Rehab WC
30	Kathua	29b/K	Budhi	Sundri Kote	734.55	0.00	0.00	0.00	54.01	788.56	Chir I WC	Chir Rehab WC
31	Kathua	30/K	Budhi	Jothana	12.78	277.00	0.00	0.00	0.00	289.79	Grazing WC	Rehab/Prot WC
32	Kathua	31/K	Budhi	Ghati	24.88	297.40	0.00	0.00	0.00	322.29	Grazing WC	Rehab/Prot WC
33	Kathua	32/K	Budhi	Ghati	185.12	139.39	0.00	0.00	0.00	324.51	Chir I WC	Chir Rehab WC
34	Kathua	33/K	Budhi	Jothana	0.00	0.00	0.00	128.36	82.52	210.87	Grazing WC	Rehab/Prot WC
35	Kathua	34/K	Budhi	Jothana	26.66	401.96	0.00	0.00	0.00	428.61	Grazing WC	Rehab/Prot WC
36	Kathua	35/K	Budhi	Jothana	26.14	303.20	0.00	67.96	0.00	397.29	Grazing WC	Rehab/Prot WC
37	Kathua	36/K	Budhi	Sundri Kote	439.94	0.00	0.00	0.00	0.00	439.94	Chir I WC	Chir Rehab WC
38	Kathua	37/K	Budhi	Sundri Kote	505.93	0.00	0.00	40.39	0.00	546.32	Chir I WC	Chir Rehab WC
39	Kathua	38/K	Budhi	Sundri Kote	593.02	0.00	0.00	0.00	0.00	593.02	Chir I WC	Chir Rehab WC
40	Jasrota	1/J			5.14	74.95	113.06	0.00	0.00	193.15	Biodiv Cons WC	Jasrota WLS
41	Jasrota	2/J			0.00	53.02	35.60	0.00	0.00	88.63	Biodiv Cons WC	Jasrota WLS
42	Jasrota	3/J			0.00	31.24	37.25	81.71	0.00	150.20	Biodiv Cons WC	Jasrota WLS

S	Danga	Comp -	Dlook	Deat	Area (in hectares) as per GIS					Previous	Working Circle	
No	Range	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
43	Jasrota	4/J			0.00	99.67	15.69	34.15	0.00	149.51	Biodiv Cons WC	Jasrota WLS
44	Jasrota	5/J			0.00	46.29	0.00	75.08	0.00	121.37	Biodiv Cons WC	Jasrota WLS
45	Jasrota	6/J			0.00	47.26	10.27	0.00	0.00	57.53	Biodiv Cons WC	Jasrota WLS
46	Jasrota	7/J	Dinga Amb	Behari	0.00	6.80	33.02	26.22	0.00	66.04	Bamboo I WC	Bamboo Rehab WC
47	Jasrota	8/J	Dinga Amb	Behari	0.00	33.57	83.92	50.35	0.00	167.83	Bamboo I WC	Bamboo Rehab WC
48	Jasrota	9/J	Dinga Amb	Behari	0.00	24.33	0.00	72.22	0.00	96.55	Bamboo I WC	Bamboo Rehab WC
49	Jasrota	10/J	Dinga Amb	Kori Bagni	0.00	0.00	18.25	73.90	0.00	92.15	Bamboo I WC	Bamboo Rehab WC
50	Jasrota	11/J	Dinga Amb	Kori Bagni	0.00	153.60	0.00	37.73	0.00	191.32	Bamboo I WC	Bamboo Rehab WC
51	Jasrota	12a/J	Dinga Amb	Sallan	0.00	48.88	0.00	49.77	0.00	98.65	Bamboo I WC	Bamboo Rehab WC
52	Jasrota	12b/J	Dinga Amb	Sallan	0.00	34.04	0.00	39.88	0.00	73.92	Bamboo I WC	Bamboo Rehab WC
53	Jasrota	12c/J	Dinga Amb	Mela	0.00	0.00	0.00	99.56	0.00	99.56	Bamboo I WC	Bamboo Rehab WC
54	Jasrota	12d/J	Dinga Amb	Mela	0.00	0.00	0.00	42.28	0.00	42.28	Bamboo I WC	Bamboo Rehab WC
55	Jasrota	13/J	Rajwalta	Galak	145.88	34.39	0.00	13.31	0.00	193.58	Chir I WC	Chir Rehab WC
56	Jasrota	14/J	Rajwalta	Galak	151.78	15.18	0.00	8.09	0.00	175.05	Chir I WC	Chir Rehab WC
57	Jasrota	15/J	Rajwalta	Galak	189.27	16.35	0.00	15.92	0.00	221.54	Chir I WC	Chir Rehab WC
58	Jasrota	16/J	Rajwalta	Galak	149.43	18.87	0.00	11.92	0.00	180.22	Chir I WC	Chir Rehab WC
59	Jasrota	17/J	Rajwalta	Galak	266.70	28.65	0.00	7.71	0.00	303.07	Chir I WC	Chir Rehab WC
60	Jasrota	18/J	Rajwalta	Rajwalta	167.47	0.00	0.00	0.00	0.00	167.47	Chir I WC	Chir Rehab WC
61	Jasrota	19/J	Rajwalta	Rajwalta	482.29	42.45	0.00	0.00	0.00	524.74	Chir I WC	Chir Rehab WC
62	Jasrota	20/J	Rajwalta	Rajwalta	56.17	5.62	0.00	0.00	0.00	61.78	Chir I WC	Chir Rehab WC
63	Jasrota	21/J	Rajwalta	Rajwalta	138.23	0.00	0.00	196.10	0.00	334.33	Chir I WC	Chir Rehab WC
64	Jasrota	22/J	Rajwalta	Rajwalta	127.89	9.53	0.00	0.00	13.56	150.98	Chir I WC	Chir Rehab WC
65	Jasrota	23/J	Mastgarh	Mastgarh	140.89	0.00	0.00	95.29	12.86	249.03	Chir I WC	Chir Rehab WC

S	Damas	Comp -	Dlask	Deat	Area (in hectares) as per GIS						Previous	Warking Circle
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
66	Jasrota	24/J	Mastgarh	Mastgarh	51.06	32.83	0.00	78.42	10.03	172.34	Chir I WC	Chir Rehab WC
67	Jasrota	25/J	Mastgarh	Mastgarh	33.01	0.00	0.00	112.48	6.52	152.01	Chir I WC	Chir Rehab WC
68	Jasrota	26a/J	Mastgarh	Mastgarh	61.37	37.94	0.00	109.36	0.00	208.67	Chir I WC	Rehab/Prot WC
69	Jasrota	26b/J	Mastgarh	Mastgarh	0.00	0.00	0.00	187.89	9.66	197.55	Plantation WC	Rehab/Prot WC
70	Jasrota	26c/J	Mastgarh	Mastgarh	4.90	0.00	0.00	252.43	25.49	282.82	Plantation WC	Rehab/Prot WC
71	Jasrota	26d/J	Mastgarh	Mastgarh	0.00	0.00	0.00	105.29	0.00	105.29	Plantation WC	Rehab/Prot WC
72	Jasrota	27/J	Mastgarh	Mastgarh	109.76	0.00	0.00	102.98	0.00	212.74	Chir I WC	Chir Rehab WC
73	Jasrota	28/J	Rajwalta	Thein	37.47	0.00	0.00	93.08	0.00	130.55	Chir I WC	Chir Rehab WC
74	Jasrota	29/J	Rajwalta	Thein	12.27	0.00	0.00	74.39	0.00	86.66	Plantation WC	Rehab/Prot WC
75	Jasrota	30/J	Rajwalta	Thein	48.13	0.00	0.00	57.11	0.00	105.24	Chir I WC	Chir Rehab WC
76	Jasrota	31/J	Rajwalta	Thein	56.32	0.00	0.00	49.73	0.00	106.04	Chir I WC	Chir Rehab WC
77	Jasrota	32a/J	Rajwalta	Thein	55.75	0.00	0.00	149.43	22.85	228.03	Plantation WC	Chir Rehab WC
78	Jasrota	32b/J	Rajwalta	Thein	39.03	12.76	0.00	37.15	0.00	88.93	Chir I WC	Chir Rehab WC
79	Jasrota	33/J	Rajwalta	Thein	75.59	0.00	0.00	92.50	20.89	188.99	Chir I WC	Chir Rehab WC
80	Jasrota	34/J	Dinga Amb	Dinga Amb	14.48	24.94	0.00	28.96	0.00	68.37	Plantation WC	Rehab/Prot WC
81	Jasrota	35/J	Dinga Amb	Dinga Amb	7.18	16.02	0.00	62.97	0.00	86.17	Plantation WC	Rehab/Prot WC
82	Jasrota	36/J	Mastgarh	Kathera	0.00	13.54	0.00	58.67	0.00	72.21	Grazing WC	Rehab/Prot WC
83	Jasrota	37/J	Mastgarh	Kathera	0.00	31.72	0.00	161.50	7.21	200.43	Grazing WC	Rehab/Prot WC
84	Jasrota	38/J	Mastgarh	Kathera	4.13	0.00	0.00	90.02	6.61	100.75	Plantation WC	Rehab/Prot WC
85	Jasrota	39/J	Mastgarh	Kathera	6.59	5.86	0.00	74.68	10.25	97.38	Grazing WC	Rehab/Prot WC
86	Jasrota	40/J	Mastgarh	Kathera	13.34	16.42	0.00	46.19	8.21	84.17	Plantation WC	Rehab/Prot WC
87	Jasrota	41/J	Mastgarh	Kathera	15.70	0.00	0.00	192.66	10.47	218.83	Grazing WC	Rehab/Prot WC
88	Jasrota	42/J	Mastgarh	Kathera	13.23	0.00	0.00	60.15	8.42	81.81	Grazing WC	Rehab/Prot WC

S No	Range	Comp - artment	Block	Beat	Area (in hectares) as per GIS						Previous	
					Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
89	Jasrota	43/J	Mastgarh	Bera	0.00	0.00	0.00	231.80	18.62	250.41	Grazing WC	Rehab/Prot WC
90	Jasrota	44/J	Mastgarh	Bera	117.01	17.24	0.00	29.25	16.19	179.70	Chir I WC	Chir Rehab WC
91	Jasrota	45/J	Mastgarh	Bera	31.25	9.70	0.00	53.35	10.24	104.54	Plantation WC	Rehab/Prot WC
92	Jasrota	46/J	Mastgarh	Bera	0.00	89.22	0.00	40.77	7.68	137.68	Grazing WC	Rehab/Prot WC
93	Jasrota	47a/J	Mastgarh	Bera	0.00	0.00	0.00	0.00	106.42	106.42	Grazing WC	Rehab/Prot WC
94	Jasrota	47b/J	Mastgarh	Bera	0.00	29.98	0.00	68.98	11.93	110.88	Grazing WC	Rehab/Prot WC
95	Jasrota	48a/J	Mastgarh	Bera	0.00	0.00	0.00	34.80	40.70	75.51	Biodiv Cons WC	Rehab/Prot WC
96	Jasrota	48b/J	Mastgarh	Bera	0.00	86.58	0.00	135.38	11.02	232.99	Grazing WC	Rehab/Prot WC
97	Jasrota	49/J	Mastgarh	Kathera	0.00	0.00	0.00	100.97	4.13	105.10	Grazing WC	Rehab/Prot WC
98	Jasrota	50/J	Mastgarh	Kathera	0.00	26.60	0.00	78.29	8.53	113.42	Grazing WC	Rehab/Prot WC
99	Jasrota	51/J	Mastgarh	Kathera	0.00	30.73	0.00	111.47	33.58	175.78	Khair I WC	Broadleaf Imp WC
100	Jasrota	52/J	Dinga Amb	Dinga Amb	0.00	16.83	0.00	35.40	0.00	52.23	Khair I WC	Broadleaf Imp WC
101	Jasrota	53/J	Dinga Amb	Dinga Amb	0.00	17.95	0.00	45.73	6.95	70.62	Khair I WC	Broadleaf Imp WC
102	Jasrota	54/J	Dinga Amb	Dinga Amb	0.00	12.31	0.00	48.40	15.21	75.93	Khair I WC	Broadleaf Imp WC
103	Jasrota	55a/J	Dinga Amb	Dinga Amb	0.00	0.00	0.00	193.40	14.41	207.81	Khair I WC	Broadleaf Imp WC
104	Jasrota	55b/J	Dinga Amb	Dinga Amb	0.00	62.02	0.00	127.59	26.58	216.19	Khair I WC	Broadleaf Imp WC
105	Jasrota	56/J	Dinga Amb	Dinga Amb	0.00	71.26	0.00	64.73	23.94	159.93	Khair I WC	Broadleaf Imp WC
106	Jasrota	57/J	Dinga Amb	Chilik	0.00	22.50	0.00	155.52	8.60	186.62	Khair I WC	Broadleaf Imp WC
107	Jasrota	58/J	Dinga Amb	Chilik	52.51	27.48	0.00	0.00	9.16	89.14	Chir I WC	Chir Rehab WC
108	Jasrota	59/J	Dinga Amb	Chilik	165.05	0.00	0.00	0.00	10.43	175.48	Chir I WC	Chir Rehab WC
109	Jasrota	60/J	Dinga Amb	Chilik	0.00	56.82	0.00	148.19	0.00	205.01	Khair I WC	Broadleaf Imp WC
110	Jasrota	61/J	Dinga Amb	Chilik	0.00	13.86	0.00	79.84	7.21	100.91	Khair I WC	Broadleaf Imp WC
111	Jasrota	62/J	Lower Hiranagar	Surara	0.00	21.69	0.00	108.44	43.38	173.50	Khair I WC	Broadleaf Imp WC
S	Danga	Comp -	Plaak	Post		Area	(in hectar	es) as pe		Previous	Working Cirolo	
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No	Känge	artment	DIOCK	Deat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
112	Jasrota	63/J	Lower Hiranagar	Surara	20.10	0.00	0.00	146.15	24.97	191.21	Khair I WC	Broadleaf Imp WC
113	Jasrota	64/J	Lower Hiranagar	Surara	6.86	11.27	0.00	71.55	9.31	98.99	Khair I WC	Broadleaf Imp WC
114	Jasrota	65/J	Lower Hiranagar	Surara	138.63	0.00	0.00	63.57	51.21	253.41	Chir I WC	Chir Rehab WC
115	Jasrota	66/J	Lower Hiranagar	Surara	247.24	0.00	0.00	0.00	30.84	278.08	Chir I WC	Chir Rehab WC
116	Jasrota	67a/J	Lower Hiranagar	Kotla	57.45	60.76	0.00	24.43	25.76	168.40	Chir I WC	Chir Rehab WC
117	Jasrota	67b/J	Lower Hiranagar	Kotla	12.53	31.55	0.00	138.71	0.00	182.78		Broadleaf Imp WC
118	Jasrota	67c/J	Lower Hiranagar	Kotla	0.00	12.54	0.00	0.00	0.00	12.54	Biodiv Cons WC	Rehab/Prot WC
119	Jasrota	68/J	Lower Hiranagar	Kotla	0.00	0.00	0.00	56.32	6.19	62.51	Khair I WC	Broadleaf Imp WC
120	Jasrota	69/J	Lower Hiranagar	Nonath	0.00	0.00	0.00	154.01	5.36	159.36	Khair I WC	Broadleaf Imp WC
121	Jasrota	70/J	Lower Hiranagar	Nonath	0.00	0.00	0.00	177.17	13.56	190.74	Khair I WC	Broadleaf Imp WC
122	Jasrota	71/J	Lower Hiranagar	Nonath	0.00	0.00	0.00	134.38	0.00	134.38	Khair I WC	Broadleaf Imp WC
123	Jasrota	72/J	Dinga Amb	Mela	7.80	46.81	0.00	144.89	2.60	202.11	Khair I WC	Broadleaf Imp WC
124	Jasrota	73/J	Lower Hiranagar	Said Koota	0.00	60.21	0.00	104.34	11.59	176.14	Khair I WC	Broadleaf Imp WC
125	Jasrota	74/J	Lower Hiranagar	Said Koota	0.00	0.00	0.00	192.84	8.79	201.64	Khair I WC	Broadleaf Imp WC
126	Jasrota	75/J	Lower Hiranagar	Said Koota	151.02	27.92	0.00	0.00	0.00	178.94	Chir I WC	Chir Rehab WC
127	Jasrota	76/J	Lower Hiranagar	Said Koota	92.49	0.00	0.00	0.00	3.26	95.76	Chir I WC	Chir Rehab WC
128	Jasrota	77/J	Lower Hiranagar	Said Koota	61.61	15.25	0.00	0.00	3.66	80.52	Chir I WC	Chir Rehab WC

