PART-II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER – VII

BASIS OF PROPOSALS

CHAPTER – VII

Basis of Proposals

7.1 In accordance with the Forest policy of State, the objectives for future management are laid down as follows.

7.1.1 General Objects of Management

1. To conserve, preserve and improve the forest cover for soil and water conservation and to maintain the health of the forest vegetation and forest soils for augmenting water supplies through recharge of underground aquifers and regulation of surface water flow.

2. To manage the forests in accordance with silvicultural requirements of the crop.

3. To take adequate measures for promoting natural regeneration of Chir and other indigenous species in regeneration deficient areas and to supplement it with artificial regeneration where ever necessary.

4. To rehabilitate poorly stocked forests close to habitations to meet the requirements of local population for fodder and small timber.

5. To seek involvement of local population in JFM, making them stakeholders in protection, management and sharing of the usufructs of forests.

6. To conserve and scientifically manage Biodiversity of the area.

7. To take measures to improve the condition of Chir Forests.

8. To develop the Ecotourism potential of the area.

9. To improve the productivity of the areas that are used for grazing and to prevent their over exploitation.

7.2 Methods of Treatment

Taking into consideration the above mentioned objectives of management following methods of treatment are proposed.

1. Chir forests shall be managed with required interventions for further improvement of condition of crop and to promote regeneration naturally and artificially in regeneration deficient areas.
2. All Forest areas which are poorly stocked and close to habitations shall be taken up for rehabilitation by planting of species that meet the livelihood requirements of local people.
3. All areas which are prone to soil erosion and have been degraded shall be stabilized by soil and water conservation measures to recharge the ground water.
4. Areas infested with alien invasive species shall be improved by replacing them with indigenous species through intensive management.
5. The areas subject to excessive grazing shall be managed to increase their productivity by introduction of suitable fodder species, weed control, and regulating grazing.

6. Wildlife rich areas shall be managed for protection, preservation and improvement of Biodiversity of the area.

7. Areas having tourism potential shall be identified and developed from the point of view of ecotourism.

8. Strict fire control measures on scientific lines shall be taken to prevent damage due to fire.

7.3 Constitution of Working Circles

Consistent with the above mentioned objectives of management and prescribed methods of treatment, the following working circles are proposed.

i. Chir Improvement cum Selection Working Circle.

ii. Rehabilitation cum Reboisement Working Circle.

iii. Grazing (Overlapping) Working Circle.

iv. Plantation (Overlapping) Working Circle.

v. Non-Timber Forest Produce (Overlapping) Working Circle.

vi. Ecotourism Working Circle.

vii. Protection (Overlapping) working Circle.

In addition to these working circles following special chapters are also discussed in detail in this Working Plan:

i. Wood Based Industries

ii Participatory Forest Management

iii. Wildlife Management

iv. Development Project

The compartment wise area allotment of the above working circle have been listed and given in the Appendix. However the crop wise area statement for all the working circles is given below in the table.7.1

Table 7.1: Crop wise area statement of all the working circles

S.No.	Working circle	Area (in Ha.) under			Total
		Chir	B/L + Scrub	Blanks	
1	Chir Improvement cum selection working Circle	25336	7712	1279	34327
2	Rehabilitation cum Reboisement Working Circle.	3960	29741	1901	35602
	Total	**29296**	**37453**	**3180**	**69929**

7.3.1 Chir improvement cum Selection Working Circle

This working circle shall cover more or less the same areas that were covered under the same working circle of Sh. Manoj Pant's plan. The sole intention of constitution of this working circle is to improve general health of chir crop.

In the past these areas were managed for extraction of resin but due to over exploitation and poor management the condition of crop had completely deteriorated and at present there is no space left for more blazes. These areas experience tremendous biotic pressure due to grazing, lopping, fire etc. due to which regeneration has not been able to come up on its own. The general health of the crop in these areas is poor and the status of regeneration is not satisfactory barring few patches scattered here and there.

The priority shall be to restore the health of the crop and the rest given to the crop in respect of resin extraction during Sh. Manoj Pant's plan is proposed to be extended in the ensuing plan. No commercial felling is proposed and only dead fallen material shall be allowed to be removed.

On the basis of status of regeneration of Chir at different places, the area shall be divided into two substrata. First substratum shall include those areas where regeneration is coming up well and can establish itself if adequate protection measures are taken. In these areas, adequate protection against biotic interference is proposed along with rotational closure to grazing till establishment of regeneration. In the second substratum those areas shall be included where regeneration is totally absent or inadequate. In these areas the Chir seedlings of good provenance shall be planted and effectively protected against biotic interference and fire incidence.

7.3.2 Rehabilitation cum Reboisement Working Circle

This working circle is constituted to treat those areas which have degraded over the years due to increasing biotic pressure, frequent fires, illicit damages and encroachment. These areas were productive earlier but have degraded due to lack of proper management. It consists mainly of broadleaved species, dense or sparse shrubs and open areas which have eroded are prone to erosion.

On the basis of their present condition and the treatment needed, these areas have been divided into three substrata. First substratum includes those areas which are steep, heavily eroded with deep gullies and shallow soil. Such areas shall be treated by constructing suitable engineering structures like check dams, contour trenches and raising palatable grasses and shrubs along these trenches to reduce the run-off and check further erosion.

The second substratum shall include those areas which have dense or sparse scrub with scattered broadleaved trees and blank areas. A large percentage of the area of the division comes under this category thereby requiring special attention for treatment. It is proposed to replace the uneconomical and unproductive bushes like lantana and parthenium etc. with suitable broadleaved species like carrisa, khair, sissoo and bamboo which can withstand the extreme climatic and edaphic conditions of this area.

The third substratum includes those areas which have satisfactory presence of broadleaved species. This also include the natural gaps and forest fringe areas where due to excessive biotic pressure varying degree of degradation has taken place. The objective shall be to protect and conserve such areas where the crops is in satisfactory condition and to raise native species in the natural gaps and forest fringe areas that are useful for local people . These areas are proposed to be managed under participatory Forest management model making people stakeholders in the protection and development of such areas and in sharing the usufructs of the Forests. Cottage industry can be encouraged in the fringe villages and the people shall be provided the raw material from the forests under cooperative structure

to sustain these units. This shall be in tune with the stated objective of poverty allevation as envisaged in the State Forest Policy 2011.

7.3.3 Grazing (Overlapping) Working Circle

This overlapping working circle shall cover areas that experience heavy grazing of permanent and nomadic livestock population. It also covers areas that are allotted to nomadic graziers during winter months . These areas are under heavy pressure of grazing by both locals as well as migratory graziers.

The nomadic graziers are using forest land for establishment of semi-Permanent / permanent Behaks. 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 the vegetation and also erodes the soil. In general the grazing and lopping on ground is uncontrolled and unmanaged. Excessive grazing is the biggest challenge to the natural regeneration in these areas.

Efforts shall be made to address the menace of unscientific. uncontrolled and unregulated grazing and suggest measures to sustain the local and nomadic livestock without adversely affecting the productivity of forests. The basic objectives of management are:

a. To improve the grazing potential of forest land allotted for grazing purposes.

b. To meet the fodder requirements of local and nomadic livestock.

c. To reduce the grazing pressure on forest land.

d. To achieve the above mentioned goals, following treatments are prescribed:

(i) Closing areas / rotational grazing.

(ii) Planting of legumes, grass and fodder trees.

(iii) Establishment of short rotation fodder closures.

(iv) Creation of fodder banks.

(v) Promotion of stall feeding.

(vi) Creating awareness among the graziers to keep superior breed of livestock.

7.3.4 Plantation (Overlapping) Working Circle.:-

This is an overlapping working circle and shall cover areas that are close to habitation and where the demands of local population with regard to fuel wood, fodder and small timber are very high. This shall comprise of blank and degraded forest areas falling in the vicinity of human settlements. Due to excessive biotic pressure these areas are highly degraded, blank or scanty vegetated. In these areas the remaining broadleaved trees have lost vigor and form due to indiscriminate lopping and browsing and have become bushy.

This working circle shall be fulfilling the following objectives:

a. To provide firewood, fodder and small timber to the locals.

b. To create buffer zones between village and forests.

c. To ameliorate the degraded areas.

d. To bring maximum area under tree / green cover.

The area shall be identified depending upon the requirements of the local population and shall be taken up for plantation of suitable multipurpose species like *khair, shisham, bamboo, drek, kachnar, dhaman, butea* etc. Such areas shall be planted and managed in participatory mode to increase their productivity. People's participation is necessary for the success of these plantations. This also goes in tune with the stated objective of the state forest policy 2011.

Apart from this, the guidelines for artificial regeneration work on wastelands, village commons lands, public places, roadside strips, road meridians and avenues shall be suggested. The Jammu Forest Division has areas of thick urban / rural population in and around it. The green cover is required for aesthetic and environmental purposes for neutralizing air and noise pollution. There has been an alarming increase in the number of automobiles and industries within and around the area falling in the jurisdiction of this division. The levels of air pollution are gradually increasing it is proposed to raise strips of plantation on the road medians, road sides, along canal blanks, in the compounds of schools, colleges and public building, on the village common lands, waste lands etc. The species to be planted shall be evergreen, socially useful, and multipurpose, hardy and non exacting. On wastelands, biodiesel yielding species like *Jatropha* and *Pongamia* are proposed to be planted The primary purpose shall be to increase the green cover for carbon sequestration, and the secondary purpose shall be to gradually improve the microclimate of wastelands so that the introduction of other species is possible in these areas in the later years thereby conjointly serving the aesthetic cum environmental purposes.

7.3.5 Non-Timber Forest Produce (Overlapping) Working Circle

Jammu Forest Division is a habitat for many medicinal plants which are used by the local people for treatment of various ailments. The forest tract is suitable for cultivation of many of these species.

The non timber forest produce plays an important role in revenue and employment generation in rural areas. If the present ecological fragility and forest policies are considered it is clear that in future foresters have to generate revenue mainly through Non timber forest produce. Planting of multipurpose tree species in fragile ecosystem is desirable as, non timber forest produce can be extracted without cutting down the trees.

This helps in maintaining vegetal cover in ecological sensitive areas. Further non timber forest produce yielding plants can also be planted in private lands.

The intention of constitution of this working circle is to inventorise the non timber forest produce yielding species of Jammu Forest division and to provide guidelines for their conservation, development and sustainable exploitation. The broad objectives of management shall be:

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.

c. To provide employment to the people living adjacent to the forests on sustained basis.

A large number of plants yield non timber forest produce and are widely distributed all over the Division thus necessitating the constitution of an overlapping working circle. Some of the important non timber forest produce of the area are enlisted as under:

a. Resin and gums c) Grasses and Fodder e) Fibre

b. Medicinal Plants d) Fruits

This working circle shall be discussed under two headings:

i) Resin extraction.

ii) Other Non timber Forest produce.

The prescriptions for these have been discussed in detail in the main draft of the plan.

7.3.6 Eco-Tourism Working Circle

To tap the Eco tourism Potential of Jammu Forest Division.

7.3.7 Forest Protection (overlapping) working Circle

The area of Jammu Forest Division lies in vicinity of Jammu City with Head quarter at Jammu city, the winter Capital of Jammu & Kashmir State. Due to increase in population both permanent and floating in an around Jammu city, the Jammu Forest division faces lot of pressure. Therefore protection of forests is most critical activity of this division.

7.4 Blocks and Compartments

7.4.1 As mentioned earlier, the first compartmentation of the forest area of the Division took place in late 1960,s. Prior to that the area was divided into various soil conservation units which had their distinct identification numbers. After the compartmentation of the forest areas of the Division and preparation of its first working plan by Sh. M.S Jamwal, the first working plan map of the division was prepared and was subsequently published by survey of India in 1979.

7.4.2 Working plan maps followed by Sh.Manoj Pant's plan shall be followed during this revision with some minor variations.

7.4.3 However, the compartmentation of the forest area has not been completely adopted by territorial staff who still continue to refer to compartments by different numbers. The problem is pronounced in Bahu Range where compartmentation on ground does not match with working plan maps prepared so far.

7.4.4 The issue was discussed in detail with the then Conservator of Forest, Working Plan Circle , Chief Conservator of Forest Jammu and Conservator of Forests East circle and it was decided

that the compartmentation as per original working plan map of the Division should be followed objectively and territorial field staff has to rectify the compartmentation as per working plan compartmentation and follow the same in future.

7.4.5 The layout of the compartments of the division has been done along the compartment boundaries and at prominent places. Adequate number of top boards, base boards, guide boards, running boards etc. have been given except in compartments that are completely encroached. Layout has also been depicted on tin plates with green backgrounds and details painted on them with white paints. These boards have been fixed at many places where suitable trees were not available for layout purpose. In some places layout has been conducted on exposed rocks along the boundaries of compartments due to non availability of suitable trees for conducting layouts or for fixing of tin plates.

7.4.6 The layout boards indicate name of the Range in abbreviated form, name of the Block, compartment / sub-compartment Nos. and symbols for physical features. Names of adjoining division in abbreviated form have also been indicated on layout boards along Divisional boundaries.

7.4.7 Equidistant single coalter rings of 10 cms width have been given on suitable trees along compartment boundaries. The boundaries between two sub-compartments have been indicated by dry rings and Divisional boundaries have been given tripple rings on ground.

7.4.8 The working plan maps during the course of revision of the plan have been prepared Range wise on 1:50000 scale and all the boundaries have been clearly shown. It is expected that the territorial staff shall now follow boundaries as given in the map.

7.5 Period of the Plan and Necessity for Revision

This plan shall remain in force for a period of 10 years. The period of this plan shall be from 2013-14 to 2023-2024 A.D. There is no necessity for intermediate revision during the above plan period.

CHAPTER – VIII

WORKING PLAN FOR CHIR IMPROVEMENT CUM SELECTION WORKING CIRCLE

CHAPTER- VIII

Working Plan for Chir Improvement cum Selection Working Circle

8.1 General Constitution of the Working Circle

8.1.1 All Chir bearing areas of the Division that need to be developed for raising Chir crop of good and known provenance along with its close broadleaved associates constitute this working circle. These forests are found in most areas of Kalidhar Range, Nagrota Block of Jammu range, Parts of Mansar, Tunnel and Puni Blocks of Jindrah Range and upper reaches of Bahu Range.

8.2. General Character of Vegetation

8.2.1 The Forests constituting this working circle consist mainly of Chir crop which is found to be mixed with broad leaved species on lower slopes and is in pure patches towards higher reaches. These forests are covered under type 9 – subtropical Pine forests as per the classification by Champion and Seth in Survey of Forests Types in India. The type is 9 / C1 Himalayan subtropical Pine forest and subtype is 9 / C1 a Lower Shiwalik Chir Pine Forest. The main associates of Chir on lower slopes are *Acacia catechu, Zizyphus spp. Acacia arabica, Emblica offcinalis, Ficus spp. etc. in upper story, Dodonea viscosa, Woodfordia fruticosa, Adhatoda vasica, Colebrookia oppositifolia, Carrissa spinarum* etc. as shrubs and bushes and *Rumex hastatus*, *Cymbopogon etc* as ground flora and grasses.

8.2.2 The general condition of the crop on the whole is poor. The crop is mostly of young to middle age and the trees are mostly stunted malformed and twisted. The regeneration is very poor, or totally absent barring some isolated patches. The biotic pressure especially in forest fringe areas is high and forests fires are a common phenomenon.

8.2.3 Significant area of this working circle is under broad leaved trees and shrubs which are usually found mixed with Chir and are occasionally found in pure patches. They are confined mostly to shady and moist localities in depression and along the banks of nallas. The intensity of under growth is usually low to moderate.

8.3 Area and Allotment

8.3.1 The detailed statement of area of compartment / sub compartments allotted to this working circle is given in annexures. However Range wise summary of distribution of area is given as below in table 8.1

Table: 8.1: Range Wise Distributions of Areas under Chir Improvement Working Circle.

S.No	Range	Area (in Ha.) under			Total
		Chir	B/L Shrubs	Blanks	
1	Kalidhar	16515	4689	1013	22217
2	Jammu	3771	992		4763
3	Jindrah	2328	1226		3554
4	Bahu	2727	805	266	3798
	Total	25341	7712	1279	34332

8.4 Special Objectives of Management

8.4.1 To create conditions conducive for establishment of natural regeneration of Chir through suitable silvicultural interventions. These areas either have natural regeneration of Chir coming up in patches or areas where the natural regeneration is capable of coming up on its own.

8.4.2 To supplement natural regeneration of Chir with artificial sowing and planting of Chir from known provenance along with its close broad leaved associates.