S	Damas	Comp -	Dlask	Deat	Area (in hectares) as per GIS						Previous	Warking Circle
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
129	Jasrota	78/J	Dinga Amb	Sallan	26.42	12.01	0.00	59.65	0.00	98.08	Chir I WC	Chir Rehab WC
130	Jasrota	79/J	Dinga Amb	Kori Bagni	38.75	28.37	0.00	56.04	4.84	128.00	Biodiv Cons WC	Rehab/Prot WC
131	Jasrota	80/J	Dinga Amb	Kori Bagni	15.10	48.78	0.00	59.23	5.81	128.92	Biodiv Cons WC	Rehab/Prot WC
132	Jasrota	81/J	Dinga Amb	Kori Bagni	7.12	14.23	0.00	86.93	0.00	108.28	Biodiv Cons WC	Rehab/Prot WC
133	Jasrota	82/J	Mastgarh	Bera	57.97	16.56	0.00	0.00	14.20	88.73	Biodiv Cons WC	Rehab/Prot WC
134	Jasrota	83/J	Mastgarh	Bera	55.98	11.20	0.00	4.20	4.90	76.27	Biodiv Cons WC	Rehab/Prot WC
135	Samba	1/B	Kali	Bharatgarh	0.00	85.08	0.00	11.74	0.00	96.82	Khair I WC	Broadleaf Imp WC
136	Samba	2/B	Kali	Bharatgarh	0.00	190.14	0.00	29.05	0.00	219.19	Khair I WC	Broadleaf Imp WC
137	Samba	3/B	Kali	Bharatgarh	0.00	114.90	0.00	0.00	0.00	114.90	Khair I WC	Broadleaf Imp WC
138	Samba	4/B	Kali	Bharatgarh	0.00	51.97	0.00	9.99	0.00	61.96	Khair I WC	Broadleaf Imp WC
139	Samba	5/B	Kali	Bharatgarh	0.00	154.13	0.00	0.00	0.00	154.13	Khair I WC	Broadleaf Imp WC
140	Samba	6a/B	Kali	Bharatgarh	0.00	77.49	0.00	0.00	0.00	77.49	Grazing WC	Rehab/Prot WC
141	Samba	6b/B	Kali	Bharatgarh	0.00	0.00	0.00	93.14	45.58	138.73	Grazing WC	Rehab/Prot WC
142	Samba	7/B	Kali	Bharatgarh	99.20	71.99	0.00	0.00	0.00	171.19	Khair I WC	Broadleaf Imp WC
143	Samba	8/B	Kali	Bharatgarh	57.27	53.45	0.00	0.00	0.00	110.72	Chir I WC	Chir Rehab WC
144	Samba	9/B	Kali	Bharatgarh	0.00	78.52	0.00	20.52	4.46	103.50	Khair I WC	Rehab/Prot WC
145	Samba	10/B	Kali	Bharatgarh	0.00	92.32	0.00	0.00	0.00	92.32	Khair I WC	Broadleaf Imp WC
146	Samba	11/B	Kali	Bhagooni	50.98	116.70	0.00	0.00	10.20	177.88	Chir I WC	Chir Rehab WC
147	Samba	12/B	Kali	Bhagooni	68.57	48.21	0.00	0.00	10.71	127.50	Chir I WC	Chir Rehab WC
148	Samba	13/B	Kali	Leani	82.74	86.52	0.00	0.00	8.65	177.91	Chir I WC	Chir Rehab WC
149	Samba	14/B	Kali	Leani	105.89	48.08	0.00	0.00	8.01	161.99	Chir I WC	Chir Rehab WC
150	Samba	15/B	Kali	Leani	78.10	34.40	0.00	0.00	0.00	112.50	Chir I WC	Chir Rehab WC
151	Samba	16/B	Kali	Leani	137.22	38.42	0.00	0.00	7.68	183.33	Chir I WC	Chir Rehab WC

S	Damas	Comp -	Dlask	Deat	Area (in hectares) as per GIS						Previous	Warking Circle
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
152	Samba	17/B	Kali	Leani	0.00	0.00	0.00	26.03	0.00	26.03	Chir I WC	Chir Rehab WC
153	Samba	18/B	Kali	Leani	83.38	18.53	0.00	0.00	23.16	125.07	Chir I WC	Chir Rehab WC
154	Samba	19/B	Soram	Jeer	9.21	0.00	0.00	173.03	0.00	182.25	Plantation WC	Rehab/Prot WC
155	Samba	20/B	Soram	Jeer	235.96	37.29	0.00	0.00	0.00	273.26	Chir I WC	Chir Rehab WC
156	Samba	21/B	Soram	Jeer	78.52	0.00	0.00	0.00	0.00	78.52	Chir I WC	Chir Rehab WC
157	Samba	22/B	Soram	Samotha	109.35	9.03	0.00	0.00	5.02	123.39	Chir I WC	Chir Rehab WC
158	Samba	23/B	Soram	Samotha	34.89	19.19	0.00	0.00	0.00	54.08	Chir I WC	Chir Rehab WC
159	Samba	24a/B	Soram	Samotha	43.04	31.25	0.00	0.00	0.00	74.29	Chir I WC	Chir Rehab WC
160	Samba	24b/B	Soram	Samotha	0.00	118.29	0.00	0.00	0.00	118.29	Plantation WC	Rehab/Prot WC
161	Samba	25/B	Soram	Jeer	144.19	27.10	0.00	0.00	0.00	171.29	Chir I WC	Chir Rehab WC
162	Samba	26/B	Soram	Jeer	67.99	13.24	0.00	0.00	0.00	81.23	Chir I WC	Chir Rehab WC
163	Samba	27/B	Soram	Jeer	189.87	20.23	0.00	0.00	0.00	210.10	Chir I WC	Chir Rehab WC
164	Samba	28/B	Soram	Jeer	99.30	24.83	0.00	0.00	0.00	124.13	Chir I WC	Chir Rehab WC
165	Samba	29/B	Soram	Jeer	103.12	10.31	0.00	0.00	0.00	113.43	Chir I WC	Chir Rehab WC
166	Samba	30/B	Soram	Soram	5.37	0.00	0.00	139.71	0.00	145.08	Grazing WC	Rehab/Prot WC
167	Samba	31/B	Soram	Soram	17.68	0.00	0.00	95.49	9.43	122.61	Chir I WC	Chir Rehab WC
168	Samba	32/B	Soram	Soram	31.43	0.00	0.00	160.45	41.35	233.23	Chir I WC	Chir Rehab WC
169	Samba	33/B	Soram	Soram	43.76	0.00	0.00	98.17	11.83	153.77	Chir I WC	Chir Rehab WC
170	Samba	34/B	Soram	Soram	102.30	25.26	0.00	18.95	0.00	146.51	Chir I WC	Chir Rehab WC
171	Samba	35/B	Soram	Soram	100.91	0.00	0.00	53.46	0.00	154.37	Chir I WC	Chir Rehab WC
172	Samba	36/B	Soram	Soram	42.53	4.25	0.00	0.00	51.03	97.81	Chir I WC	Chir Rehab WC
173	Samba	37/B	Goran	Goran	42.08	6.38	0.00	0.00	0.00	48.46	Chir I WC	Chir Rehab WC
174	Samba	38/B	Goran	Goran	64.87	0.00	0.00	0.00	0.00	64.87	Chir I WC	Chir Rehab WC

S	Damas	Comp -	Dlask	Deat		Area	(in hectar	res) as pe		Previous	Warking Circle	
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
175	Samba	39/B	Goran	Goran	73.06	13.87	0.00	0.00	0.00	86.93	Chir I WC	Chir Rehab WC
176	Samba	40/B	Soram	Soram	67.72	0.00	0.00	35.91	23.60	127.23	Chir I WC	Chir Rehab WC
177	Samba	41/B	Soram	Samotha	73.63	0.00	0.00	0.00	8.45	82.08	Chir I WC	Chir Rehab WC
178	Samba	42/B	Goran	Goran	35.74	0.00	0.00	56.49	5.76	98.00	Chir I WC	Chir Rehab WC
179	Samba	43/B	Goran	Goran	54.14	0.00	0.00	0.00	13.21	67.35	Chir I WC	Chir Rehab WC
180	Samba	44/B	Goran	Goran	74.96	0.00	0.00	26.03	13.53	114.52	Chir I WC	Chir Rehab WC
181	Samba	45/B	Goran	Goran	42.39	15.90	0.00	5.30	18.02	81.60	Chir I WC	Chir Rehab WC
182	Samba	46/B	Goran	Goran	63.21	5.10	0.00	0.00	11.22	79.53	Chir I WC	Chir Rehab WC
183	Samba	47/B	Goran	Goran	25.18	0.00	0.00	2.88	4.32	32.38	Chir I WC	Chir Rehab WC
184	Samba	48/B	Soram	Samotha	0.00	41.84	0.00	12.25	4.08	58.17	Grazing WC	Rehab/Prot WC
185	Samba	49/B	Goran	Sumb	38.85	11.66	0.00	46.62	14.57	111.70	Chir I WC	Chir Rehab WC
186	Samba	50/B	Goran	Sumb	51.71	30.08	0.00	0.00	0.00	81.79	Chir I WC	Chir Rehab WC
187	Samba	51/B	Goran	Sumb	70.39	31.05	0.00	0.00	0.00	101.44		Chir Rehab WC
188	Samba	52/B	Goran	Sumb	93.97	0.00	0.00	0.00	0.00	93.97	Chir I WC	Chir Rehab WC
189	Samba	53/B	Goran	Sumb	0.00	0.00	0.00	130.97	0.00	130.97	Khair I WC	Broadleaf Imp WC
190	Samba	54/B	Goran	Sumb	0.00	19.12	0.00	164.42	0.00	183.54	Grazing WC	Rehab/Prot WC
191	Samba	55/B	Goran	Sumb	0.00	0.00	0.00	110.91	5.84	116.75	Grazing WC	Rehab/Prot WC
192	Samba	56/B	Goran	Sumb	0.00	7.01	0.00	95.27	0.00	102.29	Grazing WC	Rehab/Prot WC
193	Samba	57/B	Goran	Sumb	0.00	0.00	0.00	47.22	21.25	68.46	Plantation WC	Rehab/Prot WC
194	Samba	58/B	Goran	Sumb	0.00	0.00	0.00	61.30	7.91	69.21	Grazing WC	Rehab/Prot WC
195	Samba	59/B	Goran	Sumb	0.00	0.00	0.00	27.39	7.95	35.35	Grazing WC	Rehab/Prot WC
196	Samba	60/B	Goran	Sumb	0.00	21.47	0.00	60.12	4.29	85.89		Rehab/Prot WC
197	Samba	61/B	Goran	Sumb	41.60	62.39	0.00	0.00	0.00	103.99	Khair I WC	Broadleaf Imp WC

S	Damas	Comp -	Dlask	Deat	t Area (in hectares) as per GIS						Previous	Warking Circle
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
198	Samba	62/B	Goran	Sumb	0.00	114.39	0.00	7.20	0.00	121.59	Khair I WC	Broadleaf Imp WC
199	Samba	63/B	Goran	Sumb	15.54	23.31	0.00	0.00	0.00	38.85	Chir I WC	Chir Rehab WC
200	Samba	64/B	Goran	Jar Jareli	0.00	45.94	0.00	0.00	0.00	45.94	Biodiv Cons WC	Rehab/Prot WC
201	Samba	65/B	Goran	Jar Jareli	58.26	22.41	0.00	0.00	0.00	80.66	Chir I WC	Chir Rehab WC
202	Samba	66/B	Goran	Jar Jareli	92.72	22.51	0.00	0.00	0.00	115.23	Chir I WC	Chir Rehab WC
203	Samba	67/B	Goran	Jar Jareli	85.86	32.32	0.00	0.00	0.00	118.18	Chir I WC	Chir Rehab WC
204	Samba	68/B	Goran	Jar Jareli	90.06	62.11	0.00	0.00	0.00	152.17	Biodiv Cons WC	Rehab/Prot WC
205	Samba	69/B	Goran	Jar Jareli	37.61	21.06	0.00	7.52	0.00	66.19	Chir I WC	Chir Rehab WC
206	Samba	70/B	Goran	Jar Jareli	18.51	27.27	0.00	46.75	66.23	158.76	Chir I WC	Chir Rehab WC
207	Samba	71/B	Goran	Jar Jareli	81.91	0.00	0.00	0.00	0.00	81.91	Chir I WC	Chir Rehab WC
208	Samba	72/B	Goran	Leaki	39.57	0.00	0.00	0.00	0.00	39.57	Chir I WC	Chir Rehab WC
209	Samba	73/B	Goran	Leaki	0.00	108.22	0.00	0.00	0.00	108.22	Plantation WC	Rehab/Prot WC
210	Samba	74/B	Goran	Leaki	0.00	98.07	0.00	27.13	0.00	125.20	Plantation WC	Rehab/Prot WC
211	Samba	75/B	Goran	Leaki	8.25	56.11	0.00	7.43	0.00	71.78	Plantation WC	Rehab/Prot WC
212	Samba	76/B	Goran	Leaki	0.00	100.29	0.00	15.43	4.63	120.34	Plantation WC	Rehab/Prot WC
213	Samba	77/B	Goran	Leaki	0.00	86.29	0.00	0.00	0.00	86.29	Plantation WC	Rehab/Prot WC
214	Samba	78/B	Goran	Leaki	0.00	44.44	0.00	0.00	0.00	44.44	Plantation WC	Rehab/Prot WC
215	Samba	79/B	Goran	Leaki	0.00	107.96	0.00	0.00	0.00	107.96	Plantation WC	Rehab/Prot WC
216	Samba	80/B	Goran	Leaki	0.00	175.66	0.00	23.11	0.00	198.78	Plantation WC	Rehab/Prot WC
217	Samba	81/B	Goran	Leaki	6.86	77.78	0.00	0.00	0.00	84.64	Plantation WC	Rehab/Prot WC
218	Samba	82/B	Goran	Leaki	14.57	85.47	0.00	0.00	0.00	100.04	Plantation WC	Rehab/Prot WC
219	Samba	1/D	Basantar	Labli	0.00	0.00	0.00	189.84	0.00	189.84	Grazing WC	Rehab/Prot WC
220	Samba	2/D	Basantar	Khirdi	0.00	112.24	0.00	34.62	0.00	146.87	Grazing WC	Rehab/Prot WC