8.5 Silvicultural Characteristics of Chir

8.5.1 Chir is a strong light demander and attains best growth under conditions of overhead light. However on hot exposed south facing slopes, protection from sun may be needed in early stages.

8.5.2 The root system of Chir being extensively developed both laterally as well as downwards, makes Chir trees wind firm in general.

8.5.3 Chir Pine is frost hardy.

8.5.4 Chir Pine comes up on almost any type of soil. It is least exacting of all Himalayan conifers. Very often Chir manages to establish itself on bare rock conditions. However it is intolerant to poorly drained and richly calcareous soil.

8.5.5 Even though Chir pine is fire hardy species, there is considerable fire damage to it because of needle shedding that occurs during the hot season and due to resin tapping which involves removal of protective bark and leaves the basal portion of tree exposed to fire damage.

8.6 Divsion of Working Circle Into Two Sub-Strata

8.6.1 As indicated in general constitution of the working circle general characters of vegetation and special objectives of management the working circle can be divided into two distinct substrata. The treatments for both the substrata are being proposed accordingly.

8.7 Sub-Stratum - I

8.7.1 Characteristics of the sub Stratum

This sub stratum covers area where regeneration of Chir is coming up well in patches and is capable of establishing on its own provided adequate measures are taken. In these areas the biotic pressure is comparatively low.

8.7.2 Methods of Treatment

i. These areas shall be developed with the sole intention of promoting natural regeneration of Chir and by supplementing the natural regeneration with artificial sowing and planting of Chir seedlings wherever necessary.

ii. Natural regeneration of Chir is hampered by the presence of thick layers of needles on forest floor. Therefore, periodic cleaning of forest floor is proposed in the areas after the needle shedding season is over.

iii. Adequate protection against forest fires is proposed in these areas as the young crop may be completely wiped out as a result of fire.

iv. Grazing and grass cutting are also detrimental for regeneration. Therefore grazing and grass cutting are proposed to be regulated in these areas.

8.7.3 Thinning

There is no need of any thinning in these areas as the intensity and the occurrence of regeneration is not very high. However if due to proper management practices, the area regenerates completely, thinning may be required after sometime. It is difficult to perceive this kind of situation coming up in near future. If required, old and over matured trees which are liable to wind fall because of deep gashes of cup and lip method can be removed selectively.

8.7.4 Closing of Areas

i. The areas that constitute this sub-stratum of the forests of the Division are subjected to lesser biotic pressure. Therefore it is neither essential nor advisable to close the entire area of this sub stratum. Some of the compartment of this working circle that is recommended for closing for short duration is given below.

Jindrah Range

Mansar Block: **Co: 1, 2 and 8**

Kalidhar Range: **Co. 5, 29, 38, 10, 41 and 43**

ii. The sequence of closing is left to the discretion of the territorial DFO. Taking into a account the availability of requisite funds for the purpose and social constraints.

iii. Some of the compartments of this working circle which have been closed partially have already started giving good results. e.g Co. 7 of Nagrota Block of Jammu Range a part of which falls under Bilani project and Co. 38,39,42,43,44 of Kalidhar Range.

8.8 Sub-Stratum-II

8.8.1 Characteristics of Sub Stratum

This substratum constitutes areas where regeneration of Chir is inadequate or totally absent. These areas are found in the buffer and outer zone of Chir forests, where Chir crop is mostly found mixed with broad leaved trees and shrubs. Being closed to habitation, biotic pressure in these areas for fuel wood and fodder is high.

8.8.2 Methods of Treatment

i. These areas shall be development with the sole intention of raising chir crop of good and known provenance along with its close broad leaved associates by plantations in easily accessible area and by direct sowing in difficult areas.

ii. These area shall be closed rotationally for raising plantations. The sequence of closing of the area for a period of 10 years is given in Table No: 8.2

Table 8.2 Sequence of Closing of Forest Area.

S.No	YEAR	AREA TO BE TAKEN (Ha.)	LOCATION
1	1st	530	Co. 39 / K, 27 b / K
2	2nd	425	Co. 30 / K, 34 / K,
3	3rd	345	Co. 23 / K, 25 / K, 27a / K,
4	4th	670	Co. 37 / K, 16 / K, 21 / K
5	5th	230	Co., 14 / K, 15 / K
6	6th	590	Co. 4/N, 5 / N 7/N,
7	7th	630	Co. 6/ Nagrota, 8 / N
8	8th	470	Co. 1 / Puni, 2 / Puni, 3 / Puni
9	9th	580	Co. 21 / Devak, 1 / Tunnel, 5 / T
10	10th	270	Co. 2 / Balote, , 33 / b, 52 B

The above table has been given to serve only as guideline. The actual area available for plantation every year shall depend upon the availability of funds and availability of actual area in the field as some area has already been covered / likely to be covered under projects running in the Division e.g Social Forestry etc.

8.8.3 Nursery Techniques for Chir

Nursery techniques though well known are given in brief for Chir as under. Nursery techniques for its other broad leaved associates are given in following chapters.

8.8.4 Collection of Seeds

Ripened cones of length 10 Cm and more are collected from healthy vigorous trees of good form and better growth, free from twist during February to April. These cones are sun dried and seeds are taken out. An average healthy cone gives about 45 seeds and hundred cones yield about 0.45 Kg of clean seeds, a quantity capable of producing about 1200 seedlings. After 2 years storage in gunny bags kept in well ventilated rooms, a germination capacity of 40-60 % can be expected.

8.8.5 Seed Treatment

The seeds are first immersed in saline water and those which float are rejected. Heavier seeds are mixed with cow dung and kept wrapped in gunny bags inside a pit. Water is regularly sprinkled to keep them moist. After about 19 days of storage, bags are examined daily for about a week and sprouted seeds are taken out for sowing. Seeds which fail to sprout within this time are rejected. A sprouted seed is planted in each polythene bag.

8.8.6 Raising of Seedlings In Nursery

Roots of Chir being sensitive it is sown directly in polythene bags filled with a mixture of shifted forest soil and decomposed manure in proportion of 2:1. Mycorrhiza containing soil is added in the soil mix in the bag. Addition of 5 gm of super phosphate and 5 gm calcium, ammonium sulphate per bag is also recommended to improve growth. Fertilizers are mixed thoroughly in soil before filling the bag. If soil is clayey, sand is also mixed to make the texture light. The optimum size of perforated bag recommended for this purpose on the basis of cost and performance is 15cm X 9 cm.

8.8.7 Nursery Sites

i. The site of Nursery should be as close to the plantation site as possible.

ii. The area of the Nursery should be about 0.4 ha for every 1 lac seedlings.

iii.. The site must have perennial water supply of about 200 Ltrs per day for every 1000 plants. The water should have pH between 5.5 to 7.5 and salt less than 400 ppm.

iv. The soil should be well drained and fertile. Loam to sandy loam texture with good structure is preferred.

v. In view of the large area under this sub stratum spread all over the Division it is recommended that temporary or gypsy Nurseries are established close to the plantation site. These nurseries can be abandoned or shifted to other plantation areas after plantation at one place is over. Various sites for setting up these temporary Nurseries at different plantation sites are proposed as in table No. 8.3

Table 8.3 Proposed Locations of Temporary Nurseries For Different Plantation Sites.

S.No	Range	Block	Compartment No.S (Covered)	Proposed Locations Of Nursery
1	Bahu	Balole	1, 2	Jaswal
2	Bahu	Balole	24	Karnal
3	Bahu	Bahu	15b, 17c	Gher
4	Bahu	Bahu	19	Kana
5	Bahu	Bahu	29, 30, 31	Pucholi
6	Bahu	Bahu	33, 42	Dagher
7	Bahu	Bahu	43, 44, 45	Sagaun
8	Bahu	Bahu	46, 47, 48	Punjwa Bafa
9	Bahu	Bahu	49,50, 51	Surensar
10	Bahu	Bahu	53, 56	Aitham
11	Bahu	Bahu	57, 58	Bhair Gifan
12	Jindrah	Mansar	8	Saral
13	Jidrah	Jindrah	6	Kanyala
14	Jindrah	Tunnel	1, 5	Janakha
15	Jindrah	Puni	1, 2	Sarmoli
16	Jindrah	Puni	3	Haripur
17	Jammu	Nagrota	4, 5	Karli
18	Jammu	Nagrota	6, 8	Dumhuni
19	Kalidhar	Chowki	4	Jagi
20	Kalidhar	Chowki	6	Mathanni
21	Kalidhar	Chowki	7a, 7b, 8	Dalkiyan

22	Kalidhar	Chowki	10, 12, 13	Chagiyal
23	Kalidhar	Chowki	14, 15, 16	Phagal
24	Kalidhar	Chowki, Samah	21, 23	Tanda
25	Kalidhar	Samah, Panjgrain	25, 27a, 27b	Mawa Brahmna
26	Kalidhar	Khor	30, 34	Bali
27	Kalidhar	Panjgrain, Choura	37, 39	Charar
28	Kalidhar	Choura	45	Sirwala.

8.9 New Plantation and Method of Establishment

8.9.1 Planting of about 15 months old seedlings should be done in July. The ideal height of seedlings for planting in the field is 25-30 cms. considering the erratic nature of monsoons in the tract and the risk of seed being devoured by rodent and birds, planting is a surer and more popular method, care should be taken so as to ensure that the roots are not damaged while transplanting.

8.9.2 Pit Size and Spacing

The most suitable pit size for plantation of Chir in the tract is 45cm X 45cmX 45cm. Planting should be done in the 2nd week of July. A spacing of 3m X 3m recommended for planting which ensures closing of the canopy within the shortest time as well as production of saleable material from the first thinning.

8.9.3 Direct Sowing

This method being simple and cheap is recommended for inaccessible areas. Seeds are soaked in cold water for a day or two and then either broadcast or dibbled in holes, notches or on trench ridges. It is further recommended that seeds should not be buried to a depth exceeding 0.6 cm. sowing should be done 1 or 2 weeks before the expected time of monsoon or on the onset of rains, as late sowing reduces the chance of success.

8.9.4 Subsidiary Silvicultural Operations

The first thinning should be done in the August and then 5th and 15th years to remove surplus stems from the patch, if the plantation has been raised by direct sowing. Cleanings and thinning are left to the discretion of the territorial staff who should follow the procedure for naturally regenerated crop. In twisted Chir areas, weeding plays an important role as invasion of natural seedling of twisted origin is to be kept under check. This can be secured by cutting away all such natural seedling annually for the first 5 years and then once in 2 years for next 5 years.

8.10 Silvicultural System

As fellings are not recommended in this working circle, no defined silvicultural system is proposed for the working circle. However for the academic reasons only the exploitable diameter can be fixed at 60 cm dbh. The quality chir crop takes 120 years to reach this dia.

8.11 Analysis and Valuation of the Crop

8.11.1 The quantitative assessment of growing stock and preparation of its inventory in this working circle has been made on the basis of data collected and analysed separately from 103 points in substratum I out which 91 points represent Chir areas and 12 points represent non Chir areas and 183 points in substratum II out of which 163 points represent Chir areas and 20 points represent non Chir areas. These sample points selected at random were located surveyed and analysed in the field by adopting point sampling technique by or plotless sampling in Chir areas using wedge prism of suitable Basal area factor and by laying of plots of 0.1 ha. in non Chir area and conducting total enumeration of growing stock in those plots. The methodology adopted has been described in detail earlier on.

8.11.2 In Chir areas mean values of 2 variables i.e number of trees per ha. and volume per ha have been separately calculated for both the substrata by the arithmetic averages of two variables from the data drawn from all the sample points surveyed in each substratum. These variables have been put to due statistical scrutiny and tests. The results thereof are summarised in a tabular statement given in Table.

8.11.3 The growing stock in Chir as well as Rehabilitation working circle has reduced drastically as compared to previous working plan, because of following reasons :

(i) Area under Chir has decreased by 4.21 % and area under broad leave & shrubs by 14 % as compared to previous working plan.

(ii) Blanks have increased by 1.24 % more as compared to previous working plan.

(iii) Absence of higher Dia-classes in the data.

8.12 Calculation of Yield

The estimation of growing stock of chir was done by the point sampling technique of Bitterlich. The results of statistical analysis are prepared in the tables.

The average number of Chir trees per hectare works out to be 77.08 and the volume per hectare is 50.47 cum in sub-stratum-I, where as it works out to be 66.33 and 43.60 cum respectively in sub-stratum-II. The statistical analysis of both the sub-stratum is given in the Table 8.4. The dia class wise distribution of average number of trees per hectare is given in Table 8.5 & 8.6 of sub-stratum-I and table No.s 8.7,8.8 of sub-stratum-II.

From the analysis of data of average number of trees and volume falling under different dia classes. It is found that there is preponderance of trees in lower dia class upto dia class of 40-50. The commercially exploitable volume which could be extracted from higher dia classes is negligible.

Due to this reason, no commercial extraction has been prescribed, no commercial felling is to be carried out during the plan period and accordingly yield has neither been calculated nor prescribed.

Table 8.4 Results of Statistical analysis for substratum 1 and substratum 2 of Chir Improvement-cum-Selection Working Circle

Block	Variable (per ha.)	Sample Points (n)	Mean (X)	Variance (S2)	Standard Deviation (S)	Standard Error (S.E.)	Coefficient of variation (%)	95% Confidence limits (X + 1.96 x S.E.)		Confidence Interval (C.I.)	Lower limit as % of mean (%)
								Lower limit	Upper limit		
1	2	3	4	5	6	7	8	9	10	11	12
Substratum 1	No. of Stems	103	90.34	6863.00	82.84	8.16	91.70	74.34	106.34	32.00	82.29
	Volume	103	50.47	1192.40	34.53	3.40	68.42	43.80	57.14	13.34	86.79
Substratum 2	No. of Stems	183	91.03	8516.80	92.29	6.82	101.38	77.66	104.40	26.74	85.31
	Volume	183	43.60	1245.00	35.28	2.61	80.93	38.49	48.71	10.22	88.27

The measures of dispersion like standard deviation, coefficient of variation, are based on figures for total number of stems and total volume computed for each sample point.

Column 7 : S.E. = S/ square root (n)
Column 8 : C.O.V (%) = (S/X) x 100
Column 9 : Lower limit = X - 1.96 x S.E.
Column 10 : Upper Limit = X + 1.96 x S.E.
Column 11 : C.I. = Upper limit - Lower limit

Table No. 8.5 Statement showing species and diameter(cm) class wise tree count of sub-stratum 1 of Chir Working Circle
Tree count per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	15.73	22.48	15.49	13.29	7.26	1.88	0.47	0.42	0.06	0.00	77.08
B.L.	6.89	3.37	0.68	0.58	0.58	0.00	0.29	0.00	0.29	0.49	13.17
Total	**22.62**	**25.85**	**16.17**	**13.87**	**7.84**	**1.88**	**0.76**	**0.42**	**0.35**	**0.49**	**90.25**

Total tree count over the entire commercial area (forest cover excluding blanks) of the substratum 1. (Area = 13221 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	207966.33	297208.08	204793.29	175707.09	95984.46	24855.48	6213.87	5552.82	793.26	0.00	1019074.68
B.L.	91135.05	44540.65	8985.15	7701.55	7701.55	0.00	3850.78	0.00	3850.78	6417.96	174183.47
Total	**299101.38**	**341748.73**	**213778.44**	**183408.64**	**103686.01**	**24855.48**	**10064.65**	**5552.82**	**4644.04**	**6417.96**	**1193258.15**

Table No.8.6 Statement showing species and diameter(cm) class wise volume(m3) of Chir in Sub-stratum 1.
Volume of chir per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	7.47	15.02	16.05	6.67	2.27	2.59	0.41	0.00	50.47
Total	**0.00**	**0.00**	**7.47**	**15.02**	**16.05**	**6.67**	**2.27**	**2.59**	**0.41**	**0.00**	**50.47**

Total volume of chir over the entire chir area of sub-stratum-1 (Area =10699 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	79930.88	160689.63	171711.68	71336.36	24281.54	27692.75	4356.47	0.00	539999.30
Total	0.00	0.00	79930.88	160689.63	171711.68	71336.36	24281.54	27692.75	4356.47	0.00	539999.30

Table No.8.7 Statement showing species and diameter(cm) class wise tree count of sub-stratum 2 of Chir Working Circle

Tree count per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	14.87	18.02	13.61	10.97	6.37	1.57	0.57	0.29	0.06	0.00	66.33
B.L.	19.69	3.37	0.60	0.33	0.49	0.11	0.05	0.00	0.00	0.05	24.69
Total	**34.56**	**21.39**	**14.21**	**11.30**	**6.86**	**1.68**	**0.63**	**0.29**	**0.06**	**0.05**	**91.03**

Total tree count over the entire commercial area (forest cover excluding blanks) of the substratum 2. (Area = 19827 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	294804.74	357319.38	269885.56	217446.93	126329.41	31094.80	11376.15	5742.25	1191.79	0.00	1315191.00
B.L.	390364.38	66740.07	11917.87	6500.66	9750.98	2166.89	1083.44	0.00	0.00	1083.44	489607.72
Total	**685169.11**	**424059.44**	**281803.43**	**223947.59**	**136080.39**	**33261.69**	**12459.59**	**5742.25**	**1191.79**	**1083.44**	**1804798.72**

Table No. 8.8 Statement showing species and diameter r(cm) class wise volume(m3) of Chir in Sub-stratum 2.