S	Damas	Comp -	Dlask	Deet	at Area (in hectares) as per GIS Chir B/leaf Bamboo Scrub Blank						Previous	Warking Circle
No	Kange	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
221	Samba	3a/D	Basantar	Khirdi	0.00	20.86	0.00	121.67	0.00	142.52	Grazing WC	Rehab/Prot WC
222	Samba	3b/D	Basantar	Khirdi	0.00	0.00	0.00	97.28	0.00	97.28	Grazing WC	Rehab/Prot WC
223	Samba	4/D	Basantar	Khirdi	0.00	192.17	0.00	29.21	8.18	229.56	Plantation WC	Rehab/Prot WC
224	Samba	5/D	Basantar	Labli	0.00	58.65	0.00	13.28	0.00	71.93	Khair I WC	Broadleaf Imp WC
225	Samba	6/D	Basantar	Labli	0.00	241.91	0.00	44.51	0.00	286.41	Plantation WC	Rehab/Prot WC
226	Samba	7a/D	Basantar	Labli	0.00	102.17	0.00	0.00	0.00	102.17	Khair I WC	Broadleaf Imp WC
227	Samba	7b/D	Basantar	Labli	0.00	1 14.15	0.00	11.07	32.37	157.60	Khair I WC	Broadleaf Imp WC
228	Samba	23/D	Kali	Mohargarh	75.35	97.33	0.00	25.12	0.00	197.80	Grazing WC	Rehab/Prot WC
229	Samba	26/D	Kali	Mohargarh	0.00	128.68	0.00	22.80	0.00	151.48	Grazing WC	Rehab/Prot WC
230	Samba	27/D	Kali	Mohargarh	0.00	67.40	0.00	18.98	0.00	86.38	Grazing WC	Rehab/Prot WC
231	Samba	28/D	Kali	Mohargarh	0.00	29.62	0.00	111.64	106.51	247.77	Grazing WC	Rehab/Prot WC
232	Samba	29/D	Kali	Mohargarh	115.97	57.52	0.00	0.00	0.00	173.49	Chir I WC	Chir Rehab WC
233	Samba	30/D	Kali	Mohargarh	66.40	120.78	0.00	0.00	0.00	187.18	Grazing WC	Rehab/Prot WC
234	Samba	31/D	Kali	Mohargarh	0.00	0.00	0.00	143.15	28.18	171.32	Grazing WC	Rehab/Prot WC
235	Samba	32/D	Kali	Mohargarh	94.49	0.00	0.00	0.00	5.67	100.16	Chir I WC	Chir Rehab WC
236	Samba	33/D	Kali	Mohargarh	35.67	68.20	0.00	60.86	8.39	173.13	Chir I WC	Chir Rehab WC
237	Samba	34/D	Kali	Mohargarh	0.00	0.00	0.00	50.57	4.85	55.42	Grazing WC	Rehab/Prot WC
238	Samba	35/D	Kali	Mohargarh	31.93	61.04	0.00	86.87	24.42	204.26	Grazing WC	Rehab/Prot WC
239	Samba	36/D	Kali	Mansar Nali	151.18	0.00	0.00	44.61	7.44	203.23	Chir I WC	Chir Rehab WC
240	Samba	37/D	Kali	Mansar Nali	154.81	0.00	0.00	0.00	0.00	154.81	Chir I WC	Chir Rehab WC
241	Samba	38/D	Kali	Mansar Nali	61.23	20.75	0.00	14.53	12.45	108.96	Chir I WC	Chir Rehab WC
242	Samba	39/D	Kali	Mansar Nali	127.97	0.00	0.00	0.00	0.00	127.97	Chir I WC	Chir Rehab WC
243	Samba	40/D	Kali	Mansar Nali	0.00	119.73	0.00	19.20	9.60	148.53	Grazing WC	Rehab/Prot WC

S	Damas	Comp -	Diasla	Deat	Beat Area (in hectares) as per GIS Pre- Chir B/leaf Bamboo Scrub Blank Total Workit				Previous	Wanking Circle		
No	Range	artment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	Working Circle	working Circle
244	Samba	41/D	Kali	Mansar Nali	0.00	97.92	0.00	0.00	0.00	97.92	Grazing WC	Rehab/Prot WC
245	Samba	42/D	Kali	Mansar Nali	123.31	55.24	0.00	0.00	7.89	186.44	Chir I WC	Rehab/Prot WC
246	Samba	43/D	Kali	Mansar Nali	113.61	4.54	0.00	31.81	27.27	177.23	Chir I WC	Broadleaf Imp WC
247	Samba	44/D	Kali	Mansar Nali	0.00	11.42	0.00	52.05	12.69	76.16	Grazing WC	Rehab/Prot WC
248	Samba	45/D	Kali	Mansar Nali	0.00	57.74	0.00	113.56	0.00	171.30	Grazing WC	Rehab/Prot WC
249	Samba	46/D	Kali	Mansar Nali	0.00	57.95	0.00	100.89	0.00	158.84	Grazing WC	Rehab/Prot WC
250	Samba	47/D	Kali	Mansar Nali	0.00	56.68	0.00	0.00	0.00	56.68	Grazing WC	Rehab/Prot WC
251	Samba	48/D	Kali	Mohargarh	0.00	17.78	0.00	109.65	0.00	127.43	Grazing WC	Rehab/Prot WC
252	Samba	49/D	Kali	Mohargarh	0.00	0.00	0.00	58.95	0.00	58.95	Grazing WC	Rehab/Prot WC
253	Samba	50/D	Kali	Mohargarh	0.00	0.00	0.00	124.91	11.49	136.40		Rehab/Prot WC
254	Samba	51/D	Kali	Mohargarh	0.00	0.00	0.00	173.77	0.00	173.77	Grazing WC	Rehab/Prot WC
255	Samba	52/D	Kali	Mohargarh	0.00	65.77	0.00	0.00	0.00	65.77	Khair I WC	Broadleaf Imp WC
256	Samba	53/D	Kali	Mohargarh	0.00	154.60	0.00	0.00	0.00	154.60	Khair I WC	Broadleaf Imp WC
257	Samba	54/D	Kali	Mohargarh	0.00	290.88	0.00	0.00	0.00	290.88	Plantation WC	Rehab/Prot WC
258	Samba	55/D	Kali	Mohargarh	0.00	100.90	0.00	0.00	0.00	100.90	Plantation WC	Rehab/Prot WC
259	Samba	56/D	Kali	Mohargarh	0.00	229.89	0.00	0.00	0.00	229.89	Grazing WC	Rehab/Prot WC
260	Samba	57/D	Kali	Durui	0.00	127.48	0.00	25.16	0.00	152.65	Khair I WC	Broadleaf Imp WC
261	Samba	58/D	Kali	Durui	0.00	213.23	0.00	0.00	0.00	213.23	Khair I WC	Broadleaf Imp WC
262	Samba	59/D	Basantar	Nandni	0.00	328.33	0.00	0.00	0.00	328.33	Biodiv Cons WC	Rehab/Prot WC
263	Samba	60/D	Basantar	Nandni	0.00	104.51	0.00	0.00	0.00	104.51	Biodiv Cons WC	Rehab/Prot WC
264	Samba	61/D	Basantar	Bee-Kamela	0.00	154.18	0.00	0.00	0.00	154.18	Biodiv Cons WC	Rehab/Prot WC
265	Samba	62/D	Basantar	Bee-Kamela	0.00	236.02	0.00	15.34	0.00	251.36	Grazing WC	Rehab/Prot WC
266	Samba	63/D	Basantar	Bee-Kamela	0.00	161.34	0.00	17.16	0.00	178.51	Grazing WC	Rehab/Prot WC

Chir I WC: Chir Improvement WC, Khair I WC: Khair Improvement WC, Bamboo I WC: Bamboo Improvement WC, Biodiv Cons WC: Biodiversity Conservation WC.Chir Rehab WC: Chir Rehabilitation WC, Broadleaf Imp WC: Broadleaf Improvement WC, Bamboo Rehabilitation WC, Rehab/Prot WC: Rehabilitation-cum-Protection WC

Abstract

Range	Chir	Broadleaf	Bamboo	Scrub	Blank	Total
Kathua	3936.78	7994.71	711.18	1682.38	482.01	14807.06
Jasrota	4038.20	1674.52	135.19	6685.00	834.79	13367.70
Samba	4837.91	7418.20	0.00	3910.44	779.37	16945.92
Total	12812.89	17087.43	846.37	12277.82	2096.17	45120.68

Area Transferred	Chir	Broadleaf	Bamboo	Scrub	Blank	Total
Jasrota Wildlife Sanctuary	5.14	352.43	211.87	190.94	0.00	760.38
Thein Conservation Reserve	915.41	1444.53	0.00	380.86	46.37	2787.17
Total	920.55	1796.96	211.87	571.80	46.37	3547.55

APPENDIX-III

Area statement of Kathua Forest Division showing Working Circle wise Distribution of Area

(i)	Bamboo F	Rehabilitation Wo	orking Circle							
C M-	Demos	Contractor	Dissla	De e 4		A	Area (in hee	ctares)		
5.INO.	Kange	Compartment	вюск	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
1	Kathua	1/K	Budhi	Budhi	0.00	164.24	0.00	61.83	7.73	233.80
2	Kathua	2/K	Budhi	Budhi	0.00	214.46	0.00	65.15	5.43	285.04
3	Kathua	3/K	Budhi	Barwal	0.00	0.00	340.79	0.00	33.19	373.98
4	Kathua	4/K	Budhi	Barwal	0.00	0.00	331.57	0.00	0.00	331.57
5	Jasrota	7/J	Dinga Amb	Behari	0.00	6.80	33.02	26.22	0.00	66.04
6	Jasrota	8/J	Dinga Amb	Behari	0.00	33.57	83.92	50.35	0.00	167.83
7	Jasrota	9/J	Dinga Amb	Behari	0.00	24.33	0.00	72.22	0.00	96.55
8	Jasrota	10/J	Dinga Amb	Kori Bagni	0.00	0.00	18.25	73.90	0.00	92.15
9	Jasrota	11/J	Dinga Amb	Kori Bagni	0.00	153.60	0.00	37.73	0.00	191.32
10	Jasrota	12a/J	Dinga Amb	Sallan	0.00	48.88	0.00	49.77	0.00	98.65
11	Jasrota	12b/J	Dinga Amb	Sallan	0.00	34.04	0.00	39.88	0.00	73.92
12	Jasrota	12c/J	Dinga Amb	Mela	0.00	0.00	0.00	99.56	0.00	99.56
13	Jasrota	12d/J	Dinga Amb	Mela	0.00	0.00	0.00	42.28	0.00	42.28
	Total				0.00	679.92	807.55	618.89	46.34	2152.70

(ii)	Broadleaf	Improvement W	orking Circle							
S.No	Danas	Compartmen	Dlask	Deet			Area (in l	hectares)		
•	Kange	t	DIOCK	Deat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
1	Kathua	8/K	Basantpur	Manu	29.24	155.07	0.00	0.00	0.00	184.31
2	Kathua	9/K	Basantpur	Thein	97.93	211.82	0.00	0.00	0.00	309.75
3	Kathua	17/K	Basantpur	Dhana Dhanore	0.00	576.05	0.00	60.69	0.00	636.74
4	Kathua	18a/K	Basantpur	Dhana Dhanore	0.00	402.09	0.00	168.24	0.00	570.33
5	Kathua	20a/K	Basantpur	Nora	0.00	0.00	0.00	130.28	0.00	130.28
6	Kathua	20b/K	Basantpur	Nora	0.00	296.25	0.00	0.00	67.42	363.67
7	Kathua	24/K	Janglote	Dilwan Dole	0.00	32.44	0.00	416.70	0.00	449.14
8	Kathua	25/K	Janglote	Dilwan Dole	0.00	414.33	0.00	0.00	0.00	414.33
9	Kathua	26/K	Janglote	Janglote II	0.00	679.31	0.00	0.00	0.00	679.31
10	Kathua	27/K	Janglote	Janglote I	14.64	342.56	0.00	0.00	0.00	357.20
11	Jasrota	51/J	Mastgarh	Kathera	0.00	30.73	0.00	111.47	33.58	175.78
12	Jasrota	52/J	Dinga Amb	Dinga Amb	0.00	16.83	0.00	35.40	0.00	52.23
13	Jasrota	53/J	Dinga Amb	Dinga Amb	0.00	17.95	0.00	45.73	6.95	70.62
14	Jasrota	54/J	Dinga Amb	Dinga Amb	0.00	12.31	0.00	48.40	15.21	75.93
15	Jasrota	55a/J	Dinga Amb	Dinga Amb	0.00	0.00	0.00	193.40	14.41	207.81
16	Jasrota	55b/J	Dinga Amb	Dinga Amb	0.00	62.02	0.00	127.59	26.58	216.19
17	Jasrota	56/J	Dinga Amb	Dinga Amb	0.00	71.26	0.00	64.73	23.94	159.93
18	Jasrota	57/J	Dinga Amb	Chilik	0.00	22.50	0.00	155.52	8.60	186.62
19	Jasrota	60/J	Dinga Amb	Chilik	0.00	56.82	0.00	148.19	0.00	205.01
20	Jasrota	61/J	Dinga Amb	Chilik	0.00	13.86	0.00	79.84	7.21	100.91
21	Jasrota	62/J	Lower Hiranagar	Surara	0.00	21.69	0.00	108.44	43.38	173.50
22	Jasrota	63/J	Lower Hiranagar	Surara	20.10	0.00	0.00	146.15	24.97	191.21
23	Jasrota	64/J	Lower Hiranagar	Surara	6.86	11.27	0.00	71.55	9.31	98.99
24	Jasrota	67b/J	Lower Hiranagar	Kotla	12.53	31.55	0.00	138.71	0.00	182.78

(ii)	Broadleaf	Improvement W	orking Circle							
S.No	Danas	Compartmen	Dlask	Deet			Area (in l	nectares)		
•	Kange	t	BIOCK	beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
25	Jasrota	68/J	Lower Hiranagar	Kotla	0.00	0.00	0.00	56.32	6.19	62.51
26	Jasrota	69/J	Lower Hiranagar	Nonath	0.00	0.00	0.00	154.01	5.36	159.36
27	Jasrota	70/J	Lower Hiranagar	Nonath	0.00	0.00	0.00	177.17	13.56	190.74
28	Jasrota	71/J	Lower Hiranagar	Nonath	0.00	0.00	0.00	134.38	0.00	134.38
29	Jasrota	72/J	Dinga Amb	Mela	7.80	46.81	0.00	144.89	2.60	202.11
30	Jasrota	73/J	Lower Hiranagar	Said Koota	0.00	60.21	0.00	104.34	11.59	176.14
31	Jasrota	74/J	Lower Hiranagar	Said Koota	0.00	0.00	0.00	192.84	8.79	201.64
32	Samba	1/B	Kali	Bharatgarh	0.00	85.08	0.00	11.74	0.00	96.82
33	Samba	2/B	Kali	Bharatgarh	0.00	190.14	0.00	29.05	0.00	219.19
34	Samba	3/B	Kali	Bharatgarh	0.00	114.90	0.00	0.00	0.00	114.90
35	Samba	4/B	Kali	Bharatgarh	0.00	51.97	0.00	9.99	0.00	61.96
36	Samba	5/B	Kali	Bharatgarh	0.00	154.13	0.00	0.00	0.00	154.13
37	Samba	7/B	Kali	Bharatgarh	99.20	71.99	0.00	0.00	0.00	171.19
38	Samba	10/B	Kali	Bharatgarh	0.00	92.32	0.00	0.00	0.00	92.32
39	Samba	53/B	Goran	Sumb	0.00	0.00	0.00	130.97	0.00	130.97
40	Samba	61/B	Goran	Sumb	41.60	62.39	0.00	0.00	0.00	103.99
41	Samba	62/B	Goran	Sumb	0.00	114.39	0.00	7.20	0.00	121.59
42	Samba	5/D	Basantar	Labli	0.00	58.65	0.00	13.28	0.00	71.93
43	Samba	7a/D	Basantar	Labli	0.00	102.17	0.00	0.00	0.00	102.17
44	Samba	7b/D	Basantar	Labli	0.00	114.15	0.00	11.07	32.37	157.60
45	Samba	43/D	Kali	Mansar Nali	113.61	4.54	0.00	31.81	27.27	177.23
46	Samba	52/D	Kali	Mohargarh	0.00	65.77	0.00	0.00	0.00	65.77
47	Samba	53/D	Kali	Mohargarh	0.00	154.60	0.00	0.00	0.00	154.60
48	Samba	57/D	Kali	Durui	0.00	127.48	0.00	25.16	0.00	152.65
49	Samba	58/D	Kali	Durui	0.00	213.23	0.00	0.00	0.00	213.23
	TOTAL				443.51	5363.63	0.00	3485.25	389.29	9681.68

(iii)	Chir Imp	rovement Wo	king Circle							
S.	Demos	Compartm	Dlash	Deed			Area (in he	ectares)		
No.	Kange	ent	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
1	Kathua	22/K	Basantpur	Tank di Garhi	475.99	360.14	0.00	0.00	0.00	836.13
2	Kathua	29a/K	Basantpur	Tank di Garhi	653.05	0.00	0.00	0.00	0.00	653.05
3	Kathua	29b/K	Budhi	Sundri Kote	734.55	0.00	0.00	0.00	54.01	788.56
4	Kathua	32/K	Budhi	Ghati	185.12	139.39	0.00	0.00	0.00	324.51
5	Kathua	36/K	Budhi	Sundri Kote	439.94	0.00	0.00	0.00	0.00	439.94
6	Kathua	37/K	Budhi	Sundri Kote	505.93	0.00	0.00	40.39	0.00	546.32
7	Kathua	38/K	Budhi	Sundri Kote	593.02	0.00	0.00	0.00	0.00	593.02
8	Jasrota	13/J	Rajwalta	Galak	145.88	34.39	0.00	13.31	0.00	193.58
9	Jasrota	14/J	Rajwalta	Galak	151.78	15.18	0.00	8.09	0.00	175.05
10	Jasrota	15/J	Rajwalta	Galak	189.27	16.35	0.00	15.92	0.00	221.54
11	Jasrota	16/J	Rajwalta	Galak	149.43	18.87	0.00	11.92	0.00	180.22
12	Jasrota	17/J	Rajwalta	Galak	266.70	28.65	0.00	7.71	0.00	303.07
13	Jasrota	18/J	Rajwalta	Rajwalta	167.47	0.00	0.00	0.00	0.00	167.47
14	Jasrota	19/J	Rajwalta	Rajwalta	482.29	42.45	0.00	0.00	0.00	524.74
15	Jasrota	20/J	Rajwalta	Rajwalta	56.17	5.62	0.00	0.00	0.00	61.78
16	Jasrota	21/J	Rajwalta	Rajwalta	138.23	0.00	0.00	196.10	0.00	334.33
17	Jasrota	22/J	Rajwalta	Rajwalta	127.89	9.53	0.00	0.00	13.56	150.98
18	Jasrota	23/J	Mastgarh	Mastgarh	140.89	0.00	0.00	95.29	12.86	249.03
19	Jasrota	24/J	Mastgarh	Mastgarh	51.06	32.83	0.00	78.42	10.03	172.34
20	Jasrota	25/J	Mastgarh	Mastgarh	33.01	0.00	0.00	112.48	6.52	152.01
21	Jasrota	27/J	Mastgarh	Mastgarh	109.76	0.00	0.00	102.98	0.00	212.74
22	Jasrota	28/J	Rajwalta	Thein	37.47	0.00	0.00	93.08	0.00	130.55
23	Jasrota	30/J	Rajwalta	Thein	48.13	0.00	0.00	57.11	0.00	105.24

(iii)	Chir Improvement Working Circle									
S.	D	Compartm	Dll.	D 4			Area (in he	ectares)		
No.	Kange	ent	Бюск	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
24	Jasrota	31/J	Rajwalta	Thein	56.32	0.00	0.00	49.73	0.00	106.04
25	Jasrota	32a/J	Rajwalta	Thein	55.75	0.00	0.00	149.43	22.85	228.03
26	Jasrota	32b/J	Rajwalta	Thein	39.03	12.76	0.00	37.15	0.00	88.93
27	Jasrota	33/J	Rajwalta	Thein	75.59	0.00	0.00	92.50	20.89	188.99
28	Jasrota	44/J	Mastgarh	Bera	117.01	17.24	0.00	29.25	16.19	179.70
29	Jasrota	58/J	Dinga Amb	Chilik	52.51	27.48	0.00	0.00	9.16	89.14
30	Jasrota	59/J	Dinga Amb	Chilik	165.05	0.00	0.00	0.00	10.43	175.48
31	Jasrota	65/J	Lower Hiranagar	Surara	138.63	0.00	0.00	63.57	51.21	253.41
32	Jasrota	66/J	Lower Hiranagar	Surara	247.24	0.00	0.00	0.00	30.84	278.08
33	Jasrota	67a/J	Lower Hiranagar	Kotla	57.45	60.76	0.00	24.43	25.76	168.40
34	Jasrota	75/J	Lower Hiranagar	Said Koota	151.02	27.92	0.00	0.00	0.00	178.94
35	Jasrota	76/J	Lower Hiranagar	Said Koota	92.49	0.00	0.00	0.00	3.26	95.76
36	Jasrota	77/J	Dinga Amb	Said Koota	61.61	15.25	0.00	0.00	3.66	80.52
37	Jasrota	78/J	Dinga Amb	Sallan	26.42	12.01	0.00	59.65	0.00	98.08
38	Samba	8/B	Kali	Bharatgarh	57.27	53.45	0.00	0.00	0.00	110.72
39	Samba	11/B	Kali	Bhagooni	50.98	116.70	0.00	0.00	10.20	177.88
40	Samba	12/B	Kali	Bhagooni	68.57	48.21	0.00	0.00	10.71	127.50
41	Samba	13/B	Kali	Leani	82.74	86.52	0.00	0.00	8.65	177.91
42	Samba	14/B	Kali	Leani	105.89	48.08	0.00	0.00	8.01	161.99
43	Samba	15/B	Kali	Leani	78.10	34.40	0.00	0.00	0.00	112.50
44	Samba	16/B	Kali	Leani	137.22	38.42	0.00	0.00	7.68	183.33
45	Samba	17/B	Kali	Leani	0.00	0.00	0.00	26.03	0.00	26.03
46	Samba	18/B	Kali	Leani	83.38	18.53	0.00	0.00	23.16	125.07
47	Samba	20/B	Soram	Jeer	235.96	37.29	0.00	0.00	0.00	273.26
48	Samba	21/B	Soram	Jeer	78.52	0.00	0.00	0.00	0.00	78.52
49	Samba	22/B	Soram	Samotha	109.35	9.03	0.00	0.00	5.02	123.39
50	Samba	23/B	Soram	Samotha	34.89	19.19	0.00	0.00	0.00	54.08

(iii)	Chir Imp	rovement Wo	rking Circle							
S.	Denes	Compartm	Dlash	Dee4			Area (in he	ectares)		
No.	Kange	ent	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
51	Samba	24a/B	Soram	Samotha	43.04	31.25	0.00	0.00	0.00	74.29
52	Samba	25/B	Soram	Jeer	144.19	27.10	0.00	0.00	0.00	171.29
53	Samba	26/B	Soram	Jeer	67.99	13.24	0.00	0.00	0.00	81.23
54	Samba	27/B	Soram	Jeer	189.87	20.23	0.00	0.00	0.00	210.10
55	Samba	28/B	Soram	Jeer	99.30	24.83	0.00	0.00	0.00	124.13
56	Samba	29/B	Soram	Jeer	103.12	10.31	0.00	0.00	0.00	113.43
57	Samba	31/B	Soram	Soram	17.68	0.00	0.00	95.49	9.43	122.61
58	Samba	32/B	Soram	Soram	31.43	0.00	0.00	160.45	41.35	233.23
59	Samba	33/B	Soram	Soram	43.76	0.00	0.00	98.17	11.83	153.77
60	Samba	34/B	Soram	Soram	102.30	25.26	0.00	18.95	0.00	146.51
61	Samba	35/B	Soram	Soram	100.91	0.00	0.00	53.46	0.00	154.37
62	Samba	36/B	Soram	Soram	42.53	4.25	0.00	0.00	51.03	97.81
63	Samba	37/B	Goran	Goran	42.08	6.38	0.00	0.00	0.00	48.46
64	Samba	38/B	Goran	Goran	64.87	0.00	0.00	0.00	0.00	64.87
65	Samba	39/B	Goran	Goran	73.06	13.87	0.00	0.00	0.00	86.93
66	Samba	40/B	Soram	Soram	67.72	0.00	0.00	35.91	23.60	127.23
67	Samba	41/B	Soram	Samotha	73.63	0.00	0.00	0.00	8.45	82.08
68	Samba	42/B	Goran	Goran	35.74	0.00	0.00	56.49	5.76	98.00
69	Samba	43/B	Goran	Goran	54.14	0.00	0.00	0.00	13.21	67.35
70	Samba	44/B	Goran	Goran	74.96	0.00	0.00	26.03	13.53	114.52
71	Samba	45/B	Goran	Goran	42.39	15.90	0.00	5.30	18.02	81.60
72	Samba	46/B	Goran	Goran	63.21	5.10	0.00	0.00	11.22	79.53
73	Samba	47/B	Goran	Goran	25.18	0.00	0.00	2.88	4.32	32.38
74	Samba	49/B	Goran	Sumb	38.85	11.66	0.00	46.62	14.57	111.70
75	Samba	50/B	Goran	Sumb	51.71	30.08	0.00	0.00	0.00	81.79
76	Samba	51/B	Goran	Sumb	70.39	31.05	0.00	0.00	0.00	101.44
77	Samba	52/B	Goran	Sumb	93.97	0.00	0.00	0.00	0.00	93.97

(iii)	Chir Improvement Working Circle										
S.	Damas	Compartm	Dlask	Deat			Area (in he	ectares)			
No.	Kange	ent	DIOCK	Deat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	
78	Samba	63/B	Goran	Sumb	15.54	23.31	0.00	0.00	0.00	38.85	
79	Samba	65/B	Goran	Jar Jareli	58.26	22.41	0.00	0.00	0.00	80.66	
80	Samba	66/B	Goran	Jar Jareli	92.72	22.51	0.00	0.00	0.00	115.23	
81	Samba	67/B	Goran	Jar Jareli	85.86	32.32	0.00	0.00	0.00	118.18	
82	Samba	69/B	Goran	Jar Jareli	37.61	21.06	0.00	7.52	0.00	66.19	
83	Samba	70/B	Goran	Jar Jareli	18.51	27.27	0.00	46.75	66.23	158.76	
84	Samba	71/B	Goran	Jar Jareli	81.91	0.00	0.00	0.00	0.00	81.91	
85	Samba	72/B	Goran	Leaki	39.57	0.00	0.00	0.00	0.00	39.57	
86	Samba	29/D	Kali	Mohargarh	115.97	57.52	0.00	0.00	0.00	173.49	
87	Samba	32/D	Kali	Mohargarh	94.49	0.00	0.00	0.00	5.67	100.16	
88	Samba	33/D	Kali	Mohargarh	35.67	68.20	0.00	60.86	8.39	173.13	
89	Samba	36/D	Kali	Mansar Nali	151.18	0.00	0.00	44.61	7.44	203.23	
90	Samba	37/D	Kali	Mansar Nali	154.81	0.00	0.00	0.00	0.00	154.81	
91	Samba	38/D	Kali	Mansar Nali	61.23	20.75	0.00	14.53	12.45	108.96	
92	Samba	39/D	Kali	Mansar Nali	127.97	0.00	0.00	0.00	0.00	127.97	
					11371.32	1952.48	0.00	2138.58	691.17	16153.54	

(iv)	Rehabilitation Cum Protection Working Circle									
C N-	Damas	Commentation	Dla ala	Dee4			Area (in	hectares)		
5.INO.	Kange	Compartment	вюск	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total
1	Kathua	15/K	Basantpur	Tank di Garhi	49.58	618.82	0.00	65.45	24.79	758.65
2	Kathua	18b/K	Basantpur	Dhana Dhanore	0.00	407.56	38.82	189.22	0.00	635.60
3	Kathua	19/K	Basantpur	Dhana Dhanore	0.00	48.02	0.00	288.11	73.83	409.96
4	Kathua	21a/K	Basantpur	Tank di Garhi	0.00	395.97	0.00	0.00	44.67	440.65
5	Kathua	21b/K	Basantpur	Tank di Garhi	0.00	230.89	0.00	0.00	53.54	284.43
6	Kathua	23/K	Basantpur	Tank di Garhi	17.44	311.02	0.00	0.00	34.88	363.34
7	Kathua	28/K	Budhi	Sundri Kote	49.89	714.72	0.00	0.00	0.00	764.61
8	Kathua	30/K	Budhi	Jothana	12.78	277.00	0.00	0.00	0.00	289.79
9	Kathua	31/K	Budhi	Ghati	24.88	297.40	0.00	0.00	0.00	322.29
10	Kathua	33/K	Budhi	Jothana	0.00	0.00	0.00	128.36	82.52	210.87
11	Kathua	34/K	Budhi	Jothana	26.66	401.96	0.00	0.00	0.00	428.61
12	Kathua	35/K	Budhi	Jothana	26.14	303.20	0.00	67.96	0.00	397.29
13	Jasrota	26a/J	Mastgarh	Mastgarh	61.37	37.94	0.00	109.36	0.00	208.67
14	Jasrota	26b/J	Mastgarh	Mastgarh	0.00	0.00	0.00	187.89	9.66	197.55
15	Jasrota	26c/J	Mastgarh	Mastgarh	4.90	0.00	0.00	252.43	25.49	282.82
16	Jasrota	26d/J	Mastgarh	Mastgarh	0.00	0.00	0.00	105.29	0.00	105.29
17	Jasrota	29/J	Rajwalta	Thein	12.27	0.00	0.00	74.39	0.00	86.66
18	Jasrota	34/J	Dinga Amb	Dinga Amb	14.48	24.94	0.00	28.96	0.00	68.37
19	Jasrota	35/J	Dinga Amb	Dinga Amb	7.18	16.02	0.00	62.97	0.00	86.17
20	Jasrota	36/J	Mastgarh	Kathera	0.00	13.54	0.00	58.67	0.00	72.21
21	Jasrota	37/J	Mastgarh	Kathera	0.00	31.72	0.00	161.50	7.21	200.43
22	Jasrota	38/J	Mastgarh	Kathera	4.13	0.00	0.00	90.02	6.61	100.75
23	Jasrota	39/J	Mastgarh	Kathera	6.59	5.86	0.00	74.68	10.25	97.38

(iv)	v) Rehabilitation Cum Protection Working Circle											
C No	Danas	Commentersent	Dlask	Deet			Area (in	hectares)				
5. 1NO.	Kange	Compartment	BIOCK	Беаг	Chir	B/leaf	Bamboo	Scrub	Blank	Total		
24	Jasrota	40/J	Mastgarh	Kathera	13.34	16.42	0.00	46.19	8.21	84.17		
25	Jasrota	41/J	Mastgarh	Kathera	15.70	0.00	0.00	192.66	10.47	218.83		
26	Jasrota	42/J	Mastgarh	Kathera	13.23	0.00	0.00	60.15	8.42	81.81		
27	Jasrota	43/J	Mastgarh	Bera	0.00	0.00	0.00	231.80	18.62	250.41		
28	Jasrota	45/J	Mastgarh	Bera	31.25	9.70	0.00	53.35	10.24	104.54		
29	Jasrota	46/J	Mastgarh	Bera	0.00	89.22	0.00	40.77	7.68	137.68		
30	Jasrota	47a/J	Mastgarh	Bera	0.00	0.00	0.00	0.00	106.42	106.42		
31	Jasrota	47b/J	Mastgarh	Bera	0.00	29.98	0.00	68.98	11.93	110.88		
32	Jasrota	48a/J	Mastgarh	Bera	0.00	0.00	0.00	34.80	40.70	75.51		
33	Jasrota	48b/J	Mastgarh	Bera	0.00	86.58	0.00	135.38	11.02	232.99		
34	Jasrota	49/J	Mastgarh	Kathera	0.00	0.00	0.00	100.97	4.13	105.10		
35	Jasrota	50/J	Mastgarh	Kathera	0.00	26.60	0.00	78.29	8.53	113.42		
36	Jasrota	67c/J	Lower Hiranagar	Kotla	0.00	12.54	0.00	0.00	0.00	12.54		
37	Jasrota	79/J	Dinga Amb	Kori Bagni	38.75	28.37	0.00	56.04	4.84	128.00		
38	Jasrota	80/J	Dinga Amb	Kori Bagni	15.10	48.78	0.00	59.23	5.81	128.92		
39	Jasrota	81/J	Dinga Amb	Kori Bagni	7.12	14.23	0.00	86.93	0.00	108.28		
40	Jasrota	82/J	Mastgarh	Bera	57.97	16.56	0.00	0.00	14.20	88.73		
41	Jasrota	83/J	Mastgarh	Bera	55.98	11.20	0.00	4.20	4.90	76.27		
42	Samba	6a/B	Kali	Bharatgarh	0.00	77.49	0.00	0.00	0.00	77.49		
43	Samba	6b/B	Kali	Bharatgarh	0.00	0.00	0.00	93.14	45.58	138.73		
44	Samba	9/B	Kali	Bharatgarh	0.00	78.52	0.00	20.52	4.46	103.50		
45	Samba	19/B	Soram	Jeer	9.21	0.00	0.00	173.03	0.00	182.25		
46	Samba	24b/B	Soram	Samotha	0.00	118.29	0.00	0.00	0.00	118.29		
47	Samba	30/B	Soram	Soram	5.37	0.00	0.00	139.71	0.00	145.08		
48	Samba	48/B	Soram	Samotha	0.00	41.84	0.00	12.25	4.08	58.17		
49	Samba	54/B	Goran	Sumb	0.00	19.12	0.00	164.42	0.00	183.54		
50	Samba	55/B	Goran	Sumb	0.00	0.00	0.00	110.91	5.84	116.75		