Volume of chir per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	6.53	12.39	14.08	5.58	2.79	1.80	0.42	0.00	43.60
Total	**0.00**	**0.00**	**6.53**	**12.39**	**14.08**	**5.58**	**2.79**	**1.80**	**0.42**	**0.00**	**43.60**

Total volume of chir over the entire chir area of sub-stratum 2. **(Area = 14637 hectares)**

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	95634.80	181395.62	206107.12	81741.65	40899.62	26282.61	6149.94	0.00	638211.35
Total	**0.00**	**0.00**	**95634.80**	**181395.62**	**206107.12**	**81741.65**	**40899.62**	**26282.61**	**6149.94**	**0.00**	**638211.35**

8.13 Protection against Forest Fires

In spite of the fact that the Chir forests of the division have been continuously experiencing forest fires this aspect of management has been neglected. Only limited fire protection measures worth the name have taken place during the past decade. Frequent fires have been one of the major causes responsible for failure of regeneration in these forests. The frequency and extent of forest fires has been more in years when resin extraction has taken place. Dry needles resinous wood and resin channels make these forests more prone to forest fires. Most of these forest fires are caused due to negligence. Apart from damage to young crop, these fires have many other harmful effects on the soil, the ground flora and fauna of these forests. Therefore protection against forest fires is very significance in the scientific management of these forests. Following measures are recommended to have effective control and protection against fires.

A. Creation of Fire Lines

i. Creation of fire lines is of utmost importance in Chir areas having continuous unbroken belts of Chir forests. The network of foot path already existing in these areas should be extended and maintained to serve as fire lines.

ii. Areas either bearing young and un established regeneration, steep with shallow soil covers or where artificial regeneration is being induced should be separated from the rest of area by providing fire lines all around them.

iii. Temporary fire lines of width 20m to 30m should be created wherever required. In these temporary fire lines the felling of trees need not be done to clear up the area but these areas should be control burnt every year.

B. Control Burning

Following consideration should be kept in mind while carrying out control burning in forest area.

1. The control burning operation should always start from the top portion of the area and should be extended downwards on the slope. Control burning proceeding upwards damages the crop.

2. In area having established regeneration. Control burning should take place once in two years.

3. Small patches of unestablished regeneration should be strictly guarded against any damage during control burning operation.

4. The control burning operation should take place during the period Dec to Feb and even earlier on hotter aspects.

5. The worked out area should not be controlled burnt till is thoroughly cleared off slash / debris and felling refuse.

6. Inspection observation posts should be located at strategic point to keep a close watch over any forest fires during the hot season.

7. Adequate number of fire watchers should be engaged for the protection of these forests from fire.

C. Identification of Vulnerable Compartments:

On the basis of information provided by the Forest Division Jammu certain compartment have been identified where incidences of forest fire have been more frequent in recent year. These compartments requires special attention against forest fires. Some of these vulnerable compartments as listed below.

KALIDHAR RANGE: Co. 5, 23, 27a, 29, 30, 34 and 43

JAMMU RANGE: Co. 5 / Nag, 6 / Nag, and 9a / Nag,

JINDRAH RANGE: Co. 5/ Mansar, 10/ Mansar, 2/ Mansar, 1, 2, 3/ Puni

The vulnerable compartments of Bahu Range could not be identified as compartmention on ground in this Range does not match with the working Plan Map mentioned earlier.

8.14 Grazing Regulation

The pressure of grazing by both local and migratory livestock population has been a major factor adversely affecting regeneration and general health of the growing stock in these areas. There is an utmost need to protect these forests from uncontrolled, unscientific unregulated grazing that has been going on from time immemorial. Some of the regulation measures have been provided within the following chapter. However in areas under Chir improvement Working Circle, areas of unestablished regeneration and areas taken up artificial regeneration should be closed for grazing.

CHAPTER – IX

WORKING PLAN FOR REHABILITATION CUM REBOISEMENT WORKING CIRCLE

CHAPTER IX

Working Plan for Rehabilitation cum Rebiosement Working Circle

9.1 General Constitution of The Working Circle

This working circle covers areas that were productive once upon a time and have become degraded and denuded partly due to management neglect and mainly due to increasing biotic pressure like heavy lopping, grazing, frequent fires, illicit damages and on top of all, encroachments. These areas are spread all over the Division and are thickly populated. These area need to be rehabilitated on top priority as most of the area has either become eroded or has become prone to soil erosion.

9.2 General Character of Vegetation

The forest constituting this working circle consists mainly of dense or sparse shrubs mixed with scattered broad leaved trees, some pure patches of broad leaved trees are found. Scattered Chir trees are also found at some places. The scrubs forest of this working circle are covered under forest type 9C1 / DS 1. Himalayan sub tropical scrub forest and the broad leaved forests of the working circle bear a close resemblance to forest type 5 B / C2 – Northern dry mixed deciduous forest as per the classification by Champion and Seth. The upper storey is dominated by broad leaved trees like *Dalbergia sissoo, Acacia catechu, Acacia arabica, Acacia modesta, Lannea grandis, Mallotus philippensis, Albizzia lebbak, Butea monosperma, Ficus spp., where as scrubs found in the working circle are Dodonea viscosa, Adhatoda vasica, Carissa spinarum, Punica granatum, Nerium odorum, Murraya koenigii, Euphorbia royleana, Parthenium hysterophorus, Zanthium strumarium, Lantana camara, Ipomea fistula etc. Grasses like Saccharum spontaneum and Cymbopogon spp* are also found.

9.2.1 The general condition of the crop on the whole is poor. These areas are characterised by conglomeratic sandy soil with pebbles and boulders with low soil depth and poor water retention capacity. The ground flora is depleted and most of the area has become prone to soil erosion. The biotic pressure is high and this has resulted in deterioration of the condition and composition of the crop at most of the places. Weeds like lantana have come up in abundance at places. Most of the area under this working circle comes under the category of degraded forest.

9.3 Area and Allotment

The detailed statement of area of compartment / sub compartment allotted to this working circle is given in Appendix. However Range wise summary of distribution of area given in Table 9.1

Table No: 9.1 Range Wise Distribution of Area under Rehabilition cum Reboisement Working Circle

S.No	Range	Area (In Ha.) Under			Total
		Chir	B/L & Shrubs	Blanks	
1	Kalidhar	594	7092	366	8052
2	Jammu	972	3291	260	4523
3	Jindrah	656	7370	196	8222
4	Bahu	1738	11988	1079	14805
Total		**3960**	**29741**	**1901**	**35602**

9.4 Special Objective of Management

I. To control soil erosion by means of effective conservation measures.

II. To effectively manage scrub dominated areas of the working circle for optimum utilisation of the existing crop and for improving the composition and condition of these scrub forest.

III. To effectively protect the broad leaved forests of the working circle against interferences and to rehabilitate degraded areas of these broad leaved forests by sowing and planting of useful species.

IV. To raise fast growing species in areas close to habitation to meet their requirements of fuelwood, small timber and fodder so as to reduce pressure on Forests.

9.5 Division of the Working Circle into Three Sub-Strata:

As is clearly indicated in the objectives of management given above, the working circle is divided into three distinct areas. Method of treatment of each area shall depend upon the condition and composition of crop of each area. Therefore the circle has been divided into three sub strata each having its own specific method of treatment.

9.6 Rehabilitation Sub – Stratum – I

9.6.1 Characteristics of the Sub – Stratum-I: This sub stratum is characterised by poor vegetative cover, low soil depth, poor water retention capacity and vulnerability to soil erosion. Most of the area of sub stratum is heavily eroded with the presence of deep gullies and exposed parent rock.

9.6.2 Area and Allotment

The Range wise allotment of the area of this sub stratum is given below in Table No: 9.2

Table No: 9.2 Range Wise Distribution of Area under Rehabilitation Sub Stratum-I.

S.NO	Range	Area (in ha.) under			Total
		Chir	B/L & Shrubs	Blanks	
1	Kalidhar	197	3273	298	3768
2	Jammu	---	---	---	---
3	Jindrah	123	407		530
4	Bahu	138	2355	354	2847
Total		**458**	**6035**	**652**	**7145**

9.6.3 Methods of Treatment:

i) Effective soil conservation measures shall be taken up in these areas to check erosion. For this purpose, stone or brush wood check dams should be erected in nallas, masonry check dams should be provided with aprons on lower side and the wing walls should be properly embedded in nalla sides. When these dams get filled up the area should be planted with *Agave*, *Ipomea* and *Vitex negando*. Gully control measures should be taken to check gully erosion.

ii) Along with the soil conservation measures, these areas shall be taken up for plantation of soil binding, hardy and useful species. The plantation should be done in contour trenches. Apart from the soil binding measures planting of species like *Agave, Ipomaea* and *Leucaena leucocephala* and grasses like *Napier grass, Saccharum munja* are also recommended.

iii) These areas shall be closed rotationally for taking up soil conservation works and plantation of above mentioned species. In-situ Nurseries shall be established, close to the plantation site. The sequence and extent of area to be closed for this purpose are given Table No: 9.3.

Table No: 9.3: Sequences and Extent of area to be Closed for Undertaking Soil Conservation Works and Plantation.

S.No	Year of Closing	Area to be taken (Ha.)	Location.
1	1st	475	Co. 4,31,32, 11/Bahu
2	2nd	490	Co. 37,38,39,63,64a/Bahu
3	3rd	500	Co. 53,61,64 B/Bahu
4	4th	510	Co. 62/Bahu, 12,14,15/Devak
5	5th	555	Co.17,19,20/Devak
6	6th	440	Co.6,7/Puni
7	7th	570	Co.18/Kalidhar
8	8th	520	Co. 19,28/Kalidhar
9	9th	490	Co. 20,21/Kalidhar
10	10th	470	Co.26. 2a/Kalidhar

The above table has been given to serve only as a guideline. The actual area available for plantation every year shall depend upon the availability of funds and availability of actual area in the field, as some area has already been covered / likely to be covered under various projects running in the division.

9.7 Sub – Stratum – II, Shrub Sub – Stratum

9.7.1 Characteristics Of The Sub – Stratum-II

This sub-stratum-II is characterised by presence of dense shrubs mixed wth scattered broad leaved trees. The main shrubs found in this sub- stratum-II *are Dodonea viscosa, Adhatoda vasica, Carissa spinarum, Punica granatum, Nerium indicum alongwith weeds like Lantana camara and Parthenium hysterophorus etc.*

9.7.2 Area and Allotment

Rangewise Allotment of Area to the sub-stratum In Table No: 9.4

Table No: 9.4: Rangewise Distribution of Area Under Sub – Stratum- II

S.NO	Range	Area (In Ha.) Under			Total
		Chir	B/L & Shrubs	Blanks	
1	Kalidhar	---	---	---	---
2	Jammu	765	2440	260	3465
3	Jindrah	---	---	---	---
4	Bahu	1475	8890	712	11077
Total		**2240**	**11330**	**972**	**14542**

9.7.3 Methods of Treatment

i) As the vegetation of the sub – stratum represent typical edaphic and climatic condition of the area, it is neither practical nor advisable to change the crop composition of the area during the period of the plan. This area represents typical conglomeratic sandy soil with low poor water retention capacity. Replacement of shrubs with broadleaved species is likely to fail in these areas due to poor soil condition, moreover some of the shrubs like *Dodonea* are quite useful as excellent source of fuel and are also used by locals for making basket and thaching material in local construction.

ii) However some of the weeds like *Lantana* and *Parthenium* are recommended to be removed in phases and replaced with useful thorny species that can withstand adverse edaphic climatic conditions. Some of these species are *Acacia catechu, Acacia arabica Acacia modesta and Zizyphus* species. Plantation of these species is also recommended in areas which are stable against soil erosion.

9.8 Sub-Stratum- III, Reboisement Sub-Stratum

9.8.1 Characteristics of the Sub –Stratum:

This sub-stratum represents the broadleaved forest of the Division. The general health of these forests is comparatively better. These forests are found scattered in small patches all over the Division. These forest are mixed with shrubs. The density of shrubs is low in these forests.

9.8.2 Area and Allotment

The Range wise allotment of the area to this sub-stratum is given in Table: 9.5

Table: 9.5 Rangewise Distribution of Area under Reboisement Sub-Stratum III

S.NO	Range	Area (In Ha.) Under			Total
		Chir	B/L & Shrubs	Blanks	
1	Kalidhar	397	3019	68	3484
2	Jammu	207	851		1058
3	Jindrah	533	6963	196	7692
4	Bahu	125	743	13	881
Total		1262	11576	277	13115

9.8.3 Methods of Treatment:

i. These forests being in close proximity to habitation are under tremendous biotic pressure. These forests should be given adequate protection against biotic interference.

ii. Some of the areas of the sub stratum that have become degraded and denuded due to biotic pressure, are proposed to be taken up for plantation of useful broad leaved species. The extent and sequence for raising artificial plantation in these patches is left to the discretions of territorial DFO.

9.9 Nursery Techniques for Broad Leaved Species of Sub Tropical Zone

Nursery techniques for species commonly raised in sub tropical zone are well known. However, some of the important recommendations for raising these plants in Nurseries are given below for ready reference. These are general in nature and do not necessarily give precise details for individual species which may vary depending upon the requirements for different species.

9.9.1 Site Selection:

i. The site of Nursery should be as near planting site as possible.

ii. The area of Nursery should be about 0.4 Ha. for every 100000 seedlings.

iii. The site should have a perennial water supply of 200 ltrs. Per day for every 1000 plants. The water should have pH between 5.5 to 7.5 and salt less than 400 ppm**.**

iv. The soil should be well drained and fertile, loam to sandy loam texture with good structure is preferred.

9.9.2 Preparation of Beds:

There are four types of beds namely seed flats, containers, housing beds and transplanting beds.

i. Seed flats are used for germinating seeds in ground made of earthen pots, shallow wooden boxes, plastic trays or wicker or bamboo baskets of portable size. The growing medium should be disinfected quartz sand or sandy loam soil.

ii. 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 seeding shall be growing in them.

iii. 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 bed should be provided with a black polythene sheet of 300-500 gauge to keep seedling roots from penetrating mother earth. The size of the bed is usually 10mt. X 1.2mt.

iv. The transplanting beds are of 10 mt. X 1.2 mt. Size raised, or sunk by 10-20 cm. The soil is dug out, bigger particles removed and pulverized. One part of compost or dry

cow dung manure to four parts of soil and 100 gms of 5% aldrex is thoroughly mixed with the sieved soil and put back in the dug out space, raised or sunken as the case may be.

The number of beds required is approximately one bed of 12 mt. X 1.2 mt for 2000 seedlings. The seed flat area required is 6 % of the transplanting or housing bed area.

9.9.3 Seeds

i. The selection of the tree for seed collection should be done with care. Middle aged, vigorously growing tree, free from knots are usually selected for collection of seeds.

ii. 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 prophyletics like gamaxene or neem leaves.

iii. Treatment should be given to seeds as and when required.

iv. 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 to 3 seeds should be sown.

9.9.4 Pricking Out:

i. Pricking out should be done when the cotyledons have dropped off or at least two leaves formed and the needling stem has reasonable strength to withstand transplanting. This can be done about 3 to 4 weeks after germination.

ii. The seedling should be held with thumb and the fore finger by the leaves or just before first pair of leaves and pulled up softly.

iii. This operation should be carried out on a humid day during rains or in the evening.

iv. The distance between transplant 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.

9.9.5 Nursing:

i. Watering should be just adequate so that the soil reaches field capacity.

ii. 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.

iii. The quantity of the water should be calculated at rate of 200 cc per nursery plant for watering.

iv. The water should have low salinity and low sodium class.

v. Weeding in each bed should be done at least once in 15 days.

vi. Good hygiene should be maintained to avoid pest attack. If the attack does take fungicide and insecticide should be used as per the requirement.

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

9.9.6 Fertilization:

i) Fertilization should be done by foliar spray at a regular interval in appropriate quantities. It should be stopped during the last two months of the nursery life of seedling to make it hardy and to allow lignifications of the stem.

ii) Inoculation of rhizobium and mycorrhize is necessary to maintain and improve the health and growth of seedlings of some species.

9.9.7 Planting Out:

i) 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.

ii) The size of the seedling for planting out varies depending upon the suitable transportation and its vulnerability to damage during transportation. It also depends upon locality and presence of weeds in plantation area. The size may vary from 25 cm to 45 cm depending upon above mentioned factors.

iii) To reduce the morality in naked root planting the seedlings should be hardened before planting out. Hardening consist of root trimming at intervals, gradual reduction of watering for the last two months of the seedling life in the nursery and side branch pruning keeping one third of the crown intact.

iv) Excluding those for which naked root planting is possible all other seedling are transported in containers which are removed before planting. The containers during their stay in the nursery should be shifted every fortnight to prevent the roots from penetrating mother earth.

9.10 Characteristics of Some of the Important Species

Characteristics of some of the important broadleaved species that have been recommended for plantation in different substrata of the working circle are given in brief. The choice of species for planting in different substrata of the working circle shall depend upon the characteristics of these species.

I. Grewia Optiva

(Dhamman)

Plant Description	Grewia optiva is a small to medium sized deciduous tree, 9-12m in height, crown spreading, bole clear,3-4m, and about 1m diameter. Leaves opposite, flowers white or pale yellow, fruit is a drupe , olive green turning black when ripe.
Distribution	Grewia optiva grows in Himalayas from J&K to Nepal up to an elevation of about 2,000m. It also grows in Punjab and extends to Bengal.
Habitat	It is a tree of sub-tropical climate. In its natural habitat, maximum shade, temperature seldom exceeds 38^0C and minimum temperature rarely drops below 2^0C.frost is a quite common feature during autumn and winter months. The mean annual rain fall varies from about 1200mm to 2500 mm.
Soil	Prefers sandy loam soil with adequate soil moisture which supports good growth and poor in shallow dry soil.
Silvicultural Characters	Light to strong light demander and requires complete overhead light for its optimum growth and cannot tolerate shade. Frost hardy but saplings be protected from frost which causes die back in the seedling stage.
Natural Regeneration	Natural Stands of Grewia optiva are rare and it is mostly cultivated along agriculture fields. Natural reproduction takes place through seed.
Seed Collection	Fruit ripe during October-December. As fruits are sweet and liable to devoured and eaten by birds, therefore it should be collected in time .
No. of Seeds Per Kg	There are about 12000 to 15000 seeds/kg, which can be stored for at least one year in the ambient condition without the loss of viability.
Nursery Techniques	Seeds are sown in the month of March, in lines, 15 cm apart and 2cm deep. About 250gm seed is required for each sq. M of Nursery area. Seeds are irrigated after sowing until the germination is completed. Plants can be treated with 0.6% IBA, which give maximum rooting response (36%).
Use	Very good fodder, basket making, roap making.

II. Acacia nilotica:

Calorific Value	Softwood 4800 K cal / Kg. Heartwood ï 4950 K cal / Kg (Excellent)
Fodder	Preferred by sheep & goat , pods liked by cattle
Other uses	Bark and pod for tannin, gum & wood.
Seed collection Time	April ï June
No. of seeds per Kg.	7000 ï 11000
Viability	More than 2 years.
Germination % age	High ï 85 to 90 percent.
Seed treatment	Fresh seeds directly sown. Stored seeds immersed in boiling water for one minute and soaked for 24 hours or pods fed to goats and scarified seeds recovered from

	dung of goats are confined in area that is to be reseeded.
Nursery Techniques	Direct seeding in field in rains or 2 ï 3 seeds in each polypot in April ï May. Germination starts in 10 days and completes in one month. Irrigate with hose once in two days till seedling 10 cm high. Subsequent flow irrigation once in 7 days. Ready for planting in July.
Temperature	Extreme high temperature but frost tender when young.
Soil	Prefers alluvial but can stand poor soil.
Coppicing ability	Poor.

III *Albizza lebbek:*

Fuel wood	5200 K cal / Kg (good fuel wood)
Fodder	Excellent, contains 30 % protein.
Other uses	Beautification, Timber, Good soil binder.
Seed collection time	November ï December to February.
No. of seeds per Kg.	9200
Germination % age	40 after 1 year. 60 after 1 years 20 after 1 years
Viability	4 ï 5 years
Dormancy	4--30 days
Seed Treatment	Seeds are soaked in water for 48 hours.
Nursery Techniques	Seeds are grown in germination bed in Feb ï March. Germination commences in 4 days and completes in 30 days. Pricked out in containers 10 days after germination. Can be planted out with ball of earth from seed bed. Weeding and irrigation of beds are done as required.
Coppicing Ability	Readily coppices, Propagated by stem cutting/Stump

IV *Azadirachta indica:*

Fuel wood	Excellent.
Fodder	Average
Other uses	Timber, energy, wind break, shade, soil improvement cake, fertilizer, tannin. Seeds and leaves are systemic repellent.
Seed Collection time	June and July.
No. of seds per Kg.	1750 fruits or 4000 cleaned seeds.
Viability	One to two weeks only.
Germination %age	50
Seed Treatment	None required but depulping the seeds before sowing gives better germination.
Nursery Technique	Fresh seeds sown in pots, 3 in each. Germination starts one in week and planted out next year. Can also be sown in seed beds 15 cm x 3.5 cm apart sparingly watershed area pricked out at 15 cm x 15 cm when two months old planted out with ball of earth next year.
Coppicing ability	Good, root ï shoot cutting possible for artificial regeneration.

V *Emblica officinalis*:

Fuel wood	Good, caloric value 5200 k Cal / Kg.
Fodder	Fruit and foliage excellent.

Other Uses	Timber, fruit as a source of Vitamin C green manure to soil alkalinity.
Seed Collection Time	November ï January.
Germination % age	80% after treatment.
Dormancy	Nil
Seed Treatment	Fruits dried in sun. Endocarp dried up and seeds extracted. Treatment in hot water for 5 minutes.
Nursery technique	Seeds sown in March ï April in containers or in transplanting beds and covered with earth. Can be planted in the rains after few months.
Soil	Alkaline and poor soil.
Pests and Diseases	Susceptible to insect attack.

Vi *Leucaena leucocephala:*

Calorific Value	4200 ï 4600 K cal / Kg. Excellent firewood and charcoal.
Fodder	Excellent (leaf and green fruit). Leaf 14 % protein and fruit 43.5 %. Mimosene(high 2.5%). Related toxicity may occur, avoided by mixing with other forages.
Other Uses	Aggressive root system therefore soil binder and moisture retainer, timber, pulp.
Germination % age	90%
Viability	upto 2 years.
Dormancy	Not significant.
Seed treatment	Hot water for 2 ï 3 minutes & then soaking for 2 ï 3 Days.
Nursery techniques	Direct sowing in pots in April, germination in 8 days. Seedlings can also be grown in beds and bare root planted in rains by lifting them from the beds. Root and shoot clipping do not affect the seedling
Preferred altitude	Below 500 mts.
Soil	Wide range of soil conditions, prefers neutral calcareous.
Coppicing ability	Very good.
Pests and Diseases	Seed weevils and twig borers.

VII *Syzygium cumini:*

Calorific Value	4800 K cal / Kg (good fuel wood.)
Fodder	Average.
Other Uses	Fruits, hedges, Tannin bark, bee forage.
Seed Collection time	June ï August
No. of Seed per Kg	1200
Germination % age	50%
Seed Viability	Very low.
Nursery technique	Direct sowing in field, direct sowing in poly pots. Germination 2 - 4 weeks. Transplanting after 12 months in rains without disturbing the sensitive root.
Altitude	Generally below 600 mts.
Coppicing ability	Good.
Pests Diseases	Scale insects, whites flies and leaf eating caterpillars.

VIII *Dalbergia sissoo:*

Fodder	Good, readily browsed by cattle goats and camels.
Other Uses	Heart wood very hard strong and durable, used for making furniture, carts, carriages, agricultural implements,

	carriage wheels and generally carpentry.
Silvicultural Characteristics	Strong light demander, frost hardy, drought resistant.
Artificial Regeneration	By direct sowing just before the onset of monsoon rains, raised in nursery and planted out when 9 to 12 months old either with a ball of earth or naked root at a spacing of 2.5 mt x 2.5 mt.
Coppicing power	Good coppicer.

9.11 Analysis and Valuation of the Crop

9.11.1 The quantitative assessment of growing stock in this working circle has been made on the basis of data collected and analysed separately from 44 points in sub- stratum- I, 112 points in Sub – Stratum II, 68 points in sub – stratum III, These sample points, selected at random were located surveyed and analysed in the field by adopting point sampling technique in area with adequate no. of trees were available around the point and by laying of plots of 0.1 ha, in areas, where adequate no. of trees were not available for point sampling exercise and by conducting total enumeration in these plots. The methodology adopted has been described in detail earlier on.

9.11.2 In non-Chir areas mean values of 1 variable i.e. No. of broad leaved trees / ha. have been separately calculated for all the sub strata by the progressive arithmetic averages of the variable from the data drawn in each sub stratum. The results of statistical analysis for all the sub strata are given in the tables 9.5.

Result of analysis clearly indicates that all the sub-strata of this circle have presence of middle aged chir crop. The average number of broadleaved trees per hectare in these strata works out to be 49.61, 51.94 and 108.82 trees per hectare for sub-stratum I, II and III respectively. The presence of higher dia classes of Chir on the upper reaches of compartments falling in all the sub-strata indicate the progressive degradation of these areas attributed to excessive biotic interfeance and recurrence of fires in the areas.

This led to gradual invasion of these areas by broad leaves species and brushwood which was inimical to Chir regeneration.

9.11.3 For academic interest those variable were put to statistical scrutiny and tests. The result of these statistical tests are summarised in a tabular statement in tables.

9.11.4 The average number of Chir trees in different dia classes worked out from the enumeration details from sample plots surveyed in all the sub-Stratum are given in Tables 9.6, 9.7 of SS-I 9.8 & 9.9 of SS-II, 9.10 & 9.11 of SS-III.

Table.9.5 Results of Statistical analysis for substratum 1, 2 and 3 of Rehabilitation and Reboisement Working Circle. I,II & III

Block	Variable (per ha.)	Sample Points (n)	Mean (X)	Variance (S2)	Standard Deviation (S)	Standard Error (S.E.)	Coefficient of variation (%)	95% Confidence limits (X + 1.96 x S.E.)		Confidence Interval (C.I.)	Lower limit as % of mean (%)
								Lower limit	Upper limit		
1	2	3	4	5	6	7	8	9	10	11	12
Substratum 1	No. of Stems	44	49.61	1412.60	37.59	5.67	75.76	38.50	60.72	22.21	77.61
	Volume	44	29.08	6404.41	80.02	12.06	275.17	5.44	52.72	47.29	18.69
Substratum 2	No. of Stems	112	51.94	2550.00	50.50	4.77	97.22	42.59	61.29	18.70	81.99
	Volume	112	12.76	1025.52	32.02	3.03	250.97	6.83	18.69	11.86	53.52
Substratum 3	No. of Stems	68	108.82	8652.30	93.02	11.28	85.48	86.71	130.93	44.22	79.68
	Volume	68	50.07	20107.10	141.80	17.20	283.20	16.37	83.77	67.41	32.69

The measures of dispersion like standard deviation, coefficient of variation, are based on figures for total number of stems and total volume computed from each sample point.

Column 7 : S.E. = S/ square root (n)
Column 8 : C.O.V (%) = (S/X) x 100
Column 9 : Lower limit = X - 1.96 x S.E.
Column 10 : Upper Limit = X + 1.96 x S.E.
Column 11 : C.I. = Upper limit - Lower limit

Table 9.6 Statement showing species and diameter(cm) class wise tree count of sub-stratum 1 of Rehabilitation-Reboisement Working Circle											
Tree count per hectare (Mean Value).											
Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	1.14	1.59	6.59	4.18	2.93	1.14	0.00	0.68	0.68	0.23	19.16
B.L.	25.68	4.32	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.45
Total	**26.82**	**5.91**	**7.05**	**4.18**	**2.93**	**1.14**	**0.00**	**0.68**	**0.68**	**0.23**	**49.61**

Total tree count over the entire commercial area (forest cover excluding blanks) of the substratum 1. (Area = 6493 hectares)											
Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	7378.41	10329.77	42794.77	27152.55	19036.30	7378.41	0.00	4427.05	4427.05	1475.68	124399.98
B.L.	166752.05	28037.95	2951.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197741.36
Total	**174130.45**	**38367.73**	**45746.14**	**27152.55**	**19036.30**	**7378.41**	**0.00**	**4427.05**	**4427.05**	**1475.68**	**322141.34**

Table 9.7 Statement showing species and diameter(cm) class wise volume(m3) of Chir in sub-stratum 1 of Rehabilitation Working Circle Volume of chir per hectare (Mean Value).											
Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	3.16	4.73	6.48	4.02	0.00	4.23	4.77	1.70	29.08
Total	**0.00**	**0.00**	**3.16**	**4.73**	**6.48**	**4.02**	**0.00**	**4.23**	**4.77**	**1.70**	**29.08**

Total volume of chir over the entire chir area of sub-stratum 1 of Rehabilitation Working Circle. (Area = 458 hectares)											
Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	1448.95	2164.26	2967.53	1842.41	0.00	1936.09	2182.79	778.60	13320.62
Total	**0.00**	**0.00**	**1448.95**	**2164.26**	**2967.53**	**1842.41**	**0.00**	**1936.09**	**2182.79**	**778.60**	**13320.62**

Table 9.8 Statement showing species and diameter (cm) class wise tree count of sub-stratum 2 of Rehabilitation-Reboisement Working Circle
Tree count per hectare (Mean Value)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	1.52	2.60	2.74	2.21	1.59	1.01	0.27	0.09	0.00	0.00	12.03
B.L.	32.23	5.36	1.70	0.18	0.09	0.18	0.09	0.00	0.00	0.09	39.91
Total	**33.75**	**7.96**	**4.44**	**2.39**	**1.68**	**1.19**	**0.36**	**0.09**	**0.00**	**0.09**	**51.94**

Total tree count over the entire commercial area (forest cover excluding blanks) of the substratum 2. (Area = 13570 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	20597.32	35257.77	37196.34	30047.86	21566.61	13691.16	3634.82	1211.61	0.00	0.00	163203.48
B.L.	437390.18	72696.43	23020.54	2423.21	1211.61	2423.21	1211.61	0.00	0.00	1211.61	541588.39
Total	**457987.50**	**107954.20**	**60216.88**	**32471.07**	**22778.21**	**16114.38**	**4846.43**	**1211.61**	**0.00**	**1211.61**	**704791.88**

Table 9.9: Statement showing species and diameter (cm) class wise volume (m^3) of Chir in Sub-stratum - II of Rehabilitation working circle

Volume of Chir per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	1.32	2.50	3.51	3.57	1.30	0.55	0.00	0.00	12.76
Total	**0.00**	**0.00**	**1.32**	**2.50**	**3.51**	**3.57**	**1.30**	**0.55**	**0.00**	**0.00**	**12.76**

Total volume of Chir over the entire Chir area of sub-stratum II of Rehabilitation Working Circle. (Area = 2240 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	2947.20	5604.80	7867.60	8000.40	2922.00	1240.00	0.00	0.00	28582.00
Total	**0.00**	**0.00**	**2947.20**	**5604.80**	**7867.60**	**8000.40**	**2922.00**	**1240.00**	**0.00**	**0.00**	**28582.00**

Table 9.10 Statement showing species and diameter(cm) class wise tree count of sub-stratum-III of Rehabilitation-Reboisement Working Circle

Tree count per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	1.32	0.74	0.74	3.09	0.74	0.00	0.44	0.59	1.62	3.68	12.94
B.L.	49.12	27.06	10.29	3.53	1.76	0.00	2.65	0.15	1.18	0.15	95.88
Total	**50.44**	**27.79**	**11.03**	**6.62**	**2.50**	**0.00**	**3.09**	**0.74**	**2.79**	**3.82**	**108.82**

Total tree count over the entire commercial area (forest cover excluding blanks) of the substratum-III. (Area = 13638 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	18050.29	10027.94	10027.94	42117.35	10027.94	0.00	6016.76	8022.35	22061.47	50139.71	176491.76
B.L.	669866.47	369028.24	140391.18	48134.12	24067.06	0.00	36100.59	2005.59	16044.71	2005.59	1307643.53
Total	**687916.76**	**379056.18**	**150419.12**	**90251.47**	**34095.00**	**0.00**	**42117.35**	**10027.94**	**38106.18**	**52145.29**	**1484135.29**

Table 9.11 Statement showing species and diameter(cm) class wise volume (m3) of Chir in sub-stratum-III of Rehabilitation Working Circle.
Volume of Chir per hectare (Mean Value).