(iv)	v) Rehabilitation Cum Protection Working Circle										
C N-	Damas	Commentation	Dla ala	Dee4			Area (in	hectares)			
5. 1NO.	Kange	Compartment	BIOCK	Beat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	
51	Samba	56/B	Goran	Sumb	0.00	7.01	0.00	95.27	0.00	102.29	
52	Samba	57/B	Goran	Sumb	0.00	0.00	0.00	47.22	21.25	68.46	
53	Samba	58/B	Goran	Sumb	0.00	0.00	0.00	61.30	7.91	69.21	
54	Samba	59/B	Goran	Sumb	0.00	0.00	0.00	27.39	7.95	35.35	
55	Samba	60/B	Goran	Sumb	0.00	21.47	0.00	60.12	4.29	85.89	
56	Samba	64/B	Goran	Jar Jareli	0.00	45.94	0.00	0.00	0.00	45.94	
57	Samba	68/B	Goran	Jar Jareli	90.06	62.11	0.00	0.00	0.00	152.17	
58	Samba	73/B	Goran	Leaki	0.00	108.22	0.00	0.00	0.00	108.22	
59	Samba	74/B	Goran	Leaki	0.00	98.07	0.00	27.13	0.00	125.20	
60	Samba	75/B	Goran	Leaki	8.25	56.11	0.00	7.43	0.00	71.78	
61	Samba	76/B	Goran	Leaki	0.00	100.29	0.00	15.43	4.63	120.34	
62	Samba	77/B	Goran	Leaki	0.00	86.29	0.00	0.00	0.00	86.29	
63	Samba	78/B	Goran	Leaki	0.00	44.44	0.00	0.00	0.00	44.44	
64	Samba	79/B	Goran	Leaki	0.00	107.96	0.00	0.00	0.00	107.96	
65	Samba	80/B	Goran	Leaki	0.00	175.66	0.00	23.11	0.00	198.78	
66	Samba	81/B	Goran	Leaki	6.86	77.78	0.00	0.00	0.00	84.64	
67	Samba	82/B	Goran	Leaki	14.57	85.47	0.00	0.00	0.00	100.04	
68	Samba	1/D	Basantar	Labli	0.00	0.00	0.00	189.84	0.00	189.84	
69	Samba	2/D	Basantar	Khirdi	0.00	112.24	0.00	34.62	0.00	146.87	
70	Samba	3a/D	Basantar	Khirdi	0.00	20.86	0.00	121.67	0.00	142.52	
71	Samba	3b/D	Basantar	Khirdi	0.00	0.00	0.00	97.28	0.00	97.28	
72	Samba	4/D	Basantar	Khirdi	0.00	192.17	0.00	29.21	8.18	229.56	
73	Samba	6/D	Basantar	Labli	0.00	241.91	0.00	44.51	0.00	286.41	
74	Samba	23/D	Kali	Mohargarh	75.35	97.33	0.00	25.12	0.00	197.80	
75	Samba	26/D	Kali	Mohargarh	0.00	128.68	0.00	22.80	0.00	151.48	
76	Samba	27/D	Kali	Mohargarh	0.00	67.40	0.00	18.98	0.00	86.38	
77	Samba	28/D	Kali	Mohargarh	0.00	29.62	0.00	111.64	106.51	247.77	

(iv)	Rehabilit	Rehabilitation Cum Protection Working Circle									
C No	Danas	Commontenant	Dlask	Deet			Area (in	hectares)			
5.1NO.	Kange	Compartment	DIOCK	Deat	Chir	B/leaf	Bamboo	Scrub	Blank	Total	
78	Samba	30/D	Kali	Mohargarh	66.40	120.78	0.00	0.00	0.00	187.18	
79	Samba	31/D	Kali	Mohargarh	0.00	0.00	0.00	143.15	28.18	171.32	
80	Samba	34/D	Kali	Mohargarh	0.00	0.00	0.00	50.57	4.85	55.42	
81	Samba	35/D	Kali	Mohargarh	31.93	61.04	0.00	86.87	24.42	204.26	
82	Samba	40/D	Kali	Mansar Nali	0.00	119.73	0.00	19.20	9.60	148.53	
83	Samba	41/D	Kali	Mansar Nali	0.00	97.92	0.00	0.00	0.00	97.92	
84	Samba	42/D	Kali	Mansar Nali	123.31	55.24	0.00	0.00	7.89	186.44	
85	Samba	44/D	Kali	Mansar Nali	0.00	11.42	0.00	52.05	12.69	76.16	
86	Samba	45/D	Kali	Mansar Nali	0.00	57.74	0.00	113.56	0.00	171.30	
87	Samba	46/D	Kali	Mansar Nali	0.00	57.95	0.00	100.89	0.00	158.84	
88	Samba	47/D	Kali	Mansar Nali	0.00	56.68	0.00	0.00	0.00	56.68	
89	Samba	48/D	Kali	Mohargarh	0.00	17.78	0.00	109.65	0.00	127.43	
90	Samba	49/D	Kali	Mohargarh	0.00	0.00	0.00	58.95	0.00	58.95	
91	Samba	50/D	Kali	Mohargarh	0.00	0.00	0.00	124.91	11.49	136.40	
92	Samba	51/D	Kali	Mohargarh	0.00	0.00	0.00	173.77	0.00	173.77	
93	Samba	54/D	Kali	Mohargarh	0.00	290.88	0.00	0.00	0.00	290.88	
94	Samba	55/D	Kali	Mohargarh	0.00	100.90	0.00	0.00	0.00	100.90	
95	Samba	56/D	Kali	Mohargarh	0.00	229.89	0.00	0.00	0.00	229.89	
96	Samba	59/D	Basantar	Nandni	0.00	328.33	0.00	0.00	0.00	328.33	
97	Samba	60/D	Basantar	Nandni	0.00	104.51	0.00	0.00	0.00	104.51	
98	Samba	61/D	Basantar	Durui	0.00	154.18	0.00	0.00	0.00	154.18	
99	Samba	62/D	Basantar	Ber-Kamela	0.00	236.02	0.00	15.34	0.00	251.36	
100	Samba	63/D	Basantar	Ber-Kamela	0.00	161.34	0.00	17.16	0.00	178.51	
	Total				998.04	9091.38	38.82	6035.12	969.37	17132.73	

	Jasrota '	Wildlife Sanctuary						
S. No	Danga	Comportment			(Area in l	Hectares)		
5. NO.	Kange	Compartment	Chir	B/Leaf	Bamboo	Scrub	Blank	Total
	Jasrota	1/J	5.14	74.95	113.06	0.00	0.00	193.15
	Jasrota	2/J	0.00	53.02	35.60	0.00	0.00	88.63
	Jasrota	3/J	0.00	31.24	37.25	81.71	0.00	150.20
	Jasrota	4/J	0.00	99.67	15.69	34.15	0.00	149.51
	Jasrota	5/J	0.00	46.29	0.00	75.08	0.00	121.37
	Jasrota	6/J	0.00	47.26	10.27	0.00	0.00	57.53
	Total		5.14	352.43	211.88	190.94	0.00	760.39

	Thein Conservation Reserve											
S.	Dongo	Comportmont	Dlook	Poot			(Area in h	nectares)				
No.	Kalige	Compartment	DIOCK	Deat	Chir	B/Leaf	Bamboo	Scrub	Blank	Total		
	Kathua	10/K	Basantpur	Thein	281.01	154.08	0.00	0.00	0.00	435.10		
	Kathua	11/K	Basantpur	Thein	148.09	47.94	0.00	0.00	0.00	196.04		
	Kathua	12/K	Basantpur	Thein	197.47	445.16	0.00	0.00	0.00	642.62		
	Kathua	13/K	Basantpur	Nora	197.50	318.88	0.00	0.00	0.00	516.39		
	Kathua	14/K	Basantpur	Tank di Garhi	91.34	478.47	0.00	0.00	46.37	616.18		
	Kathua	16/K	Basantpur	Nora	0.00	0.00	0.00	380.86	0.00	380.86		
	Total				915.41	1444.53	0.00	380.86	46.37	2787.17		

APPENDIX-IV

Range	Block	Beat	Compartment
		Manu	8/K
		Thein	9/K to 12/K
	Basantpur	Nora	13/K, 16/K, 20a/K, 20b/K
	-	Tank Di Ghari	14/K, 15/K, 21a/K to 23/K and 29a/K
		Dhana Dhanore	17/K to 19/K
		Budhi	1/K, 2/K
Kathua		Barwal	3/K, 4/K
	Budhi	Ghati	31/K, 32/K
		Sundri Kote	28/K, 29b/K and 36/K to 38/K
		Jothana	30/K and 33/K to 35/K
		Janglote I	27/K
	Janglote	Janglote II	26/K
	U	Dilwan Dole	24, 25
		Behari	7/J to 9/J
		Kori Bagni	10/J, 11/J and 79/J to 81/J
	Dinga Amb	Sallan	12a/J, 12b/J and 78/J
	U	Mela	12c/J, 12d/J, 72/J
		Dinga Amb	34/J, 35/J and 52/J to 56/J
		Galak	13/J to 17/J
	Rajwalta	Rajwalta	18/J to 22/J
T	Ū	Thein	28/J to 33/J
Jasrota		Surara	62/J to 66/J
	Lower	Kotla	67a/J to 68/J
	Hiranagar	Nonath	69/J to 71/J
	_	Said Koota	73/J to 77/J
		Mast Garh	23/J to 27/J
	Mast Carb	Kathera	36/J to 42/J and 49/J to 51/J
	Mast Garn	Bera	43/J to 48b/J and 82/J, 83/J
		Chilik	57/J to 61/J
		Goran	37/B to 39/B and 42/B to 47/B
	Canan	Leaki	72/B to 82/B
	Goran	Jar Jareli	64/B to 71/B
		Sumb	49/B to 63/B
		Soram	30/B to 36/B and 40/B
	Soram	Samotha	22/B to 24b/B, 41/B and 48/B
		Jeer	19/B, 20/B, 21/B and 25/B to 29/B
		Leani	13/B to 18/B
Samba		Bharatgarh	1/B to 10/B
	V-l	Bagooni	11/B, 12/B
	Kan	Mansar Nali	36/D to 47/D
		Mohar Garh	23/D, 26/D to 35/D, 48/D to 56/D
		Durie	57/D and 58/D
		Nandni	59/D and 60/D
	Denerat	Khirdi	2/D, 3a/D, 3b/D and 4/D
	Basantar	Bee Kameela	61/D, 62/D and 63/D
		Labli	1/D, 5/D, 6/D, 7a/D and 7b/D

Compartment-Wise Composition of Ranges, Blocks and Beats

APPENDIX-V

S. No.	Name of Nursery	Year of formation	Effective area (in Hac)	Plant Potential (in lacs)
1	Chak Sona Nupa (Kathua)	1965	1.20	1.50
2	Haria Chak (Jasrota)	1963	4.80	1.00
3	Balode	2006	1.20	1.50
Total			7.20	4.00

Range-Wise Statement of Nurseries in Kathua Forest Division

APPENDIX-VI

Range	Name of Building	Location of the Building	Purpose/use
Kathua	DFO residental quarter	Kathua	Residental
	ACF Quarter	Kathua	Residental
	RO residental quarter	Kathua	Residental
	BO/Guard residental quarter	Kathua	Residental
	Head Clerk residental quarter	Kathua	Residental
	Class iv residential	Kathua	Residental
	Clerk residental quarter	Kathua	Residental
	Driver residental quarter	Kathua	Residental
	Forest Rest House	Kathua	Residental
	Store Quarter	Kathua	Residental
	Control Room	Kathua	Protection
	Thein Check Post Kathua Range	Kathua	Protection
	Nagri Check Post Kathua Range	Nagri	Protection
	Bamyal Chak Check Post Kathua Range	Nagri	Protection
Jasrota	Hariya Chak BO Quarter	Haria Chak	Protection
	Range Office	Hiranagar	Residental
	Dayalachak Check post	Dyalachak	Protection
	Anu Danga Check Post	Jasrota	Protection
SC Range	Range Office	Hiranagar	Residental
Samba	Range Officer Quarter	Samba	Residental
	Range Officer Quarter	Samba	Residental
	Firewood Depot	Shantighat, Samba	Firewood Depot
	Check Post	Mansar Morh, Samba	Protection
Lakhanpur	Seizure Yard	Lakhanpur	Protection
	Range Office, Quarter	Lakhanpur	Residental
	Modern Check Post	Basholi Morh	Protection
	Range Office, Quarter	Lakhanpur	Residental

Range-Wise Statement of Government Buildings in Kathua Forest Division

APPENDIX-VII

Statement of Firewood Extracted Departmentally in Kathua Forest Division From 2000-01 to 2015-16

S. No.	Year	Range	Compartment	Extracted Firewood (in qtls)
1	2000-01 to 2007-08	Nil	Nil	0.00
2	2008-09	Samba	56/D	50.00
			57/D	115.00
3	2009-10	Samba	16/B, 45/B, 37/B, 39/B	3330.45
4	2010-11	Jasrota	Haria Chak Nursery	660.60
5	2011-12	Nil	Nil	0.00
6	2012-13	Nil	Nil	0.00
7	2013-14	Nil	Nil	0.00
8	2014-15	Jasrota	Haria Chak Nursery	117.90
9	2015-16	Nil	Nil	0.00
		Total		4273.95

APPENDIX-VIII

Statement of Timber Extracted Departmentally or Through State Forest Corporation In Kathua Forest Division From 2000-01 to 2015-16

S.	Year	Range	Compartment	Timber extracted departmentally or	Extracted Timber
No.		Tunge		through SFC	(in cft)
1	2000-01 to 2005-06	Nil	Nil	Nil	0
2	2006-07	Samba	59/D Departmentally		522.77
3	2007-08	Kathua	27/K	27/K Departmentally	
			8/K, 14/K	SFC	2166.00
4	2008-09	Nil	Nil	Nil	0.00
5	2009-10	Nil	Nil	Nil	0.00
6	2010-11	Samba, Jasrota	44/B, 40/B, 30/J, 33/J, 37/J, 19/J, 20/J	SFC	25667.89
7	2011-12	Kathua	30/K	Departmentally	3631.20
8	2012-13	Nil	Nil	Nil	0.00
9	2013-14	Nil	Nil	Nil	0.00
10	2014-15	Nil	Nil	Nil	0.00
11	2015-16	Nil	Nil	Nil	0.00
			Total		32596.89

APPENDIX-IX

S. No.	Year	Range						
		Kathua	Jasrota	Samba	Total			
1	2000-01	0	0	0	0.00			
2	2001-02	58	0	0	58.00			
3	2002-03	0	0	0	0.00			
4	2003-04	28	0	0	28.00			
5	2004-05	0.00	0.00	0.00	0.00			
6	2005-06	212.00	0.00	0.00	212.00			
7	2006-07	218.50	0.00	0.00	218.50			
8	2007-08	180.66	0.00	0.00	180.66			
9	2008-09	170.00	0.00	137.30	307.30			
10	2009-10	253.50	0.00	0.00	253.50			
11	2010-11	12.00	0.00	0.00	12.00			
12	2011-12	0.00	0.00	63.10	63.10			
13	2012-13	0.00	0.00	0.00	0.00			
14	2013-14	0.00	0.00	0.00	0.00			
15	2014-15	369.50	30.00	482.70	882.20			
16	2015-16	98.00	130.00	39.91	267.91			
Total	1	1600.16	160	723.01	2483.17			

Firewood Issued to Public through Departmental Depots in Kathua Forest Division (Range Wise) From 2000-01 to 2015-16

APPENDIX-X

Statement of Land Diversion Cases under the Forest (Conservation) Act, 1997 in Kathua Forest Division