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	0.35	3.49	1.63	0.00	2.15	3.65	11.31	27.50	50.07
Total	**0.00**	**0.00**	**0.35**	**3.49**	**1.63**	**0.00**	**2.15**	**3.65**	**11.31**	**27.50**	**50.07**

Total volume of Chir over the entire Chir area of sub-stratum-III of Rehabilitation Working Circle. (Area = 1262 hectares)

Spp.	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 <	Grand Total
Deo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chir	0.00	0.00	445.41	4404.01	2050.75	0.00	2711.44	4602.59	14269.88	34705.00	63189.08
Total	**0.00**	**0.00**	**445.41**	**4404.01**	**2050.75**	**0.00**	**2711.44**	**4602.59**	**14269.88**	**34705.00**	**63189.08**

9.12 Realization of Yield:

No marking for commercial purposes has been prescribed in this working circle, therefore no yield has been fixed.

9.13 Fire Protection:

Standard fire protection measures shall be taken and these measures have already been described in detail.

9.14 Grazing Regulation:

As the entire area of this working circle is heavily grazed by locals and nomadic livestock population, the area shall be identified for regulation of grazing. In area where soil conservation measures and plantation works are taken up, no grazing should be allowed till areas are stabilized. This has to be done in consultation with local village Panchyat and is left to the discretion of territorial D.F.O.

CHAPTER – X

WORKING PLAN FOR
GRAZING (OVERLAPPING)
WORKING CIRCLE

CHAPTER-X

The Working Plan for the Grazing (Overlapping) Working Circle

10.1 General Constitution of the Working Circle

This working circle includes.

All those demarcated forest of Jammu Forest Division which are having scrubs vegetation and having very low density (<0. 1 to 0.2) and which are unsuitable for growing any other important forest tree species, have been included in this working circle. Some of these compartments are near habitation.

10.2 General Character of Vegetation

As this working circle is overlapping and the vegetation is found in whole of this Division. The area of this working Circle consist mainly of scrub forest, weed and blank areas. The scrub area comprises of species like *Lantana, congress grass, kakoa, garna, branker, sentha etc. Some trees of important species like phulai, semal, sissoo, khair, ber* etc. are found in less proportion. In some of these compartments a few scattered Chir trees are usually found at the top of ridges. Since these grazing areas carry more than the optimum number of live stock both nomadic as well as of local graziers, a pronounce depletion of vegetation and degradation of the area has taken place. As a result of over grazing, the grazing land exhibit's a highly depleted and degraded look. As such, the grazing is not conducive to the regeneration of conifers and important vegetation of the area.

10.3 The Problems of Nomadic Graziers

A large number of families of Gujjars and Bakerwals migrate to Jammu Forest Division along with their live stock during winter month. Since several years the department allots forest compartments for grazing purposes by name to nomadic families every year which leads to the degradation of the area as well as depletion of important species of vegetation. As per the record available with Jammu Forest Division for the year 1998-99 there were about 241 families having 50389 cattle population have allotments in different compartments of all the four Ranges of the Division, where as in the year 2011-12 the no. of families increased by 11% i,e 268 families and the cattle population simultaneously increased by 11% i.e. 55901. The Cases of subletting of allotments have also been reported in Jindrah and Bahu Range which again increase & more pressure on forest land.

10.3.1 Nomadic graziers are using forest land for establishment of semi permanent / permanent Behaks. The graziers are not restricted to allotted areas but are spreads all over the Division excluding some closures. Almost all trees i.e *khair, phulai, sissoo, leuceana* are heavily lopped during the winters affecting production of seed. The over grazing, browsing and trampling by sheeps and goats usually destroys all the vegetation and also erodes the soil. In a way the grazing and lopping on ground is uncontrolled and unmanaged. Encroachment of forest land / compartments allotted to these nomadic graziers have also been observed during the field exercise (List is enclosed as Annexure).

The demand of local communities regarding fodder and fuel wood has not been addressed by the department in a systematic way.

Unrestricted grazing by an excessive number of cattle, sheeps and goats belonging to both the local as well as of nomadic grazers have changed the very complexion of natural vegetation in the almost entire tract. The damage has caused the elimination of economic species and their replacement by weeds like *Carissa spinarum, Lantana camara, Adhatoda vasica,* hence lowering the moisture content of the soil and overall degradation.

10.4 Distribution of Area:

This working circle composed of low lying areas, compartment / sub compartment near habitation and water source overlapping with other working circles proposed. To regulate grazing and enhance the leaf biomass production and encourage the habit of stall feeding, rotational grazing with replacement of inferior cattle breeds.

10.5 Special Objectives of Management:

Keeping in view the overall objectives of State Forest Policy, following are the special objectives of management:

i. To maintain and improve existing grazing lands.
ii. To regulate grazing on rotational basis giving due considerations to the carrying capacity.
iii. To enhance the leaf biomass production by raising fodder plantation in low lying areas.
iv. To inculcate and encourage the habbit of stall feeding.
v. To make integrated efforts for replacing large number of inferior cattle breeds with lesser number of better cattle breed.

10.6 Strategy

Introduction of Improved Grass Species and Seed Production

Keeping the basic objectives mentioned before, in the lower Shiwalik zone the introduction of improved grasses and seed production is prescribed following grasses are suggested.

i. Sabigrass / Buffalo grass (*Urochola mosambicensis*). It is perennial creeping stoloniferous drought resistant plant.

ii. Gunia grass (*Panicum maxicum*) It is tall growing perennial grass with dense tussocks. Root system is deep dense and fibrous which enables the plant to survive long drought periods. It is shade tolerant and can grow under trees and bushes. It can be harvested 3 -4 times in a season.

iii. Napier grass (*Pennisetum purpureum*) It is a tall perennial tropical grass having large flat leaves that may be 30-90cm and up to 3 cm broad. It is usually grown vegetatively from stem cuttings as crown divisions. It is the most promising species which yields fodder and dry matter that surpass most tropical grasses. It can be grown in pure form or in mixture with legumes.

In the subtropical climate some important species which can be grown are:

I. *Setaria* (*Anceps*)
II. *Panicum maxicum*
III. *Macrotyloma axillora*. It is a perennials legume.
IV. White clover (*Trifolium repense*)

10.6.1 Seed Production:

Lower shiwalik ranges are frost free and are ideal for seed production. Following are the techniques to judge the appropriate time to harvest:

i) Rub the seed in the palm of hand, if a gritty sandy noise is heard and seed feels hard then usually it is mature.

ii) If the seed can be pinched out of the spikelet then it is ready for harvesting.

iii) When the colour of seed changes from green to grey/brown, it is mature for harvesting.

10.6.2 Fertilizer Application

In the areas taken up for fodder development small split doses of Nitrogen (in the form of urea) can be applied to increase succulence and growth. It should be about 20kg per hectare.

10.6.3 Harvesting of Herbage from the Grass Land

Harvesting of herbage at pre-bloom stage after about 60 days interval, the initiations of vegetative growth, results in higher nutritive forage and very good regeneration and second cutting becomes available at the fag end of season.

10.7 Silvipastoral Improvement

Introduction of suitable combination of grasses and tree species:

In hills number of fodder trees are good source of fuel wood and green fodder e.g *siris, morus, dhamman, sissoo, leucaena,* etc. Priority is to be given to introduction of high quality grasses as well as legumes. Useful combination of grasses and fodder trees should be adopted as per locality factors. e.g *Setaria anceps* shows good result under shaded condition of *Albizza stipulata*. Following combination of grasses and trees are prescribed for the subtropical areas of Jammu Forest Division:

1*, Napier/ Steria grass + Dhamman, Siris, Mulbery.*

2, Cenchrus spp. + Shisham, Kiker, Siris.

3, Dinanath grass + Kiker, Khair, Siris.

4, Chrysopogan spp. + Chir pine, Shisham .

5, Dicanthum spp. + Dhamman, Kiker, Siris, Mulbery.

10.8 Closures and Rotational Grazing

Continuous grazing/browsing on the same forest area year after year has depleted vegetative cover resulting into denudation and soil erosion in some areas. It shall be imparatives to suspend grazing in such areas to allow them to recuperate to introduce rotational grazing thereafter. A few such compartments which were noted during field survey are as following:

S.No.	Range	Block	Compartments
1	Kalidar	Chowki	7,22,24/K
2	Jindrah	Jindrah, Mansar Puni	2,3,4,6,8 and 9/J 3,4/M 4,5,6 and 7/P
3	Jammu	Nagrota	6,7/N
4	Bahu	Bahu Devak	37,39/B 15, 20/D

10.9 Grazing and Settlement Fee

In the working plan under revision some increase is proposed in the grazing as well as settlement fee. Since there has been a tremendous rise in the price index. In view of this it is necessary to revise the grazing fees so that there is some conformity with the prices prevalent at this point of time and the revenue so obtained can be ploughed back for the improvement of their grazing lands / forest areas.

10.9.1 Following Increase is suggested:

There are two categories of rates i.e B-rates, C-rates

B-rates – Nomadic graziers.

C-rates- for Bovine traders

Name of Animals	Present Fee	Proposed fee
Buffalo	B- Rs 5/- unit	B-Rs 10.00/- unit
	C-Rs 11.50/- unit	C-Rs 23.00/- unit
Sheep	B- Rs 0.20/- unit	B-Rs 0.40/- unit
	C-Rs 0.65/- unit	C-Rs 1.30/- unit
Goat	B- Rs 0.40/- unit	B-Rs 0.80/- unit
	C-Rs 2.50/- unit	C-Rs 5.00/- unit
Horse	B- Rs 5/- unit	B-Rs 10.00/- unit
	C-Rs 7.50/- unit	C-Rs 15.00/- unit
Donkey	B- Rs 0 .20/- unit	B-Rs 0.40/- unit
	C-Rs 0.65/- unit	C-Rs1.30/- unit

Settlement fee to be increased from Rs. 40 to 350 /- allotment free from Rs 80 to 500/-

10.10 Strategies to tackle Grazing problem and Fodder scarcity:

i. Plantation of fodder trees is to be promoted in the community forests and forest fringes.

ii. Grazing permits to the migratory graziers should be issued after proper enumeration of livestock and the existing rates of grazing fee may be increased reasonably.

iii. Allotment area to the nomadic graziers may be changed every year as per the number of animals and the productivity of the area. No permanent allotment may be made to the same area every year. This will provide rest to overgrazed areas on rotational basis.

iv. A Consultative mechanism with the involvement of the panchayats to integrate nomadic graziers and the local community to address grazing issues may be evolved.

v. New forest areas for grazing to nomadic graziers will be allotted on the recommendation of concerned gram panchayat, grazing committee and forest field staff keeping in view the carrying capacity of the area.

vi. Programme for augmenting the productivity of grazing lands / areas will be implemented through introduction of better quality nutritious grasses and legumes, rotational closures and eradication of obnoxious weeds and shrubs. The forest department may work in close coordination with the Animal Husbandry and Agriculture Department in this regards.

CHAPTER – XI

WORKING PLAN FOR
PLANTATION (OVERLAPPING)
WORKING CIRCLE

CHAPTER-XI

Working Plan for Plantation (Overlapping) Working Circle.

11.1 General Constitution and Character of Vegetation

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 are highly degraded, blank or have scanty vegetation. Broad leaved trees are scanty and bush like in such areas because of reckless lopping and browsing. Regeneration is almost absent. Areas is situated in close proximity of habitation having undergone onslaught of man and animals by way of illicit felling, lopping, grazing and encroachment have been included in this working circle.

11.2 Special Objectives of Management

Plantation working circle has been constituted in view of the following special objectives:

i. To meet the local demands 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.

v. To control erosion and improve soil and moisture regime.

11.3 Methods of Treatment

A mixture of multiple use local and fast growing species is prescribed to be planted in order to meet the above said objectives. For sub-tropical areas *khair, shisham, subabul, anardana, bamboo, babool, drek and kachnar* etc shall be suitable. Also grasses and legumes like *Napier, Steria, Trifolium* etc shall also be grown to meet the fodder and other requirements.

Vegetative fencing by planting of species like *Agave* along the fences shall be resorted to Social fencing i.e co-operation of people in the protection of plantations shall be the backbone of protection work. So, the people's participation is an important component of this working circle.

Social Forestry Division Jammu and Udhampur should be involved in execution of works i.e raising plantations near habitations. (RDF) Rehabilitation of degraded Forests and VWL (Village wood Lots) are the two components in social Forestry works which can contribute to the works undertaken in this working circle. D F O Social Forestry should formulate the annual plan in consultation with D F O Territorial so that there is proper distribution of work in priority areas.

11.4 Choice of Species

Suitable species for plantations have been mentioned earlier, besides these local species like *Toona ciliata, Olea cuspidata, Grewia optiva, Syzigium cumini, Acacia catechu, Acacia modesta, Dalbergia sissoo, Ziziphus* spp etc can also be grown.

Since the objectives is to meet the local demand of fuel, fodder, small timber and to create the buffer zones between habitations and natural forest, the involvement of local people becomes imperative, hence the final decision of species to be planted shall be that of local people as per their demands.

11.5 Nurseries and Nursery Techniques

A good number of nurseries are being maintained in this division by various agencies. The list of nurseries is shown in the Annexure . More Nurseries can be created as per the requirement from time to time

11.6 Annual Treatment

Areas proposed:

It was observed during the field exercise that comptts./areas which are degraded and have mostly blank patches need immediate rehabilitation through plantation works as given in the table No. 11.1

Table No. 11.1

Name of Range	Compartments
Jammu Range	4,6,8/N & 4/M
Kalidar Range	4,10,27,35,37,39,43/K
Jindrah Range	3,6,7/J , 4,6,7/P , 4,5/P , 2/Mansar
Bahu Range	16,32,33,34,40,64/Bahu 14,15,16,18,19,20,21,39/Devak

Annual treatment plan involving quantum of work and areas to be taken up for plantation shall be at the discretion of territorial D.F.O who will formulate the plan in consultation with D F O Social Forestry Jammu and Udhampur and local village forest committees. However the success of treatment plan shall be on availability of sufficient funds, desired co-operation of the local people and actual availability of the area .

CHAPTER – XII

NON-TIMBER FOREST PRODUCE

(OVERLAPPING)

WORKING CIRCLE

CHAPTER-XII

Non - Timber Forest Produces (Overlapping) Working Circle

12.1 General Description

The Non-Wood Forest Products (NWFP) plays an important role in revenue and employment generation, particularly in rural areas. In the 1960s NWFP contributes only 2 % of forest revenue and now this has increased to 36% at the National Level.

Planting of multipurpose tree species in fragile eco-systems is desirable as NWFP can be extracted without cutting down the trees. This helps in maintaining vegetal cover in ecologically sensitive areas (like Jammu Forest Division). Further NWFP's can also be cultivated in private lands.

12.2 General Constitution of the Working Circle

This working circle shall overlap all other working circle of the Division. The working circle shall be discussed under two heading.

i. Resin Extraction.
ii. Other Non-Wood Forest Products / Medicinal Plants.

12.3 Resin Extraction

12.3.1 Past history:

Extraction of resin from Chir started in Jammu Forest Division in 1971-72. The extraction was initially done by cup and lip method by giving channels on standing tree. However due to short sightedness at that point of time unrealistic targets of production was fixed year after year. This heavy tapping resulted in deep and wide gashes extending into heartwood of pine trees effecting their mechanical strength. Drying and snapping due to wind, affected trees became a common feature. The manner in which blazes were made, no consideration was kept of the interspaces between the blazes thus affecting the future tap able age of the trees. Setting up of large number of industrial units during this period also increased the pressure for more and more resin extraction.

12.3.2 Extraction by this method continued till 1988-89 when it was decided in consultation with the then Chief Conservator of forests, Jammu & Kashmir Govt. to give the crop rest from resin extraction due to deteriorating condition of the crop. Resin extraction started again by rill method in 1992-93 after giving rest to the crop for three years.

12.3.3 Even during the course of revision of the working Plan of the Division by Sh. J.B Singh in 1981-82 apprehensions have been expressed regarding resin extraction and the number of Channels prescribed were 22 Channels per hectare, which was quite low, considering the fact that the main consideration of constitution of the interm resin tapping Working Circle at that time was resin extraction.

12.3.4 Past Resin Extraction Details

The table 12.1 given below indicates number of channels total quantity of resin extraction resin yield per channel from 1981-82 to 2010-2011.

TABLE 12.1 Past Resin Extraction Details:

S.No	Year	Number of Blazes	Resin extracted (Qtls)	Yield % blaze (KG)
1	1981-82	941984	30632.09	3.22
2	1982-83	928083	25741.779	2.77
3	1983-84	805245	16996.08	2.11
4	1984-85	889099	21330.08	2.39
5	1985-86	750316	15413.98	2.05
6	1986-87	470897	7853.15	1.66
7	1987-88	131728	2564.98	1.94
8	1988-89	12302	370.58	3.01
9	1989-90	Nil	Nil	Nil
10	1990-91	Nil	Nil	Nil
11	1991-92	Nil	Nil	Nil
12	1993 to 2010-2011	Nil	Nil	Nil

12.3.5 Analysis

1. Table indicates that the condition of the crop became so poor in 1987-88 that it was decided to given the crop rest from resin extraction.

2. The number of channels continuously decreased from 941984 channels in 1981-82 to 12302 channels in 1988-89 indicating the deteriorating condition of the crop during the period.

3. The resin yield per channel decreased continuously from 3.22 Kg per channel in 1981-82 to 1.94 Kg per channel in 1987-88 indicating deteriorating quality of the crop.

4. As for as healing of the blazes is concerned, it is quite poor in cup and lip method as the cuts have created so deep gashes that it apprehended that %age of mortality will be increased if incidences of heavy fire/wind storm occurred in near future, whereas healing in case of Rill method is marginally better.

12.3.6 Crop Improvement works undertaken during past decade

i. No significant development works have been undertaken in chir areas of the division during past decade to promote regeneration.

II. No significant silvicultural operations have taken place to improve the condition of the crop during the past decade.

III. No specific fire protection measures have been taken in the division during the past decade except routine fire fighting operations.

12.3.7 Results of Resin channel survey exercise:

Resin channel survey exercise was undertaken by the field parties during the course of this revision of the plan, a total of 235 samples were surveyed in chir areas of the division out of which 185 samples showed resin extraction by cup and lip method only and 55 samples

showed resin extraction by both cup and lip and Ril method. This exercise was conducted along with the point sampling exercise in chir areas of the division. A total of 1031 trees in all dia classes over the entire division were surveyed and number of old channels / rills were counted. The result of the exercise are given in Table No: 12.2

Table No: 12.2 Abstract of Resin channel survey exercise:

Dia Class	Total No. Of trees showing extraction by				Total No. of		Average No. of	
	Cup & Lip Method	Both	Total	Rill	Channel	Rills	Channels / Trees	Rills / Trees
20-30	20	5	25	14	53	32	2.12	6.4
30-40	132	32	164	162	487	39	2.96	1.21
40-50	300	116	303	74	2672	185	8.81	1.59
50-60	254	156	310	25	3520	308	11.35	1.97
60-70	83	61	135	18	1566	77	11.6	1.26
70-80	33	17	50	10	584	27	11.68	1.58
80-90	24	7	31	2	314	11	10.12	1.57
90-100	13		13		39		3	

12.3.8 Analysis:

The table clearly indicates that No. of channels / Rills already put on chir trees for resin extraction over the years is very high in all diameter classes. This also indicates and confirms the apprehension that the crop has already been over exploited and there is hardly any space left for blazes now.

12.3.9 It is well known fact that extraction of resin makes chir forests vulnerable to forest fires especially when acid is used for increasing resin yield, large scale damage to trees during forest fires in 2001-2002 and 2005-2006 in chir areas can be attributed directly to the deep gashes(not healed up) made in cup and lip method for Resin extraction, which has exposed the resinous portion of the tree and made them vulnerable to fire.

12.3.10 Conclusion:

In view of the facts given above and figures supporting these facts, it is proposed that the crop should be given complete rest from extraction during the plan period and after that period review should be done.

12.4 Other Non-Wood Forest Products / Medicinal Plants:

The Jammu Forest Division is a habitat for many medicinal plants which are being used by the local people for treatments for various ailments from time immemorial. The forest tract is suitable for cultivation of many of these species. The ban on extraction of Medicinal plants was imposed in the year 2004 vide Government Order No: - 290 FST of 2004 Dated: 14-07-2004 except Guchhi, Anardana and conifer seeds. Subsequently in the year 2013, State Government vide order No.154-FST of 2013 dated 24-04-2013 lifted the ban on those which are not included in Schedule-VI of J&K Wildlife (Protection) Act of 1978(as amended till date). Further, the order also says that the extraction shall be subject to the provisions of Biological Diversity Act 2002(as amended till date). There is urgent need to survey the resource of minor forest produce in quantity as well as in quality, so that a comprehensive M F P policy can be framed regarding the extraction of M.F.P from the forest on sustainable basis in near future keeping in view of the provisions of J&K Wildlife Act, 1978 and Biological Diversity Act,2002 as well as commercial viability.

12.4.1 Objectives of Management:

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

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

iii. To explore and document the ethino botanical knowledge of local species from the forest fringe people for commercial exploitation.

12.4.2 Inventory of Medicinal Plants:

Through survey, reference to literature and interviews with local people a limited inventory of medicinal plants existing in Jammu Forest Division has been prepared. The Table No.12.3 gives the scientific name. Local names/ English names of 33 medicinal plants occurring in the division along with the uses. A detailed list of trees, shrubs, herbs and grasses having one or the other medicinal value growing in Jammu Forest Division is also given in the Annexure. This is as per study done by department of BIO-SCIENCE of Jammu University.

12.4.3 Strategies:

12.4.4 Management in Natural Forests:

At present none of the medicinal plants mentioned in the list 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.

12.4.5 Cultivation of important species:

(i) *Dioscorea composite, Withania somenifera.*
(ii) *Terminalia bellerica, Terminalia chebula, and Terminalia arjuna.*

12.4.6 Cultivation of important species:

i. *Dioscorea composita:*

The Dioscorea species yields tubers from which a steroid hormone Diosgenin is extracted. This is used in treatment of rheumatism, ophthalmic ailments and in preparation of contraceptive pills.

The experiments conducted in Jammu Region by MFP Project of Forest department has shown that D.Composita can be raised under partial shade of broad leaved species . These trials indicated that D.Composita can be cultivated on a large scale in sub-tropical Jammu region including Jammu Forest Area.

Propagation Method:

Vegetative propagation using Rhizome has shown good results.

Nursery Practice:

Rhizome cuttings should be raised in Nursery beds, two months old rooted plants should be transplanted in field.

Spacing:

A spacing of 60 cm X 75 cm is recommended, the seedlings should be planted on ridges in 30 cm x 30 cm x 30cm pits.

Weeding:

The weeding and watering should be done till the plant (vine) attains height and establishes itself. The loosening of soil near plant base is also necessary. The vines should be supported by Bamboo splits and sticks.

Harvesting and yield:

The plants can be harvested after completion of three years. On an Average 2.85 Kg tubers / vine can be obtained.

ii. Withania somnifera (Ashvagandha):

It is the most popular medicinal plant. Paipalada samhita quoted its root in the treatment of infertility. Charaka considered this as balya(tonic) and brimhana (nourishing). Ashvagandha is also known for its aphrodisiac property and for its efficacy in male infertility.

Today it is world over utilized for its anti arthritic, anti-oxidant, immunomodulatory, aphrodisiac and tranquilizing effects.

Distribution:

It is a erect under shrub, which is found throughout the drier and sub-tropical India. It is cultivated extensively throughout India at present.

Chemical constituents:

Withaferin A, Withanone, Withanolide WS-1, Withanolide A to Y, Sominirol, Sominitol, Withasomniferin A, Nicotine, Withasomnine, Sominone, Sominolide etc.

Part used: Root

Cultvation Technology:

Sandy loam or light red soils with pH between 7.5-8 are ideal. It is a Kharif crop, propagated either by direct sowing or by transplantation. Seeds are sown directly in the field and plants thinned out 25 days after sowing (20000-25000) or 2kg seeds are sown per hectare to provide seedlings which are transplanted after 6 weeks in 60cm wide furrows at 60cm apart.

Harvesting and Yield:

It can be harvested after 150-170 days after sowing. Maturity of crop is judged by drying of leaves and red berries. Plant uprooted and root is cut- separated in 7-10cm pieces and dried, about 400-500 kg roots and 50 kg of seeds are obtained per hectare.

iii.Terminalia chebula(Harad):

A moderate-sized, sometimes large deciduous tree. It is capable of growing on different soils ranging from poor rocky ground to sandy, clayey, deep or shallow loam, lateritic loam, gravelly fertile alluviul soils. The plant thrives best in areas with an annual rainfall varying between 100-150 cm. It requires maximum temperature in range of 36-47°c and minimum temperature in range from 0 to 17.5°c.

Propagation Method:

Vegetative propagation has been found advantageous over seed sowing as the former technique reduces the juvenile period and subsequently facilitates early maturing.

Part used: Dried fruits

Nursery Technique:

For raising seedling in the nursery, pre-treatment of seeds is common. The depulped seeds should be treated by fermentation process and then sown in the Nursery beds . The Nursery should be shaded against the Sun. Ordinary clayey loam or sandy loam will suffice and no manuring is required. The young plants may require watering during the first hot season. Plants suitable for transplanting are obtained in the second rains. Shelter is required in the early stages of growth. Optimum spacing in Nursery is around 15 cm*15 cm

Weeding:

Regular weeding is carried out for the first 3 years or until the plants are successfully established.

Harvesting and yield:

The fruits fall on the ground soon after ripening.The crop yield varies from year to year. The astringent principle is found in the outer pulp of the fruit. January is considered as the best time for collection of chebilic myrobalan in many areas, the later collection are slightly inferior. The collection however starts in December and continous up to the end of March in India. The annual yield of fruits nearly 15-17 tonnes per year, per hectare

Medicinal uses:

Used in Triphala, Chwanprash, Blumin Syrup, Amrit Haritaki, Sudershan Churan, Sanjivani vati, effective against chronic ulcers and mouth inflammations. Acts as laxative. Also cures sore eyes, acidity, liver troubles, blood pressure, diarrhoea, dysentery , piles, vomiting etc.

Table No. 12.3 Some important Medicinal plants found in Jammu Forest Division :

S.No	Scientific Name	Local Name	Parts used and Uses
1	Acacia catechu	Khair	Bark paste used in conjunctivitis and haemoptysis. Flowers top with Cumic, Milk and Sugar used in Gonorrhea, Katha used in treatment of dysentery, piles uterine haemorrhages, leucorrhoea gleet, atonics dyspepsia, Bronchitis etc.
2	Abelmoschus moschatus	Kasturi Dana	Seeds used as stimulant, Tonic and aphrodisiac.
3	Acacia modesta	Phulai	Twigs used as tooth brush
4	Achyranthes aspera	Put Kanda	Flowers used in renal dropsy and Bronchial disorders

5	Adiantum capillusveneris	Hans Raj	Leaves used as diuretic and febrifuge
6	Aegle marmelos	Billan	Fruits used in chronic diarrhoea and dysentery
7	Aloe barbadensis	Kuwad Kandal	Leaves used in treatment of fever liver and spleen ailments skin diseases, gonorrhoea, constipation piles and jaundice
8	Azadirachta Indica	Neem	Green twigs used as tooth brush leaves and fruits and bio pesticides, used in nervous problems. Skin disorders and as an antiseptic.
9	Alstonia scholaris	Devils tree	Bark used as a remedy for chronic diarrhoea and dysentery
10	Adhatoda vasica	Bhrainkar	Flowers, leaves and roots are considered antispasmodic and are used in case of asthma, cough and fever
11	Butea monosperma	Plah	Astringent, gum obtained from the tree is used in medicine
12	Calotropis procera	Desi Akk	Flowers used in treatment of cold, cough and asthma
13	Cannabis sativa	Bhang	Leaves and flowers used as sedatives and aphrodisiac
14	Cyperus rotundus	Deela	Trichip oil is prepared which is used for treatment of Alopecia, Dandruff and to prevent hairfall
15	Cassia fistula	Amaltash	The pulp of pods is used as purgative especially for children
16	Cassia tora	Elma	Has many uses
17	Dioscorea composita	Tarar	The steroid hormone obtained from tubers is used in treatment of Rheumatism, ophthaimic ailments and in preparation of contraceptive pills
18	Cinnamomum camphora	Camphor	Camphor is used for treatment of burns, as an sedative and as a analeptic stimulant
19	Emblica Officinalis	Amla	Fruits are rich source of vitamin C used as laxative and in the treatment of piles, liver and stomach complaints
20	Holarrhaena antidysentrica	Ivory tree	Bark is used for treatment of dysentery piles diarrhoea and leprosy
21	Jatropha curcas	Physic nut	Seeds are purgative. Oil from seeds in a strong purgative
22	Mallotus philipinensis	Kamla	Fruits used in treatment of tape worms and skin ailments. Kamla oil is used in hair fixers and ointments
23	Moringa Oleifera	Drumstick	Leaves have Ephedrine which is used in aphrodiasic medicines
24	Murraya Koenigii	Curry leaf	Leaves used in cases of dysentery and nausea.
25	Pueraria tuberose	Badad	Tubers used in medicinal preparations
26	Pinus roxburghii	Chirpine	Turpentine is obtained, resin has many pharmaceutical uses
27	Ricinus cuminus	Castor	Oil from seeds used as a purgative
28	Solanum nigrum	Black night shade	Used in treatment of liver cirrhosis
29	Syzygium cumini	Jamun	Fruits are antidiabetic and syrup used in treatment of kidney stones.
30	Terminalia bellerica	Bahera	Fruits are used to treat dropsy piles diarrhoea, leprosy and cough
31	Vitex negundo	Banna	Used in preparation of antirheumatic and anti arthritics Dazzle caspsules alongwith boswellia and withania
32	Terminalia chebula	Harar	Used in preparation of Triphala, cough syrups etc.
33	Terminalia arjuna	Arjun tree	Bark used for high Blood pressure & Diabeties etc.

12.4.7 Cultivation of Medical Plants in Private Land

A. The medicinal plants can be cultivated by farmers as part of Agro-Forestry. The medicinal plants like Dioscorea and Amla can generate revenue. Many other plants are useful for treatment of common ailments.

B. 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 e.g Aloevera, Tulsi & Sada bahar etc.

12.4.8 Role of Forest Department

a. The forest department can provide technical knowhow and supply seeds / seedlings of medicinal plants free of cost e.g MFP Project raises medicinal plants and provide it to public on nominal rates.

b. Farmers who cultivate commercially important species like Dioscorea, Haray, Ashvgandha etc. require market linkage, so that they get proper price for their produce.

c. Public awareness should be created about medicinal plants.

d. The ethino botanical knowledge of locals regarding medicinal plants should be documented and used for commercial cultivation and marketing.

e. Special VFC's to be formed in the Division for cultivation of medicinal plants in collaboration with locals for the upliftment of their economic level by earning livelihood.

12.5 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.

12.5.1 Fruit Trees

Zizyphus Jujuba (Ber) Mangifera Indica (Wild mango) Emblica officinalis (Amla) and Moringa oleifera (Drum stick)

12.5.2 Fibre Plants

Agave sislana is an important fiber yielding plant which can be cultivated in the division. This species comes up under very dry conditions.

12.5.3 Oil Yielding Plants

Many species that yield oil from their seeds occur in this division. Most of them are unexploited oil seeds although their uses have been identified. For record the species are mentioned below in Table 12.4

Table 12.4: Some Unexploited oil seeds of Jammu Forest Division.

S.No	Oil Seeds	Oil Content (%Seeds/Kernel)
1	Adhatoda vasica	25.8
2	Cannabis sativa	30-35
3	Holarrhena antidysenterica	19-30
4	Mallotus philippensis	20
5	Melia azaderack	40
6	Bombax ceiba	22.3

12.6 Area For Cultivation of NTFP

The NTFP species can be cultivated in compartments proposed for plantation working circle. The specific sites for each species should be identified by the field staff in collaboration with local panchyats. It will be the discretion of territorial DFO as well as actual availability of Funds and area.

12.7 Extraction

Since the ban on extraction of medicinal plants has been lifted by the State Government, before a comprehensive MFP policy is framed regarding the extraction of medicinal plants, the extraction can be done by adopting below mentioned formal guidelines:

a) The Territorial D.F.O will furnish the compartment wise availability of different MFPs.

b) Then C.C.F. in consultation with concerned Conservator shall fix the ceiling of annual quantity to be extracted division wise. To ensure extraction on scientific and sustained basis the extraction work shall be taken up on rotation so that a particular Forest Range or Forest Division is put to rest after carrying out extraction for one or two consecutive years.

c) Wherever possible, the extraction work should be allotted to VFCs/ Village Panchayats so that people are directly benefitted from this activity and have stakes in conservation of NWFP.