#	Name	User Agency	Sanction Date	Forest Area (Ha)	Wildlife Area (Ha)	State Area (Ha)	Other Area (Ha)	Total Area (Ha)
1	Improvement Of Dyala- Check Ramkote Road By Gref In Kathua Forest Division	GREF	11-07-2000	2.697	0	0	0	2.697
2	Formation Of Line Pland Improvement Of Road Samba Mansar Battal Road By Gref In Kathua Forest Division	GREF	11-08-2000	15.2	0	0	0	15.2
3	Realignment Of Lakhanpur Basholi And Bhar- Udhampur Road In Kathua Forest Division	RSD (RANJAT SAGAR DAM)	24/4/2000	14.97	0	0	0	14.97
4	Construction Of Hatli- Manu Road In Kathua By PWD (R&B) In Kathua Forest Division	PWD (R&B)	07-09-1999	1.2	0	0	0	1.2

5	Construction Of Road From							
	Manu To Hatli (Km 3rd)							
	By PWD Under Nabard	PWD (R&B)	#######	0.65	0	0	0	0.65
	Scheme In Kathua Forest							
	Division							
6	Construction Of Four Line							
	Pathankote Jammu Sections							
	Of National Highway	NHAI	17/1/2005	125.4	0	0	0	125.4
	Package No. C.Iii/14 I N							
	Jammu Forest Division							
7	Lakhanpur Vijaypur							
	Coming In Madhupur							
	Punjab And Jammu Trawi							
	In Connection With	NODTLIEDN						
	Doubling Of Railwy Line	RAILWAY	25/4/2005	57.62	0	0	0	57.62
	From Jalandhar Pathankote							
	Jammu Tawi By Norhtern							
	Railway In Kathua Forest							
	Division							

8	Permission For Cutting Of 548 No Of Trees Along Railway Line From River Bridge To Budhi Railway Station In Connection With Dobling Of Railway Line Between Madhopur Punjab- Jammu Tawi By Northern Railway In Kathua Forest	NORTHERN RAILWAY	#######	0	0	0	0	0
9	Construction Of Road From Galak To Upper Rajwalta (Km 0 To 10) Under PMGSY In Billawar Forest Division	PMGSY	29/10/2009	2.82	0	0	0	2.82
10	Construction Of Proposed Govt Drgree Collage At Samba By Higher Education In Kathua Forest Division	HIGHER EDUCATION	18/5/2006	3.45	0	0	0	3.45

11	Additional Forest Land For							
	Laying Of 132 Kv Double							
	Circuit Sewa-Ii To							
	Hiranagar Transmission	PGCI	31/10/2008	4.92	0	0	0	4.92
	Line (Part-Ii) Power Grid							
	Coroporation Of India Ltd							
	In Kathua Forest Division							
12	Construction Of 132 Kv							
	Double Circuit Sewa-Ii To							
	Mahanpur D/L & 132 Kv	PGCI	17/10/2006	11.85	0	0	0	11.85
	D/C Sewa-Ii To Hiranagar							
	In Billawar Forest Division							
13	Construction Of Road From							
	Janglote To Bhed Blode		10/5/2007	1.08	0	0	0	1.08
	Under Pmgsy By PWD In	$\Gamma W D (K \alpha D)$	19/3/2007	1.98	0	0	0	1.98
	Kathua Forest Division							

14	Railway Line Between							
	Mahdupur Punjab To							
	Jammu Ravi Bridge To							
	Budhi And Cutting Of 548							
	Nos Of Trees Between							
	Madhpur And Puinjab To	NORTHERN RAILWAY	31/3/2010	0.185	0	0	0	0.185
	Jammu Tawi For	KAL WAT						
	Construction Of Dobbling							
	Of Railway Line By							
	Northern Railwy In Jammu							
	And Kathu Forest Division							
14	Railway Line Between							
	Mahdupur Punjab To							
	Jammu Ravi Bridge To							
	Budhi And Cutting Of 548							
	Nos Of Trees Between	NODTHEDN						
	Madhpur And Puinjab To	RAILWAY	#######	0	0	0	0	0
	Jammu Tawi For							
	Construction Of Dobbling							
	Of Railway Line By							
	Northern Railwy In Jammu							
	And Kathu Forest Division							

15	Laying Of 132 Kv Dc Hiranagar-Battal Manwal Transmission Line In Jammu And Kathua Forest Division By Transmission Line Construction Division -Ii	J&K SPDC	03-09-2011	44.9	0	0	0	44.9
16	Cutting Of 371 Trees/Poles (Belonging To Social Forestry Department) In Connection With Widening Of Kalibari-Kathua-Hatli Morh Road By The Economic Resenstruction Agency (ERA) Social Foresty Division, Kathuia	ERA	19/12/2008	0	0	0.334	0	0.334
17	Cutting Permission Of 3010 Poles/Saplings Of Social Forestry Department Coming In Alignment Of Road From Garh To Bathri Under PMGSY In Social Forestry Division Kathua	PMGSY	02-10-2011	0	0	0.804	0	0.804

18	Construction Of Road From Sarna To Mohargarh Under PMGSY In Kathua Forest Division	PMGSY	13/10/2011	1.695	0	0	0	1.695
19	Logate-Kothera Road And Its Extension Up To Village Androte By PWD (R&B) In Kathua Forest Division	PWD (R&B)	02-02-2012	0.318	0	0	0	0.318
20	Construction Of 132 Kv Double Circuit Kathua- Mahanpur Transmission Line Under Power Grid Sasrna (PTK) In Kathua Forest Division	PGCI	13/5/2010	11.74	0	0	0	11.74
21	Goran To Samotha By PWD (R&B) In Kathua Forest Division	PWD (R&B)	09-09-2010	2.199	0	0	0	2.199
22	Mansar To Quammi By PWD (R&B) In Kathua Forest Division	PWD (R&B)	30/8/2010	2.395	0	0	0	2.395

23	Construction/Widening Of Four Laning Of Pathankote Jammu Section Of National Highway From Km. 16.350 To 80.00 In Kathua Forest Division	NHAI	28/12/2010	2.41	0	0	0	2.41
24	Chigla Bagh To Bhiker By PMGSY In Kathua Forest Division	PMGSY	09-09-2010	1.62	0	0	0	1.62
25	Construction Of Road Dasanu To Kouli Kopper (Rd Km 01 To Km 06) From Kopper Side And Km 01 To 3.6 From Kohli Side Unde PMGSY In Kathua Forest Division	PMGSY	29/1/2011	2.135	0	0	0	2.135
26	400 Kv D/C Kishenpur Samba Transmission Line By Power Grid Corporation Of Indida In Jammu Territorial Forest Diviaion, Kathua Territorial, Jammu Social Forestry Division	PGCI	23/8/2012	33.7	0	2.48	0	36.18

	And Kathua Social Forestry							
	Division							
27	Felling Permission Of Trees							
	Coming In Widening Of	PWD (R&B)	24/7/2014	0	0	1.35	0	1.35
	Vip Distributory Road At							
	Kathua By PWD (R&B)							
	Social Forestry Division							
	Kathua							
27	Felling Permission Of Trees	PWD (R&B)	17/12/2011	0	0	0.36	0	0.36
	Coming In Widening Of							
	Vip Distributory Road At							
	Kathua By PWD (R&B)							
	Social Forestry Division							
	Kathua							
28	Felling Of Social Forestry	GREF	09-04-2015	0	0	0	0	0
	Trees Coming In Widening							
	Of Chhan Katiyari-Katal-							
	Gujran-Londi-Bobiya By							
	GREF In Social Forestry							

	Division, Kathua							
29	Laying Of Rising Main							
	From Gsr Dunga To	PHE	09-10-2012	0.162	0	0	0	0.162
	Proposed Gsr At Plail By							
	PHE Department In Kathua							
	Forest Division							
30	Cutting Of 371 Trees/Poles	ERA	19/12/2008	0	0	0.334	0	0.334
	(Belonging To Social							
	Forestry Department) In							
	Connection With Widening							
	Of Kalibari-Kathua-Halti							
	Morh Road By The ERA In							
	Social Foresty Division							
	Kathua							
31	Kalibari-Kathua-Hatli Morh	ERA	09-10-2012	0.03	0	0	0	0.03
	Road Widening At							
	Crossing Near Canal Bridge							
	At Sawan Chak (Opposite							
	Gurdawara) By ERA In							
	Kathua Forest Division							
				349.917	0	5.662	0	355.579
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	Panjal Forests Divions							
	Rajouri, Poonch,							1.196
	Jammu, Reasi, Nowhsra,							
	NRSS Xxix In Kathua,	NRSS	16/9/2015	1.196	0	0	0	
	Transmission Line By							
	D/C Samba-Amargarh							
34	Construction Of 400 Kv							
	Division							
	PMGSY In Kathua Forest	PMGSY	02-05-2016	1.85	0	0	0	1.85
	Nud To Bharat Garh By	DMCSN						
33	Construction Of Road From							
	Railway							
	At Lakhanpur By N,	NORTHERN RAILWAY	12-12-2012	0.625	0	0	0	0.625
32	Doubling Of Railway Line							

APPENDIX XI

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
1	Kathua	1/K	Budhi	Budhi	242.00	233.80	-8.20	
2	Kathua	2/K	Budhi	Budhi	210.00	285.04	75.04	
3	Kathua	3/K	Budhi	Barwal	293.00	373.98	80.98	
4	Kathua	4/K	Budhi	Barwal	222.00	331.57	109.57	
5	Kathua	8/K	Basantpur	Manu	208.00	184.31	-23.69	
6	Kathua	9/K	Basantpur	Thein	436.50	309.75	-126.75	
7	Kathua	10/K	Basantpur	Thein	368.50	435.10	66.60	
8	Kathua	11/K	Basantpur	Thein	184.00	196.04	12.04	
9	Kathua	12/K	Basantpur	Thein	563.00	642.62	79.62	
10	Kathua	13/K	Basantpur	Nora	502.00	516.39	14.39	
11	Kathua	14/K	Basantpur	Tank di Garhi	438.50	616.18	177.68	
12	Kathua	15/K	Basantpur	Tank di Garhi	765.00	758.65	-6.35	
13	Kathua	16/K	Basantpur	Nora	316.50	380.86	64.36	
14	Kathua	17/K	Basantpur	Dhana Dhanore	619.00	636.74	17.74	
15	Kathua	18a/K	Basantpur	Dhana Dhanore	539.00	570.33	31.33	
16	Kathua	18b/K	Basantpur	Dhana Dhanore	655.00	635.60	-19.40	
17	Kathua	19/K	Basantpur	Dhana Dhanore	341.50	409.96	68.46	
18	Kathua	20a/K	Basantpur	Nora	142.50	130.28	-12.22	
19	Kathua	20b/K	Basantpur	Nora	356.00	363.67	7.67	
20	Kathua	21a/K	Basantpur	Tank di Garhi	434.00	440.65	6.65	
21	Kathua	21b/K	Basantpur	Tank di Garhi	212.50	284.43	71.93	
22	Kathua	22/K	Basantpur	Tank di Garhi	696.50	836.13	139.63	
23	Kathua	23/K	Basantpur	Tank di Garhi	312.50	363.34	50.84	
24	Kathua	24/K	Janglote	Dilwan Dole	360.00	449.14	89.14	
25	Kathua	25/K	Janglote	Dilwan Dole	339.00	414.33	75.33	
26	Kathua	26/K	Janglote	Janglote II	749.00	679.31	-69.69	
27	Kathua	27/K	Janglote	Janglote I	366.00	357.20	-8.80	
28	Kathua	28/K	Budhi	Sundri Kote	843.00	764.61	-78.39	
29	Kathua	29a/K	Basantpur	Tank di Garhi	695.50	653.05	-42.45	
30	Kathua	29b/K	Budhi	Sundri Kote	730.00	788.56	58.56	
31	Kathua	30/K	Budhi	Jothana	272.00	289.79	17.79	
32	Kathua	31/K	Budhi	Ghati	272.00	322.29	50.29	
33	Kathua	32/K	Budhi	Ghati	298.00	324.51	26.51	
34	Kathua	33/K	Budhi	Jothana	115.00	210.87	95.87	
35	Kathua	34/K	Budhi	Jothana	402.00	428.61	26.61	
36	Kathua	35/K	Budhi	Jothana	380.00	397.29	17.29	

Comparison of area of compartments obtained using earlier Dot-Grid method and the GIS method.

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
37	Kathua	36/K	Budhi	Sundri Kote	382.00	439.94	57.94	
38	Kathua	37/K	Budhi	Sundri Kote	541.00	546.32	5.32	
39	Kathua	38/K	Budhi	Sundri Kote	588.00	593.02	5.02	
40	Jasrota	1/J			225.50	193.15	-32.35	
41	Jasrota	2/J			117.00	88.63	-28.37	
42	Jasrota	3/J			125.00	150.20	25.20	
43	Jasrota	4/J			162.00	149.51	-12.49	
44	Jasrota	5/J			107.50	121.37	13.87	
45	Jasrota	6/J			84.00	57.53	-26.47	
46	Jasrota	7/J	Dinga Amb	Behari	68.00	66.04	-1.96	
47	Jasrota	8/J	Dinga Amb	Behari	160.00	167.83	7.83	
48	Jasrota	9/J	Dinga Amb	Behari	123.00	96.55	-26.45	
49	Jasrota	10/J	Dinga Amb	Kori Bagni	101.00	92.15	-8.85	
50	Jasrota	11/J	Dinga Amb	Kori Bagni	142.00	191.32	49.32	
51	Jasrota	12a/J	Dinga Amb	Sallan	111.00	98.65	-12.35	
52	Jasrota	12b/J	Dinga Amb	Sallan	76.00	73.92	-2.08	
53	Jasrota	12c/J	Dinga Amb	Mela	134.00	99.56	-34.44	
54	Jasrota	12d/J	Dinga Amb	Mela	55.50	42.28	-13.22	
55	Jasrota	13/J	Rajwalta	Galak	174.50	193.58	19.08	
56	Jasrota	14/J	Rajwalta	Galak	173.00	175.05	2.05	
57	Jasrota	15/J	Rajwalta	Galak	257.50	221.54	-35.96	
58	Jasrota	16/J	Rajwalta	Galak	181.50	180.22	-1.28	
59	Jasrota	17/J	Rajwalta	Galak	275.00	303.07	28.07	
60	Jasrota	18/J	Rajwalta	Rajwalta	172.00	167.47	-4.53	
61	Jasrota	19/J	Rajwalta	Rajwalta	445.00	524.74	79.74	
62	Jasrota	20/J	Rajwalta	Rajwalta	110.00	61.78	-48.22	
63	Jasrota	21/J	Rajwalta	Rajwalta	401.50	334.33	-67.17	
64	Jasrota	22/J	Rajwalta	Rajwalta	206.00	150.98	-55.02	
65	Jasrota	23/J	Mastgarh	Mastgarh	213.00	249.03	36.03	
66	Jasrota	24/J	Mastgarh	Mastgarh	189.00	172.34	-16.66	
67	Jasrota	25/J	Mastgarh	Mastgarh	186.50	152.01	-34.49	
68	Jasrota	26a/J	Mastgarh	Mastgarh	187.00	208.67	21.67	
69	Jasrota	26b/J	Mastgarh	Mastgarh	225.00	197.55	-27.45	
70	Jasrota	26c/J	Mastgarh	Mastgarh	288.50	282.82	-5.68	
71	Jasrota	26d/J	Mastgarh	Mastgarh	156.00	105.29	-50.72	
72	Jasrota	27/J	Mastgarh	Mastgarh	314.00	212.74	-101.26	
73	Jasrota	28/J	Rajwalta	Thein	162.00	130.55	-31.45	
74	Jasrota	29/J	Rajwalta	Thein	162.50	86.66	-75.84	
75	Jasrota	30/J	Rajwalta	Thein	129.00	105.24	-23.76	
76	Jasrota	31/J	Rajwalta	Thein	88.50	106.04	17.54	
77	Jasrota	32a/J	Rajwalta	Thein	249.50	228.03	-21.47	
78	Jasrota	32b/J	Rajwalta	Thein	118.50	88.93	-29.57	
79	Jasrota	33/J	Rajwalta	Thein	190.00	188.99	-1.01	
80	Jasrota	34/J	Dinga Amb	Dinga Amb	85.00	68.37	-16.63	