CHAPTER – XIII

ECO-TOURISM WORKING CIRCLE

CHAPTER-XIII

Eco-Tourism Working Circle

13.1 Introduction

According to travel and tourism competitiveness' report 2009 by the World Economic Forum, India is ranked 11th in the Asia pacific region and 62nd overall on the list of world's attractive destinations.

Indian tourism industry is expected to be the second largest employer in the world by 2019. The International Ecotourism society defines ecotourism as "responsible travel to natural areas that conserves the environment and improves the welfare of local people".

In Jammu Forest Division too, there are a few areas with good prospects of ecotourism. There are twin lakes of Mansar and Surinsar, Jhajjar Kotli and Purmandal. The forest area surrounding Mansar and Surinsar has been handed over to the Wild Life Department its management is being looked after by the Wild Life Department. However areas of Jhajjar kotli and Purmandal fall in the territorial junisdiction of Jammu Forest Division and are potential areas for ecotourism point of view. The Jhajjar Nalla attracts a lot of tourists from Jammu and adjoining areas during summer months. Purmandal also draws devotees throughout the year, by developing and popularising these spots a good no. of employment opportunities can be generated for local youth. Purmandal is about 40 Km from Jammu and has an important temple complex. It is commonly called as little Kashi and is located at the bank of holy river, Devika which is revered as sacred Ganges and also called "Gupta Ganga".

While people at the time on new moon of every month a large gathering is observed on Shivratri and Chaitra Chandeshi. Adjoining Purmandal is another important spot of uttervahini the name drawn from the northward course of the river as against the general direction of other rivers and nalah.

The people also visit the place to perform the last rites and related rituals of their relatives. Due to the use of bio non degradable products and due to the poor general drainage in the area there are certain environmental concerns.

13.2 General character of vegetation

The vegetation of this working circle falls under (type 5 B /C2) and siwalik chirpine forests (9c / 1 Ca) The surrounding forests are rich in indigenous vegetation. The important species include Chir, Bamboo, Khair, Phulai, Kembal, Sisham, Kakoa, Bear, Kasangal, Bilan, Plah, kikar, Jamun, Mango. Almost all the representative shrubs and herbs of this forest type are found in this area. The age class is young to middle. The crown density is. 0.4 to 0.6

This working circle has been constituted by including typical spots which have good potential of ecotourism. These spots are proposed to be developed with eco friendly tourism. The area adjoining comptt. 2 of Tunnel Block around Jhajjar Nallah and Co. 16 / Devak and Co. 19 / Devak of Purmandal Block have been included in this working circle which is given in the Table No. 13.1.

Table No. 13.1 Area and Allotment

S.NO	Range	Block	Comptt. Nos	Area (in Ha)
1.	Bahu	Devak	16 / D	85 Ha.
2.	Bahu	Devak	19 / D	195 Ha.

13.3 Special objectives

i. Conservation of environment and Bio-Diversity of the tract.
ii. Creating Public Awareness about the importance of flora and fauna.

13.4 Strategies, Conservation of Environment and Bio Diversity

13.4.1 Insitu conservation by developing:

(i) Sacred Groves:

The part of comptt. 16 / D and 19 / D of Purmandal block of Bahu Range around the temple complex shall be maintained as sacred groves and biotic intervention shall not be allowed except in the interest of conservation. At least 70 ha of forest land around Purmandal should be managed as a sacred grove. The management of such area shall rest with forest department. The temple management should be involved in the conservation project no right and concessions shall be admissible in these areas. Some of the suitable sites are village Kund, Taler and Dhoon.

13.4.2 Ex- Situ Field Conservation:

(II) Botanical Garden and Nakshatra Van

In this garden, the samples of all the indigenous trees, shrubs, herbs and medicinal plants climbers and grass shall be grown. At least five plants of each species occurring in the area should be planted and maintained with full taxonomical description. A sufficient nursery back up should be maintained for causality beating in respect of each species planted. The garden should be closely monitored by the management till establishment and thereafter of protection should be ensured.

In ancient Indian texts some trees have been considered sacred and are associated with zodiac signs (Rashi) and star constellations (Nakshatras) Out of 26 tree species associated with Nakshatras 16 can be grown in the agro climatic zone of Jammu Forest Division which are indicated in the Table 13.2

Table: 13.2 List of Trees and Lords Associated with Nakshatras.

S.No	Constellation	Associated Tree	English Name / Common Name	Loard	Occurance in Area

1	Ashwani	Strychnos nuxvomica	Poison nut	Ketu	Not Found
2	Bharni	Emblica officinalis	Indian geoseberry, Amla	Venus	Found
3	Kruttika	Ficus racemosa	Cluster fig, gufar	Sun	Found
4	Rohini	Syzigium cumini	Java Plum	Moon	Found
5	Mrigswina	Acacia Catechu	Cutch Trees, Khair	Mars	Found
6	Ardsa	Diospyros Melanoxy	Black Eboney, Tendu	Rahu	Not Found
7	Punarvasu	Bambusa arundinacca	Bamboo	Jupiter	Found
8	Pushya	Ficus religiosa	Sacred Fig, Peepal	Saturn	Found
9	Ashlesha	Calophyllum inophyllum	Alexandrain layral	Mercury	Not Found
10	Magha	Ficus bengalensis	Banyan tree, Bargod	Ketu	Found
11	Poorva Phalguni	Butea Monosperma	Parrot tree, Palash	Venus	Found
12	Uttara Phalguni	Ficus arnottiana	Paras pipal	Sun	Not Found
13	Hasta	Jasminum gradiflora	Jaai	Moon	Found
14	Chitra	Aegle marmelos	Golden apple, Bael	Mars	Found
15	Swati	Terminalia arjuna	Arjun Myrobalan	Rahu	Found
16	Vishakha	Mesua ferrea	Iron wood, tree, Nagkesar	Jupiter	Not Found
17	Anuradha	Mesua ferrea	Iron wood, Nagkesar	Saturn	Not Found
18	Jyeshtha	Bombax ceiba	Red silk cotton tree, semal	Mercury	Found
19	Moola	Boswellia serrata	Indian olibanum salai	Ketu	Not Found
20	Poorva Shada	Calamus spp.	Rattan Cane	Venus	Not Found
21	Uttara Shada	Artocarpus heterophyllus	Jack fruit Dheu	Sun	Not Found
22	Shravan	Calotropis gigantea	Crown flower	Moon	Found
23	Dhanishtha	Prosopis cineraria	Indian mesquite khejri	Mars	Not Found
24	Shatbhisha	Anthocephalus kadamba	Common bur flower, Kadam	Rahu	Found
25	Poorva Bhadrapad	Mangifera indica	Mango tree	Jupiter	Found
26	Uttara Bhadrapad	Azadirachta indica	Margossa tree, Neem	Saturn	Found
27	Revati	Madhuca	Butter tree,	Mercury	Not Found

		latifolia	Mahua		

This garden can be developed on the anology of several nakshatra van developed around temples in south India.

13.5 Creation of Smriti Van/Eco-Park

As a large no of people visit Purmandal to perform the last rites of their near and dear ones. Forest Department can earmark an area where these people can plant sapling in the memory of the departed souls. An area in comptt. 16/D of Bahu Range adjoining Purmandal near village kund is identified for the purpose. This area should be properly fenced reinforced with angle iron / mesh wire at vulnerable points and developed in the memory of the departed soul. The mechanism for maintenance of such area can be developed at the Divisional level by creating a scheme of plant adoption by the relatives of the departed souls.

13.6 Eco-Tourism circuit

In Co 19/D near village Taleth by constructing a check Dam, an artificial lake 70 meters long and 30 meters wide can be created with viewpoints around it. Near this point, there is reappearance of river Devak and there are old cave structures which are said to be about 200 years old. A tourist circuit of Purmandal – Uttarvahni-Surinsar – Mansar can be popularised and local youth with some training can serve as guides.

13.7 Creating Public Awareness

The programmes of Forest department shall be publicised by print and electronic media and through permanent sign boards at various places in and around Purmandal. Sign boards shall also depict do's and don'ts in the holy area of Purmandal.

13.8 Establishment of Eco-Restoration Committee

Such committees shall be framed involving officials of Forest department, temple management and prominent locals. This committee shall involve the chairman of temple management as presiding officer, Block officer of Purmandal as member secy, and local sarpanch, Panches and prominent locals as members. The committee shall work for addressing the following concerns:

13.9 Problems

1. Large scale import of non Bio- degradable products.
2. Lack of proper mechanism for waste disposal.
3. Lack of sufficient civic amenities.
4. Dependence on adjoining forest for fuel wood.

13.10 Suggested Corrective Measures

1. A ban an import of non Bio -degradable items in the area.
2. A proper mechanism for waste collection and disposal.
3. Creation of a firewood and Timber depot in the area.
4. Creation of proper areas for performing last rituals and bathing etc.

CHAPTER – XIV

FOREST PROTECTION

(OVERLAPPING)

WORKING CIRCLE

CHAPTER-XIV

Forest Protection (Overlapping) Working Circle

14.1 Introduction

The area of Jammu Forest Division lies in the vicinity of Jammu city, with headquarter at Jammu city, the winter capital of Jammu and Kashmir State. Due to increase in population both permanent and floating in and around Jammu city, the Jammu Forest division faces lot of pressure, therefore protection of forests is the most critical activity of this Division.

The increase in population of local and nomadic cattle, mushrooming of Saw Mills, furniture / Joinery units and increase in price of lands has put tremendous pressure on the forests of Jammu Forest Division, due to these reasons, the forest protection in Kandi areas is of immense importance.

14.2 Agencies Responsible for Forest Damage

The major factors responsible for Forest damage in Jammu Forest Division are:

1. Grazing and Browsing.
2. Encroachments.
3. Illicit damage and smuggling of forest produce.
4. Forest Fires.
5. Pests and Diseases.

14.2.1 Grazing and Browsing

The problem of grazing and browsing has been discussed in detail under Grazing Working Circle.

The Grazing is the major reason for forest degradation and is a formidable challenge to the entire ecosystem. It has grown into a socio-economic problem with ramifications. Apart from usual damages due to overgrazing the following problems are cropping up.

a) Encroachment of forest area by Nomadic graziers who have established semi-permanent to permanent structures in forest area.

b) The local land lords also feel encouraged to encroach forest land.

c) The heavy lopping of forest trees and overgrazing of grasses is inhibiting seed formation and thereby natural regeneration is hampered.

d) Repeated grazing of same area year after year depletes vegetative cover and causes denudation of forest area which results in soil erosion.

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 Jammu and Kashmir forest Act provides sufficient powers to the D F O and the staff to prevent these offences. The legal provisions should be implemented sincerely.

14.2.2 Encroachment :

Among all forest offences, encroachment is the most serious one, as in this case the forest land is permanently lost. Jammu Forest Division has a serious problem of encroachment in Bahu and Jammu Ranges because of their proximity to Jammu being the capital city. The land mafia, in connivance with corrupt officials, often try to encroach the forest land. A lot of court cases and recurring issues regarding title of land are coming up day to day . The situation is at alarming stage due to organised working of land mafia. The situation has become worst due to conflicting demarcation and revenue record.

The following are the reasons for encroachment problem in Jammu Forest Division:

a) Poor status of boundary pillars and Demarcation line.

b) Incomplete Demarcation records.

c) Discrepancies in revenue and forest records. Mutation of Forest land not done in Revenue Records.

d) Negligence on part of Forest staff and Revenue staff.

e) Rising land prices around Jammu city.

The Jammu & Kashmir Forest Act provides adequate legal powers to D.F.O to control encroachments. The J&K Public premises (Eviction of Unauthorised Occupants) Act. 1959 provides for summary eviction of encroachers by D.F.O. The notification SRO-403 of 1962 appoints D.F.O as an Estate Officer for exercising this power.

14.2.2.1 Status of Boundary pillars and Demarcation line in Jammu Forest Division:

The demarcation of the division took place during 1970's. However the boundary pillars in most of the areas have been conveniently removed by the people in order to encroach upon the forest land. The situation has become very alarming especially in Bahu Range where the incidents of encroachment are very high so much so that some of the compartments have been completely encroached.

The demarcation details of the last demarcation conducted in various Ranges of the Division during 1970's as compiled from Form-I, Demarcation Register of the Division are given below in Table 14.1. However these details are not reliable as in few cases the entries in the register are not complete.

Table 14.1: Details of last demarcation of different Ranges of Jammu Forest Division.

MAINLINE

AREA

Range	Year of Demarcation	Nos of BPs	Acre	Kanal	Marla
Kalidhar	1974	1708	36808	-	14
Jammu	1975	1548	22826	4	6
Bahu	1974	3205	29351	5	15
Jindrah	1973	1233	24673	2	9

In that demarcation record some very sensitive locations like Sidhra, Ragoora, Raika areas, the maps are not available which is posing great problems while going for Nishandehi in the disputed areas.

a) Forest land already encroached upon or prone to encroachment in all vulnerable areas around Jammu city such as *Bhatindi, Sunjwan, Raika,Dwara, Ragoora, Chowadhi, Birpur,. Chata, Bajalta, Janipur, Paloura, Roop Nagar, Rati Sarari,. Dugian*.

Table No. 14.2 Vulnerable forest areas of Bahu Range of various Khasras Viz :

S.No.	Name of Village/Morahs	Khasra No.
1	Sunjwan, Bahu Range	349,356,371,1467,1468,1469, 1454-55 & 1456
2	Chatta, Bahu Range	1470
3	Dungian, Bahu Range	103,104,109 & 125
4	Bahu	37/15
5	Dwara, Bahu Range	1/Min,2,3,4,40,56,57/39

Source: Jammu Forest Division

14.2.2.2 Modus operandi of encroachers:

The encroachers normally start construction work during night hours and on holidays. Whenever the Forest field staff reach the spot to stop the work, they present revenue papers and demand for Nishandehi, which is a tedious process and takes time to complete.

In some cases they ask poor nomads to construct Khullas later on the Khullas are converted into Pacca houses. In some cases temporary structures are made at different locations in the large chunk of forest land and after a few years, they are made as permanent structures. This kind of honey combing in forest land will eventually result in loss of forest area.

In few cases the land mafia with full man power erect the structure overnight and manage to get stay orders or restraining order from the Courts.

14.2.2.3 Action plan needed :

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

The forest areas nearer to the city, which are highly vulnerable to encroachments with missing Demarcation files and boundary pillars are to be taken on priority for the reconstruction of boundary pillars and the demarcation files on war footing. For the said purposes a specialised team of Officers comprising of Divisional Forest Officer Demarcation-I, Revenue Officers of the rank of Assistant Commissioner Revenue need to be constituted and the Boundary pillars of new design are to be placed on grounds as early as possible.

1. In most vulnerable areas toe wall fencing/ chain link fencing needs to be erected.

2. In many places in this division, the Boundary pillars that have been displaced or removed need to be re-fixed as per new design of boundry pillars alongwith their Geo-coordinates which are to be mentioned in *Tashree- Burjiaat* or Description of boundary pillars.

3. There is an imminent need to book the prominent habitual land mafia for encroaching forest land under Public Safety Act. This step will serve as deterrent against the further encroachments.

4. The records of Revenue Department and Forest Department should be brought in agreement.

5. The Nomadic graziers should not be allowed to construct semi permanent/permanent structures in compartments allotted for grazing. If anybody make any attempt to do this, his allotment be cancelled forever in whole of the Division.

6. A dedicated cell of territorial as well as forest Protection Force staff be constituted in each Range which will work under close supervision of Range Officer to thwart any attempt of encroachment without any delay and report be sent to higher officials immediately.

7. Regular day and night patrolling is to be done to curb the problem of encroachment, because encroachment of forest land takes place mostly in odd hours.

14.2.3 Illicit damage and smuggling:

The Jammu Forest Division has important species like khair, chir, shisham, bamboo, semal, mango and many other broad leaved species. The Illicit damage takes place in most of the cases for bonafide use by local people. But with the mushrooming of saw mills and furniture making units, the illicit damage has increased over the years for commercial reasons. The major illicit damage is occurring in forest because of demand by saw mills and furniture units and demand for firewood.

To prevent the illicit damage the following measures are suggested.

a. Intensive patrolling of the area.

b. Whenever cases are registered they should be pursued vigourously to a logical conclusion in the court.

c. Periodic checking of saw mills and other wood based industries.

d. Creation of mobile check posts along (Khads) points, during the main smuggling season temporary huts may be constructed at these khads with 2-4 guards on duty.

e. The important compartments with good khair and shisham crop to be listed. These compartments should be provided special protection and checked at least once in a month by R.O/Foresters and report should be submitted to the D.F.O.

f. The combing of forest compartments by specially formed squads of territorial and FPF staff is to be done periodically.