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
81	Jasrota	35/J	Dinga Amb	Dinga Amb	78.00	86.17	8.17	
82	Jasrota	36/J	Mastgarh	Kathera	72.00	72.21	0.21	
83	Jasrota	37/J	Mastgarh	Kathera	139.00	200.43	61.43	
84	Jasrota	38/J	Mastgarh	Kathera	61.00	100.75	39.75	
85	Jasrota	39/J	Mastgarh	Kathera	66.50	97.38	30.88	
86	Jasrota	40/J	Mastgarh	Kathera	82.00	84.17	2.17	
87	Jasrota	41/J	Mastgarh	Kathera	230.00	218.83	-11.17	
88	Jasrota	42/J	Mastgarh	Kathera	68.00	81.81	13.81	
89	Jasrota	43/J	Mastgarh	Bera	208.50	250.41	41.91	
90	Jasrota	44/J	Mastgarh	Bera	172.00	179.70	7.70	
91	Jasrota	45/J	Mastgarh	Bera	97.00	104.54	7.54	
92	Jasrota	46/J	Mastgarh	Bera	116.50	137.68	21.18	
93	Jasrota	47a/J	Mastgarh	Bera	90.00	106.42	16.42	
94	Jasrota	47b/J	Mastgarh	Bera	172.00	110.88	-61.12	
95	Jasrota	48a/J	Mastgarh	Bera	64.00	75.51	11.51	
96	Jasrota	48b/J	Mastgarh	Bera	222.00	232.99	10.99	
97	Jasrota	49/J	Mastgarh	Kathera	114.50	105.10	-9.40	
98	Jasrota	50/J	Mastgarh	Kathera	113.00	113.42	0.42	
99	Jasrota	51/J	Mastgarh	Kathera	123.00	175.78	52.78	
100	Jasrota	52/J	Dinga Amb	Dinga Amb	45.00	52.23	7.23	
101	Jasrota	53/J	Dinga Amb	Dinga Amb	61.00	70.62	9.62	
102	Jasrota	54/J	Dinga Amb	Dinga Amb	274.50	75.93	-198.57	
103	Jasrota	55a/J	Dinga Amb	Dinga Amb	173.00	207.81	34.81	
104	Jasrota	55b/J	Dinga Amb	Dinga Amb	183.00	216.19	33.19	
105	Jasrota	56/J	Dinga Amb	Dinga Amb	147.00	159.93	12.93	
106	Jasrota	57/J	Dinga Amb	Chilik	141.00	186.62	45.62	
107	Jasrota	58/J	Dinga Amb	Chilik	73.00	89.14	16.14	
108	Jasrota	59/J	Dinga Amb	Chilik	143.00	175.48	32.48	
109	Jasrota	60/J	Dinga Amb	Chilik	175.00	205.01	30.01	
110	Jasrota	61/J	Dinga Amb	Chilik	91.00	100.91	9.91	
111	Jasrota	62/J	Lower Hiranagar	Surara	128.00	173.50	45.50	
112	Jasrota	63/J	Lower Hiranagar	Surara	157.00	191.21	34.21	
113	Jasrota	64/J	Lower Hiranagar	Surara	101.00	98.99	-2.01	
114	Jasrota	65/J	Lower Hiranagar	Surara	287.00	253.41	-33.59	
115	Jasrota	66/J	Lower Hiranagar	Surara	275.00	278.08	3.08	
116	Jasrota	67a/J	Lower Hiranagar	Kotla	127.50	168.40	40.90	
117	Jasrota	67b/J	Lower Hiranagar	Kotla	197.00	182.78	-14.22	
118	Jasrota	67c/J	Lower Hiranagar	Kotla	27.00	12.54	-14.46	
119	Jasrota	68/J	Lower Hiranagar	Kotla	55.50	62.51	7.01	
120	Jasrota	69/J	Lower Hiranagar	Nonath	178.50	159.36	-19.14	
121	Jasrota	70/J	Lower Hiranagar	Nonath	225.00	190.74	-34.27	
122	Jasrota	71/J	Lower Hiranagar	Nonath	139.00	134.38	-4.62	
123	Jasrota	72/J	Dinga Amb	Mela	272.00	202.11	-69.89	
124	Jasrota	73/J	Lower Hiranagar	Said Koota	235.50	176.14	-59.36	

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
125	Jasrota	74/J	Lower Hiranagar	Said Koota	160.50	201.64	41.14	
126	Jasrota	75/J	Lower Hiranagar	Said Koota	141.00	178.94	37.94	
127	Jasrota	76/J	Lower Hiranagar	Said Koota	88.00	95.76	7.76	
128	Jasrota	77/J	Lower Hiranagar	Said Koota	132.00	80.52	-51.48	
129	Jasrota	78/J	Dinga Amb	Sallan	122.50	98.08	-24.42	
130	Jasrota	79/J	Dinga Amb	Kori Bagni	185.00	128.00	-57.00	
131	Jasrota	80/J	Dinga Amb	Kori Bagni	111.00	128.92	17.92	
132	Jasrota	81/J	Dinga Amb	Kori Bagni	106.50	108.28	1.78	
133	Jasrota	82/J	Mastgarh	Bera	75.00	88.73	13.73	
134	Jasrota	83/J	Mastgarh	Bera	109.00	76.27	-32.73	
135	Samba	1/B	Kali	Bharatgarh	99.00	96.82	-2.18	
136	Samba	2/B	Kali	Bharatgarh	207.50	219.19	11.69	
137	Samba	3/B	Kali	Bharatgarh	112.00	114.90	2.90	
138	Samba	4/B	Kali	Bharatgarh	62.00	61.96	-0.04	
139	Samba	5/B	Kali	Bharatgarh	138.00	154.13	16.13	
140	Samba	6a/B	Kali	Bharatgarh	83.00	77.49	-5.51	
141	Samba	6b/B	Kali	Bharatgarh	140.00	138.73	-1.27	
142	Samba	7/B	Kali	Bharatgarh	195.00	171.19	-23.81	
143	Samba	8/B	Kali	Bharatgarh	145.00	110.72	-34.28	
144	Samba	9/B	Kali	Bharatgarh	116.00	103.50	-12.50	
145	Samba	10/B	Kali	Bharatgarh	100.00	92.32	-7.68	
146	Samba	11/B	Kali	Bhagooni	157.00	177.88	20.88	
147	Samba	12/B	Kali	Bhagooni	119.00	127.50	8.50	
148	Samba	13/B	Kali	Leani	164.50	177.91	13.41	
149	Samba	14/B	Kali	Leani	141.50	161.99	20.49	
150	Samba	15/B	Kali	Leani	121.00	112.50	-8.50	
151	Samba	16/B	Kali	Leani	167.00	183.33	16.33	
152	Samba	17/B	Kali	Leani	25.00	26.03	1.03	
153	Samba	18/B	Kali	Leani	135.00	125.07	-9.94	
154	Samba	19/B	Soram	Jeer	178.00	182.25	4.25	
155	Samba	20/B	Soram	Jeer	201.50	273.26	71.76	
156	Samba	21/B	Soram	Jeer	71.50	78.52	7.02	
157	Samba	22/B	Soram	Samotha	123.00	123.39	0.39	
158	Samba	23/B	Soram	Samotha	46.50	54.08	7.58	
159	Samba	24a/B	Soram	Samotha	72.50	74.29	1.79	
160	Samba	24b/B	Soram	Samotha	74.00	118.29	44.29	
161	Samba	25/B	Soram	Jeer	158.00	171.29	13.29	
162	Samba	26/B	Soram	Jeer	92.00	81.23	-10.77	
163	Samba	27/B	Soram	Jeer	135.00	210.10	75.10	
164	Samba	28/B	Soram	Jeer	85.00	124.13	39.13	
165	Samba	29/B	Soram	Jeer	104.50	113.43	8.93	
166	Samba	30/B	Soram	Soram	135.00	145.08	10.08	
167	Samba	31/B	Soram	Soram	104.00	122.61	18.61	
168	Samba	32/B	Soram	Soram	141.00	233.23	92.23	

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
169	Samba	33/B	Soram	Soram	130.00	153.77	23.77	
170	Samba	34/B	Soram	Soram	116.00	146.51	30.51	
171	Samba	35/B	Soram	Soram	115.50	154.37	38.87	
172	Samba	36/B	Soram	Soram	115.00	97.81	-17.19	
173	Samba	37/B	Goran	Goran	38.00	48.46	10.46	
174	Samba	38/B	Goran	Goran	66.00	64.87	-1.13	
175	Samba	39/B	Goran	Goran	94.00	86.93	-7.07	
176	Samba	40/B	Soram	Soram	124.00	127.23	3.23	
177	Samba	41/B	Soram	Samotha	68.00	82.08	14.08	
178	Samba	42/B	Goran	Goran	85.00	98.00	13.00	
179	Samba	43/B	Goran	Goran	76.50	67.35	-9.15	
180	Samba	44/B	Goran	Goran	110.00	114.52	4.52	
181	Samba	45/B	Goran	Goran	77.00	81.60	4.60	
182	Samba	46/B	Goran	Goran	78.00	79.53	1.53	
183	Samba	47/B	Goran	Goran	45.00	32.38	-12.62	
184	Samba	48/B	Soram	Samotha	57.00	58.17	1.17	
185	Samba	49/B	Goran	Sumb	115.00	111.70	-3.31	
186	Samba	50/B	Goran	Sumb	87.00	81.79	-5.21	
187	Samba	51/B	Goran	Sumb	98.00	101.44	3.44	
188	Samba	52/B	Goran	Sumb	66.00	93.97	27.97	
189	Samba	53/B	Goran	Sumb	131.00	130.97	-0.03	
190	Samba	54/B	Goran	Sumb	144.00	183.54	39.54	
191	Samba	55/B	Goran	Sumb	100.00	116.75	16.75	
192	Samba	56/B	Goran	Sumb	87.50	102.29	14.79	
193	Samba	57/B	Goran	Sumb	58.00	68.46	10.46	
194	Samba	58/B	Goran	Sumb	70.00	69.21	-0.79	
195	Samba	59/B	Goran	Sumb	40.00	35.35	-4.65	
196	Samba	60/B	Goran	Sumb	60.00	85.89	25.89	
197	Samba	61/B	Goran	Sumb	100.00	103.99	3.99	
198	Samba	62/B	Goran	Sumb	152.00	121.59	-30.41	
199	Samba	63/B	Goran	Sumb	30.00	38.85	8.85	
200	Samba	64/B	Goran	Jar Jareli	47.00	45.94	-1.06	
201	Samba	65/B	Goran	Jar Jareli	108.00	80.66	-27.34	
202	Samba	66/B	Goran	Jar Jareli	128.00	115.23	-12.77	
203	Samba	67/B	Goran	Jar Jareli	117.00	118.18	1.18	
204	Samba	68/B	Goran	Jar Jareli	147.00	152.17	5.17	
205	Samba	69/B	Goran	Jar Jareli	88.00	66.19	-21.81	
206	Samba	70/B	Goran	Jar Jareli	163.00	158.76	-4.24	
207	Samba	71/B	Goran	Jar Jareli	61.00	81.91	20.91	
208	Samba	72/B	Goran	Leaki	41.00	39.57	-1.43	
209	Samba	73/B	Goran	Leaki	115.00	108.22	-6.79	
210	Samba	74/B	Goran	Leaki	120.00	125.20	5.20	
211	Samba	75/B	Goran	Leaki	87.00	71.78	-15.22	
212	Samba	76/B	Goran	Leaki	156.00	120.34	-35.66	

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
213	Samba	77/B	Goran	Leaki	72.00	86.29	14.29	
214	Samba	78/B	Goran	Leaki	30.00	44.44	14.44	
215	Samba	79/B	Goran	Leaki	100.00	107.96	7.96	
216	Samba	80/B	Goran	Leaki	172.00	198.78	26.78	
217	Samba	81/B	Goran	Leaki	74.00	84.64	10.64	
218	Samba	82/B	Goran	Leaki	103.00	100.04	-2.97	
219	Samba	1/D	Basantar	Labli	146.50	189.84	43.34	
220	Samba	2/D	Basantar	Khirdi	131.50	146.87	15.37	
221	Samba	3a/D	Basantar	Khirdi	123.00	142.52	19.52	
222	Samba	3b/D	Basantar	Khirdi	96.00	97.28	1.28	
223	Samba	4/D	Basantar	Khirdi	196.50	229.56	33.06	
224	Samba	5/D	Basantar	Labli	65.00	71.93	6.93	
225	Samba	6/D	Basantar	Labli	199.50	286.41	86.91	
226	Samba	7a/D	Basantar	Labli	128.00	102.17	-25.83	
227	Samba	7b/D	Basantar	Labli	92.50	157.60	65.10	
228	Samba	23/D	Kali	Mohargarh	252.00	197.80	-54.20	
229	Samba	26/D	Kali	Mohargarh	149.50	151.48	1.98	
230	Samba	27/D	Kali	Mohargarh	91.00	86.38	-4.62	
231	Samba	28/D	Kali	Mohargarh	217.50	247.77	30.27	
232	Samba	29/D	Kali	Mohargarh	187.00	173.49	-13.51	
233	Samba	30/D	Kali	Mohargarh	163.50	187.18	23.68	
234	Samba	31/D	Kali	Mohargarh	152.00	171.32	19.32	
235	Samba	32/D	Kali	Mohargarh	106.00	100.16	-5.84	
236	Samba	33/D	Kali	Mohargarh	165.00	173.13	8.13	
237	Samba	34/D	Kali	Mohargarh	68.50	55.42	-13.08	
238	Samba	35/D	Kali	Mohargarh	217.50	204.26	-13.24	
239	Samba	36/D	Kali	Mansar Nali	164.00	203.23	39.23	
240	Samba	37/D	Kali	Mansar Nali	154.00	154.81	0.81	
241	Samba	38/D	Kali	Mansar Nali	105.00	108.96	3.96	
242	Samba	39/D	Kali	Mansar Nali	150.00	127.97	-22.03	
243	Samba	40/D	Kali	Mansar Nali	131.50	148.53	17.03	
244	Samba	41/D	Kali	Mansar Nali	94.50	97.92	3.42	
245	Samba	42/D	Kali	Mansar Nali	189.00	186.44	-2.56	
246	Samba	43/D	Kali	Mansar Nali	234.00	177.23	-56.77	
247	Samba	44/D	Kali	Mansar Nali	60.00	76.16	16.16	
248	Samba	45/D	Kali	Mansar Nali	178.00	171.30	-6.70	
249	Samba	46/D	Kali	Mansar Nali	153.50	158.84	5.34	
250	Samba	47/D	Kali	Mansar Nali	50.00	56.68	6.68	
251	Samba	48/D	Kali	Mohargarh	129.00	127.43	-1.57	
252	Samba	49/D	Kali	Mohargarh	72.00	58.95	-13.05	
253	Samba	50/D	Kali	Mohargarh	95.00	136.40	41.40	
254	Samba	51/D	Kali	Mohargarh	160.00	173.77	13.77	
255	Samba	52/D	Kali	Mohargarh	65.00	65.77	0.77	
256	Samba	53/D	Kali	Mohargarh	149.00	154.60	5.60	

		Compa	rtment details		Area (Ha)			
Id	Range	Compt	Block	Beat	DotGrid	GIS	Difference	
257	Samba	54/D	Kali	Mohargarh	303.00	290.88	-12.12	
258	Samba	55/D	Kali	Mohargarh	109.00	100.90	-8.10	
259	Samba	56/D	Kali	Mohargarh	221.00	229.89	8.89	
260	Samba	57/D	Kali	Durui	182.00	152.65	-29.35	
261	Samba	58/D	Kali	Durui	152.00	213.23	61.23	
262	Samba	59/D	Basantar	Nandni	212.00	328.33	116.33	
263	Samba	60/D	Basantar	Nandni	88.00	104.51	16.51	
264	Samba	61/D	Basantar	Ber-Kamela	76.00	154.18	78.18	
265	Samba	62/D	Basantar	Ber-Kamela	213.00	251.36	38.36	
266	Samba	63/D	Basantar	Ber-Kamela	208.00	178.51	-29.50	
			Totle		46809.50	48668.24	1858.74	

APPENDIX XII

List of Medicinal Plants found in Kathua Forest Division

S.	Botanical name	Vernacular/Common	Part used	Habit	Medicinal Properties
No.		name			
1	Abrus precatorius	<i>Ratti, Rakat,</i> Gunja	Root	Climber	Root decoction is used in cough and cold, colic pain and rheumatism.
2	Acacia catechu	Khair	Wood extract	Tree	Katha produced from bark used in curing mouth ulcer.
3	Acacia modesta	Phalai, Blackwood	Bark	Tree	Bark is used as an astringent.
4	Acacia nilotica	Babul/ Kikar	Bark	Tree	Bark of the tree is used to cure skin diseases and bleeding piles.
5	Achyranthes aspera	<i>Puthkanda,</i> Prickly Chaff	Leaves Flower	Shrub	Fresh leaves are applied externally on scorpion stings Root used as an abortifacient. Plant is used for a great many medicinal purposes, especially in obstetrics and gynecology, including abortion, induction of labor, and cessation of postpartum bleeding.
6	Acorus calamus	<i>Braiyaan,</i> Sweet Flag	Rhizome	Herb	Rhizomes of the plant are carminative, stimulant and tonic and eaten for curing stomachache. Rhizomes are tied around the neck of children to control the infection caused by intestinal worms.
7	Ageratum conyzoides	Neeli Jhadi, Goatweed	Leaves	Herb	Used in nervine tonic. Juice of the herb is useful in proplepsis Leaves styptic and vulnerary.
8	Albizia chinensis	<i>Oola,</i> Silk tree	Bark	Tree	Infusion of bark is used for dressing cuts and wounds.
9	Albizia lebbeck	<i>Sareen,</i> Flea Tree Frywood	Root	Tree	Root powder act as excellent gum tonner and aphrodisiac.
10	Alternanthera sessilis	Dwarf copper leaf, Sessile Joyweed	Whole plant	Hydrophyte	Plant used as febrifuge. Young shoots rich in protein and iron juice is given to anaemics.
11	Amaranthus spinosus	<i>Kand Chalera,</i> Spiny amaranth	Roots and leaves	Herb	Boiled roots and leaves are given to children as laxative and applied as emollient. Poultice of leaves is applied to abscesses piles and wounds.
12	Anagallis arvensis	<i>Aananne dhad, Dhaanri</i> Red chickweed	Whole plant	Herb	It was considered an antidote to poison many years ago. Its internal use advised in mania, epileptic

S.	Botanical name	Vernacular/ Common	Part used	Habit	Medicinal Properties
No.		name			
					attacks, and other derangements of the nervous
					system.
13	Argemone mexicana	Peeli Kandiyari	Seeds	Herb	Seeds of the plants are ground to use for skin
		Mexican poppy			diseases
14	Arisaema	Sappe di dhaud, Sarp	Tubers	Herb	Tubers are given to sheep as remedy for colic and
	jacquemontii	Cobra plant			also as wormicide.
15	Arundo donax	Nard, Naal Narsaal	Rhizome	Herb	Decoction of rhizome is used as emollient, diuretic
		Giant Reed		_	and to stimulate menstrual discharge.
16	Asparagus adscendens	Sainpod, Sainsmaya	Tubers	Herb	Tubers cooling, demulcent and diaphoretic.
		Satavar	_		
17	Azadirachta indica	<i>Nim,</i> Neem	Leaves	Tree	Leaves used as insects repellant. Bark for skin
					troubles. Tender twigs used to clean teeth. Flowers
1.0					tonic and stomachic.
18	Barleria cristata	Kali Barenker	Leaves and	Shrub	Leaves chewed for relief in toothache. Root decoction
1.0		Philippine violet	roots		given in anaemia.
19	Barleria prionitis	Kanda Barenker	Leaves and	Shrub	Leaves used for inducing swellings and their infusion
		Porcupine flower,	roots		in cough.
		Kuranta			
20	Bahuinia vahlii	Malungad, Malu,	Buds and and	Creeper	Dried buds are useful in dysentery, diarrhoea and
		Mahul Jallaur	roots		piles and decoction of root is used to treat dyspepsia.
21	Bauhinia variegata	Katraid, Kachnar,	Bark and	Tree	Kachnar is used to cure asthma and ulcers. The buds
		Orchid tree	roots		and roots are good for digestive problems. Flower
					buds are cooked as vegetable and also mixed with
					curd (Raita).
22	Blumea lacera	Blumea	Roots and	Herb	Used as anti-pyretic. Leaf juice used as astringent,
			leaves		febrifuge, diuretic and anti-helminthic. Roots used
					against treatment of cholera.
23	Bombax ceiba	Simbal, Cotton tree	Root and fruit	Tree	Root is used as stimulant, tonic, and aphrodisiac.
					Fruits stimulant and diuretic used to cure ulcer of
2.4			 Т	-	kidney and bladder.
24	Butea monosperma	Palah, Tattua, Flame of	Leaves,	Tree	Leaves are used as tonic. Flowers are used as
		the fire	flowers and		diuretic, depurative and antiseptic. Bark used to cure
			bark		snake blke. Locals apply gum of the bark to ulcers

S.	Botanical name	Vernacular/ Common	Part used	Habit	Medicinal Properties
No.		name			
					and sore throat.
25	Calotropis procera	Desi akk, Sodom apple	Latex	Shrub	Locals use latex of the plant as an antidote to
					scorpion-sting.
26	Cannabis sativa	<i>Bhang,</i> Marijuana	Whole plant	Shrub	Entire plant is analgesic and sedative. Locals smoke
					the Cannabis leaves as narcotic.
27	Carrisa spinarum	Garna	Leaves and	Shrub	Leaves decoction is given in remittent fever. Roots
			roots		are used against stomach ailments and are purgative.
28	<i>Cassia fistula</i> Linn	Amaltas, Karangal	Leaves, roots	Tree	Leaves, roots and seeds are laxative. Fresh leaf
		Golden shower tree	and seeds		juice is locally applied to cure skin diseases. Beans
					are used to treat dysentery.
29	Senna occidentalis	Baddi Aelma, Coffee	Leaves and	Tree	Leaves and seeds are purgative. Seeds are used in
20		weed	seeds	77 1	external application for skin troubles.
30	Senna tora	Louki Aedma, Sickle	Leaves, seeds,	Herb	Dried fruits are used as a purgative.
21	Character diama allocate	Senna Duth Louble and the	roots	II. J.	
31	спепороанит аврит	Bathu, Lamb's quarters	Leaves	Herb	Leaves rich source of vitamin L, mildly laxative and
22	Ciscampolos papoina	Pattal hal Datakou di	Dooto	Climb	The roots of the plant are used as antidate to analy
52	cissumperos pareira	bal Abuta Laabu natha	ROOLS	CIIIID	noison to cure toothache and loucorrhoea
22	Clomatic	Porkolly	Whole	Chruh	Whole of the plant is used against scabios and
55	Liemuus huchananiana	Derkenu	whole	SIII UD	whole of the plant is used against scaples and
24	Clomatis gouriana	Tottal Churaphar	Whole	Croopor	Leaves used against infection of splean Poet paste is
54	ciematis gour iana		WIIDIE	creeper	applied to cure nimples. It is also used to treat fever
					and musculoskeletal disorder
35	Colebrookea	Chitti Suali, Duss	Leaves	Shruh	Leaves are applied over wounds and bruises. Also
00	oppositifolia	Indian Squirrel Tail	200,00		effective against headache.
36	Commelina	<i>Churra</i> , Bengal day	Whole	Herb	Plant is demulcent, refrigerant, laxative and used
	benghalensis	flower or tropical			against leprosy.
	0	spiderwort			
37	Cordia dichotoma	Lasuda, Fragrant	Fruits	Tree	Fruits are astringent, anthelmenthic, diuretic.
		manjack, Snotty			
		gobbles			
38	Crataeva adansonii	<i>Barni,</i> Garlic pear tree	Bark	Tree	Bark is a liver stimulant, laxative and appetizer. It is
					also used in calculus and urinary infection.
39	Cymbopogon martini	Makoda Kaa, Rosha	Whole plant	Grass	Insect repellant, applied in skin disease.

S.	Botanical name	Vernacular/ Common	Part used	Habit	Medicinal Properties
No.		name			
		grass			
40	Cynodon dactylon	<i>Khabbal,</i> Bermuda	Whole Plant	Herb	Root infusion given in bleeding piles and gout. Juice
		grass			antiseptic in wounds. Root decoction diuretic.
41	Dalbergia sissoo	Shisham, Taali, Sissoo	Root and	Tree	Root and wood astringent, used in boils, skin
			wood		eruptions and vomiting.
42	Datura innoxia	Datura, Angel's trumpet	Whole Plant	Shrub	Pain relief.
43	Datura stramonium	<i>Datura,</i> Jimson weed	Whole Plant	Shrub	Antispasmodic. Dried leaves smoked in pipe to treat asthma. Poultice of flowers applied to wounds to reduce pain. Decoction of flowers and roots used as sedative during setting of fractures.
44	Dendrocalamus strictus	<i>Baans,</i> Bamboo	Latex	Grass	White substance deposited at nodes used as tonic and astringent and given in calcium deficiency.
45	Dicliptera bupleuroides	Kalu-gha, Jhudumudu	Whole Plant	Herb	Plant extract used in debility.
46	Dioscorea deltoidea	<i>Kill Dhari,</i> Vyakur, Kukurtarul, Ghunar	Tubers	Herb	Juice of root tuber used to treat roundworm. Alleviates constipation, tubers used for washing hair to kill lice.
47	Dodonaea viscosa	<i>Santha,</i> Hopbush	Leaves	Shrub	Leaves abortifacient, febrifuge, used in wounds, swellings and burns.
48	Euphorbia helioscopia	Doodhli, Sun's spurge	Whole Plant	Herb	Root considered anthelminthic. Latex applied to eruptions, seeds given in cholera.
49	Euphorbia hirta	<i>Jar Dudli,</i> Snakeweed	Whole Plant	Herb	Used to treat colic, dysentery, cough, asthma, vomiting. Stem sap used in treatment of eyelid stye. Eaten as vegetable.
50	Euphorbia royleana	<i>Thor,</i> Danda Thor	Latex	Shrub	Milky latex considered anthelminthic and cathartic. Latex used as source of Ingol esters used on cancer research.
51	Ficus benghalensis	<i>Borh,</i> Banyan	Latex	Tree	Milky latex applied in rheumatism and lumbago, bark infusion considered astringent and tonic, used in diarrhea, dysentery.
52	Ficus palmata	<i>Phugwada</i> , Fig, Jungli Anjeer	Fruits	Tree	Fruits demulcent and laxative. Dried fruits taken to relieve constipation.

S.	Botanical name	Vernacular/ Common	Part used	Habit	Medicinal Properties
No.		name			
53	Ficus religiosa	Peepal, Sacred Fig	Bark, Leaves	Tree	Bark astringent, young shoots purgative. Bark
					infusion given internally in scabies.
54	Flacourtia indica	Kakkoya, Indian Plum	Fruits	Shrub	Ripe fruits used to treat jaundice.
55	Fumaria indica	<i>Pit-pappada,</i> Indian Fumitory	Whole plant	Herb	Decoction used to treat digestive problems.
56	Hypericum perforatum	<i>Bankehdi,</i> St. John's wort	Whole plant	Herb	Astringent, expectorant, diuretic and anthelminthic. Used in diarrhea and urinary troubles.
57	Indigofera tinctoria	<i>Neeli,</i> True Indigo	Whole plant	Shrub	Extract given in epilepsy and nervous disorders. Used in ointments for boils and ulcers.
58	Jasminum multiflorum	<i>Sanairad, Jard Siyoon,</i> Yellow Jasmine	Floers and roots	Shrub	Flowers used in tonics and roots used against ringworms.
59	Justicia adhatoda (Adhatoda vasica)	<i>Barenkar,</i> Vasika	Leaves	Shrubs	Leaves used in drug "Vasaka" to treat bronchial conditions. Leaf juice given in diarrhea, dysentery. Leaf resin is insecticidal.
60	Kydia calycina	Pulla, Kydia	Leaves and bark	Tree	Leaf paste used in pain relief. Bark fibre used in cordage and ropes.
61	Lannea coromandelica	<i>Kaimbla,</i> Indian Ash Tree	Bark	Tree	Bark astringent, used as lotion in eruption of skin and ulcers. Bark decoction used in toothache.
62	Lantana camara	<i>Panjfulli jarri,,</i> Spanish flag	Whole plant	Shrub	Decoction given in tetanus, rheumatism and malaria. Infusion of leaves given in eczema.
63	Mallotus philippensis	<i>Kameela,</i> Monkey face tree	Fruit	Tree	Reddish powder of fruit is anthelminthic, styptic and useful in skin conditions.
64	Malvastrum coromandelianum	<i>Baddi Beryaad,</i> False Mallow	Whole plant	Herb	Emollient. Decoction used in dysentery.
65	Melia azedarach	Draink, Persian lilac	Bark and leaves	Tree	Bark used in skin troubles, leaves antiseptic. Decoction of leaves used in ulcers and eczema.
66	Mentha longifolia	<i>Jungli poodna,</i> Horse mint	Leaves	Herb	Leaves and twigs carminative and stimulant, leaf juice cooling and stomachic. Leaves used to prepare chutney.
67	Phyllanthus emblica	<i>Aamlai,</i> Indian gooseberry	Fruit	Tree	Fruit rich source of Vitamin C. Cooling, astringent, diuretic, laxative. Ingredient of Triphala. Fruits edible, used as pickle and murabba.
68	Pinus roxburghii	Chir	Resin	Tree	Resin carminative, used to stop minor hemorrhage in teeth and gums, and nose bleeding.

S.	Botanical name	Vernacular/Common	Part used	Habit	Medicinal Properties
No.		name			
69	Plantago lanceolata	<i>Bumnu gha,</i> Ribwort	Leaves and	Herb	Leaves and roots astringent, used in cough, asthma
		plantain	roots		and other pulmonary conditions. Anti inflammatory.
70	Pteridium aquilinum	Drrunni, Dadunni,	Rhizomes	Fern	Astringent and anthelminthic.
		Common bracken			
71	Punica granatum	Dhaadma, anaar,	Root, bark	Tree	Root and stem bark astringent and anthelminthic
		Pomegrenate	and fruit		especially for tapeworm, dried and powdered rind of
					fruit given in diarrhea and dysentery.
72	Rauvolfia serpentina	Sarpgandha, Snake	Roots	Herb	Used to obtain "Reserpine" for treatment of high
		root			blood pressure.
73	Sapindus mukorossi	<i>Retha</i> , Soapnut	Fruit	Tree	Emetic, expectorant.
74	Sida cordata	<i>Demehdi,</i> Bala, Simak,	Roots and	Tree	Used in fever. Root bark used in leucorrhea, poultice
		Kungyi	leaves		of leaves applied to treat cuts and bruises.
75	Solanum americanum	<i>Kayan Kothi</i> , Black	Whole plant	Herb	Plant juice given in ulcer and skin diseases. Infusion
		nightshade			used to cure dysentery, fever and asthma.
76	Syzyigium cumini	<i>Tallan,</i> Jamun	Bark and seed	Tree	Fresh bark milk used to cure diarrhea. Bark and
					seeds given in diabetes, bronchitis, ulcers, fruits
			-	_	edible.
77	Tagetes minuta	<i>Banguti</i> , Mint marigold	Flower	Herb	Flower stomachic, diuretic and diaphoretic. Its oil
					used in essential oil industry.
78	Tinospra sinensis	<i>Galol,</i> Guduchi	Stem	Herb	Stem decoction anti-diabetic, hair tonic and enhances
					immunity, decoction of leaves used to treat gout, are
			_		diuretic. Used in clinical research for liver conditions.
79	Verbascum thapsus	Giddar tambaku,	Leaves	Herb	Leaves smoked for asthma and sore throat. Oral
		Common Mullein			infusion given in snakebite. Tea prepared from leaves
	**/- *				used to treat cold and dysentery.
80	Vitex negundo	Banna	Roots, flowers	Tree	Roots tonic, febrifuge, diuretic. Used in rheumatism
			and leaves		and dyspepsia. Flowers astringent. Leaves aromatic,
					tonic and vermituge.
81	Woodfordia fruticosa	Dhai, Dhoe, Fire flame	Leaves	Shrub	Leaves tonic and vermituge, smoked for relief in
		bush			catarrh and headache, tranquilizer. Flowers
					astringent, used in fever and liver complaints.