Strengthening of Existing Check Posts:

1. **Narwal Check Post**: This check post is located on byepass road Narwal in Bahu Block of Bahu Range. This Check post plays an important role in checking smuggling of timber, firewood, resin etc. It is a vital Check post as regard of encroachment is concerned in Bahu Range but it is in pathetic condition as for as infrastructure and manpower is concerned. Tented accommodation should be replaced by pacca/Tin structure for effective checking round the clock.

2. **Khara-Madana Check Post:** This Check Post is situated at Ratnuchak-Purmandal road at Khara in Devak Block of Bahu Range. This Check post plays a vital role in checking smuggling of firewood, resin and other MFP. This is an alternate route to Bari-Brahamna Industrial Estate and Surinsar-Mansar via Kanna Chargal. Building is in deplorable condition and needs immediate repair for better accommodation of staff.

3. **Agore Check Post**: This Check Post is situated on Bantalab-Agore-Akhnoor road at Agore Chowk. This Check post also plays an important role in checking smuggling of firewood and other minor forest produce e.g Harar etc. comes from Mathwar area. This Check Post needs immediate repair as regards accommodation is concerned.

4. **Akhnoor (new) Check Post**: This Check post is situated on Akhnoor- Poonch road at new Akhnoor Bridge. It is a vital Check Post as regard checking smuggling of timber, resin, firewood and other MFP. This Check Post is working in rented accommodation by which it is very difficult for the staff to manage the check post round the clock checking, so it is proposed that a pacca/ Tin structure be constructed at the place for effective checking of forest produce.

5. **Manwal Check Post** : This check post is situated on Dhar road at Manwal falls in Puni Block of Jindrah Range. It is a vital check post as regard, checking smuggling of timber, willow clefts, resin and other minor forest produce. This check post has only one room old tin accommodation on private land which needs immediate shifting from this place for effective checking of vehicle comes from Samba via Mansar road, Udhampur- Biliawer via Dhar road. Now new building has been constructed at Kattal Battal about three kilometre from old Check post for effective checking of vehicle, moves through above mentioned roads.

6. **Establishment of New Check Post**: The Devak Block of Bahu Range has only one Check post at Khara near Purmandal but new roads have been constructed which connects Samba via Utter vehini-Sumb and has become the alternate route for smuggling of forest produce. So it has become necessary to establish a check post at

place Nagrota Kamila adjoining Co.no. 17/Devak to check smuggling if any through Nagrota kamila – Vijaypur- Bari-Brahmana route.

7. The good will of people has to be earned not merely by publicity but also be earned by easy and quick supply of forest produce in form of rights and concessions and meeting their genuine demands. Concentrated efforts both by Department as well as forest fringe people have to made to remove the misconception of the villagers who think of forests to be an inexhaustible public resource. By constant publicity they need to be explained that the illicit felling and encroachment would decrease the forest land as well as forest cover gradually which will have adverse effect on environment and their socio-economic conditions.

14.2.4 Forest Fire:

Fire is a major factor that causes considerable damage to the forests of this division. The fires both accidental and intentional are very common in this tract due to the reason that majority of forests are easily approachable by roads/Paths and State Highways and other roads. Also most of the forests lie in dry/hot areas. As most of the forests are either chir or scrub forests, fire incidences are common.

Fire has an adverse effect on soil, water and ecological balance of area. Soil becomes vulnerable to erosion and its structure gets affected, thereby retarding plant growth. The soil building flora are destroyed and the area is ultimately rendered susceptible to erosion and decreasing productivity. The young regeneration is wiped out, growth of surviving vegetation is adversely affected, the yield of forest produce is immensely reduced and the vegetation damaged by fire becomes vulnerable to insect and fungal attack. In the fire burnt forests composition of crop changes, resulting in mixed crop in the forests. The Chir forests in this division are highly susceptible and are subject to frequent fires in the months of April to June. Because of all these reasons prevention and control of forest fire assumes great importance in Jammu Forest Division and there is an urgent need to take effective steps to counter the menace of forest fires, with the aim of:-

a) Protecting forests from damaging fires by taking up all preventive measures like administrative, technical, social, legal etc.

b) Preparing adequately and taking appropriate action for controlling, suppressing and extinguishing forest fires, in order to minimize the loss caused by them;

c) Educating local people about fire damage and eliciting their cooperation in preventing, controlling and extinguishing fires.

14.2.4.1 Major causes of Forest Fires in Jammu Forest Division:

The main causes attributable for the out break of fires are various and can be summarised as under:

14.2.4.2 Natural:

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

14.2.4.3 Accidental:

Such fires are more common and are caused due to:

a. Charcoal burning and control burning the forests.

b. Gross carelessness of the passersby, smokers, graziers, hikers, campers, hunters, wood collectors, honey collectors, labourers working in the forests etc.

c. Burning of refuse in the cultivated fields by the people without suitable precautions or supervision.

14.2.4.3 Intentional:

i) People set fire to forest under the false belief, that the resultant grass growth will be better and more abundant.

ii) Fires are started for scaring away wild animals for poaching.

iii) Fires are caused to destroy the evidence of crimes committed or damage caused to forest property.

14.2.4.4 Factors Contributing to Fire Damage:

Fire is the product of fire environment, which has mainly following components:

(i) High temperature
(ii) Low humidity
iii) Inflammable material

(i) High Temperature:

With the increase in temperature during summer season, the possibility of fire increases. In this area about 40^0c is considered the critical temperature, above which the cases of fires keep on increasing with increasing temperature. The detection of fire danger day can be assessed with the help of thermometer.

(ii) Low humidity:

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

(iii) Inflammable material:

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

14.2.4.5 Fire Season:

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

Fire Protection strategies:

14.2.4.6 Special Fire risk zones:

Delineation of fire risk zones i,e compartments vulnerable to fire should be done ,so that it could be managed beforehand.

14.2.4.7 Management for Fire Protection:

The following steps will prove effective in fire management.

(a) Fire prevention measures.

(b) Timely detection of forest fires and information to concerned staff.

(c) Process of fire control and fire fighting.

(d) Penal provisions and a system of rewards

i) Fire prevention measures:

"Prevention is better than cure", and this holds good in case of forest fires too. Prevention of fire is more beneficial and cost effective than fighting the fire. For this, effective steps should be taken well in time, such as summarised below:

ii) Earning good will of local people: -

The forests cannot be protected against fire without winning the good will and co-operation of the local people. This can be done by making regular contact with local villagers and meeting the reasonable bonafide demands of right holders, well in time. Also, the closures made should be affected for the minimum required period.

iii) Education and publicity:

Wide publicity especially in villages nearby forests should be given against the damages caused by forest fires. For this, timely action should be taken for distribution of pamphlets and other educative material during the fire season, well in advance, so as to acquaint the villagers/local people through Panchayats. The staff should hold regular meetings with local villagers in their areas to create awareness. Also, hoardings, notice boards and banners should be displayed at prominent points to make aware the tourists and local public regarding the damage caused by fires

vi) Removal of pine needles:

Local villagers should be allowed and encouraged to collect and remove the pine needles, before hand, for domestic purposes and use as packing material for fruits and vegetables, fire brickets and other alternate uses. The strategy to collect, bundle/baling, and transport pine needle from forest areas be chalked out in participation with VFDC,s / JFMC,s / local people of the area and collaborating with Industry which use pine needle as raw material. This will reduce the fire hazard to a great extent.

vii) Cleaning and thinning in regeneration areas:

All regeneration areas, should be isolated by cleaning a strip of 3 metre width all around from the inflammable material like leaves, bushes etc. Early cleanings and thinning in young regeneration should be done, to give a spacing of 1 metre.

The pruning of trees, which have attained a height of 1.5 metres, should be done upto $^{1}/_{3}^{rd}$ of their height and debris should be collected at suitable Nalla/place and control burnt.

viii) Fire protection staff:

Divisional Forest Officer will engage sufficient number of firewatchers in consultation with the Conservator of forests, during the fire season. Fire watchers (preferably the local villagers), will patrol the areas extensively for detection and protection against fires and will ensure all preventive measures with the local forest field staff. During fire season, fire fighting squad be formed out of the daily waged who have been regularised. This squad should always be ready at every Range/Block H.Q. and as soon as any intimation of fire occurrence is received, they be rushed on "Fire Pick up Van", to that spot.

x) Fire Protection Equipments:

The field staff (near the fire prone forests) should be provided with sufficient fire fighting equipments, such as brooms, shovels, slashers, axes, hatches, forks, buckets, gunny bags etc, so as to meet any emergency and for facilitating the speedy extinguishing of fire. Field staff should be imparted training for effectively controlling forest fires.

xi) Fire Lines:

The existing fire lines be properly maintained and kept clear of all bushes, needles etc. to avoid any chance of fire. This Division has a very good network of State Highways, link roads, bridle/inspection paths passing along or through the majority of forests. Hence, no new fire lines are proposed. It is laid down that all such roads/paths should be kept clear of all inflammable material especially during the fire season, so as to act as fire lines. .

xii) Construction of watch towers:

A net work of watch towers, at suitable commanding locations, should be developed. These should be permanently manned by fire watchers/Forest Workers during the fire season. The fire watcher will immediately come to know and report to the beat guard, any outbreak of fire that may occur. The beat guard will take further necessary action for fire fighting. Fire watch towers, may be constructed wherever considered necessary. However following fire watch towers are proposed to be constructed in Jammu forest division at highest points of each Range as given in the Table. 14.3

Table 14.3: List of proposed fire watch towers

Sr. No.	Range	Place	Compartments
1	Jammu	Bamyal	Co.2/N
2	Jindrah	Chontramata	Co.1/P
3	Kalidar	Malla Top	Co. 44/K
4	Bahu	Near Dheon	Co. 21/Bahu

xiii) Control Burning:

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

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

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

(2) Burning should progress from uphill to downhill in calm weather and special care should be taken, to keep the line of fire as straight as possible and under control.

(3) The fire should start along the ridge, a cleared path or especially cleared lines.

(4) Chir needles and other inflammable material should be fully raked to ensure through burning.

(5) In forests under resin tapping, it must be ensured that all chips, fallen resin, needles, etc. are cleared about 1.5 m away from the base of the trees by the resin labourers.

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

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

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

(9) Sufficient number of trained fire watchers should be employed during the fire season to help the field staff and provided with necessary equipments. No felling operations, even to the right holders, should be allowed during the fire season.

It is, however, to be noted that areas under regeneration should not be control burnt, until the regeneration reaches a height of about 2.5 m. In such areas, however, the grass cutting/needle collection by right holders is encouraged.

The control burning will also form a part of control forms and deviation reflected therein should be explained very clearly giving valid reasons.

In order to protect the forests, against fire risk, burning, and to maintain the sanitation of the forests, the following guidelines/steps are laid down:

(1) The inflammable/fire hazard material, from the forests should be collected and disposed off during the winters.

(2) The job should be got done preferably, through the regular forest workers of concerned ranges.

(3) Collection of humus and other inflammable material should begun by raking from top of the forest and working downhill.

(4) Stack in moderate heaps in open places or suitable Nallas.

(5) Burn the heaps downhill so that the smoke does not interfere with men working below and reduces the risk of fire.

(6) Burn the heaps in rotation to reduce the heat.

(7) Burning operation should be carried out under the supervision of forest guard concerned.

(8) Steps should be taken to make it mandatory for right holders and Forest Corporation, to collect the felling refuse after felling trees into heaps or its removal from the forest should be specified.

xiv) Fire Fighting:

When a fire is observed, Forest Guard or the fire watcher should at once inform the Block Officer and the Range Forest Officer. He should also inform the Sarpanch of the local Panchayat immediately, as well as, the staff of the Government Offices or institutions situated in the vicinity and seek their help in the fire fighting operations. In case of alarming situations, immediate help of various organisations like FPF, Army Cantonment Head Quarters, Fire Brigade, N.C.C., N.S.S., situated near the vicinity of each range can be availed. District Administration may be requested for immediate help, as and when, required. Beating with a broom of green bushes normally controls the fire.

The Senior Officer present will immediately, take command of the operations. He should know the local geography and have some idea of labour force. The labour force should be organized in sections of suitable strength each under the order of one man and given definite task. A couple of men should be kept in waiting to take messages and instructions to the various sections. In case the fire goes beyond control, it is necessary to localize it by counter firing. Counter firing should only be done under order of a senior officer in charge of operations and attempted from a defined line such as road or ridge or fire line. A line is formed along the ridge by clearing the forest floor and cutting bushes and from this fire is started, so as to consume the fuel in advance of the oncoming fire. Wind direction and gradient should always be kept in mind, while counter firing. Roads/Paths are useful, provided, enough manpower is present. After the fire has been brought under control, the smouldering stumps should be extinguished by putting the dug earth on them and strict vigilance be kept till all dangers of fire spreading are taken care of. Arrangement for the transport of food, water and adequate fire fighting tools are essential. The rolls of right holders, who helped to fight the fire, should be kept in record, so that the rights of defaulting right holders can be suspended.

xv) Shifting of compartments of Kalidhar Range to Nowshera Forest Division :

A small portion on North-west corner of Co.45 of Choura Block of Kalidhar range above Malla-Prore road near Village Budhi Dhak which drains towards Sunderbani Range of Nowshera Forest Division can be shifted to it for effective administration and fire protection point of view.

14.2.5. Pests and Diseases :

The pests and diseases form an important part of biotic factors affecting forest tree species. They cause damage to forest trees and also to the seedlings in nursery.

Usually forest managers ignore the pests and disease. But the recent epidemics of Sal borer in Madhya Pradesh and Deodar defoliator in Himachal Pradesh are stern warnings to forest managers. It is very important to monitor forest pests and diseases in each division.

In nurseries and plantations the insect pests causes serious damage and is a common occurrence every season. The negligence leads to loss of precious resources and time.

Keeping these points in view some important insect pests and disease of prominent tree species of Jammu Forest Division are given in the Table 14.4.

Table No. 14.4 : Insect Pests of Jammu Forest Division

S.No	Name of the pest	Control measures
1	Cut worms (Lepidoptera, Agrotis, Euoxa etc.	Mix with nursery soil Aldrin 1 % dust BHE 10 % dust or heptachior 1 % dustat the time of preparation of soil mixture.
2	Chafers (Coleoptera, Beeties)	5 % Aldrin dust @ 32 g per Sq Km 10 % BHE dust @ 32 g per Sq m 5 % Heptachlor dust 32 g per Sq m mixed with nursery soil at the time of bed preparation gives full control.
3	Crickets and grass hoppers (Ortho ptera)	Spray 0.5% Malathion on seedlings.
4	Termites (Isoptera)	Incorporate Dieldrin aldrin or BHC in potting soil or nursery at the rate of 300g of 1 % dust per cubic meter of the soil.
5	Defoliating beetles and caterpillars	Spray 0.02-0.1 % of endosulfan or 1-0 .25 % Fernitrothion on foliage of seedling

Pests of trees in Forest / Plantations

S.No	Name of the pest	Control measures
1	Chirpine defoliator (Lebeda nobilis)	Aerial spray of fenitrothion @ 1 Liter per ha.
2	Termites (on sissoo, khair, siris, phulai etc	Spray seedling, young plants with 0.10.2% Aldrin or BHC in water or incorporate 300 g of 1 % dust per cum soil at the time of planting.
3	Chafers	Dipping roots of seedlings in 1 % Aldrin before planting
4	Poplar defoliators (Pygaera species)	0.1 % Carbaryl or Fenitrothien or 0.04 % enclosulton in water should be sprayed on leaves.
5	Sissoo defoliater (Plectoptera reflexa)	0.1 % Carbaryl of 0.1 % Fenitrothion spray on foliage.
6	Semal shoot borer (Tonica niviferana)	Young plants should be sprayed with systematic insecticides like Rogor or Bidrin.
7	Poplar shoot borer (Eucosma glaciate)	Folior spray of Malathion 0.06 % and parathion 0.02 % (once in may ï June and again in August ï September)
8	Babul stem borer (on khair, babul etc.)	Removal of infected plants. Dust 10 % B.H.C or 4 % Carbaryl
9	Bark eating caterpillar (Inderbella sp. on khair, sissoo, siris etc.)	In young plantations remove ribbon like case mass from stems and branches. Insert cotton swabs soaked in petrol or carbon disulphide.
10	Poplar stem borer (Apriona cineraria)	Pruning of infested branches of old trees & fumigation.

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 chemical control should be restored to, but the cultural measures can be practiced on regular basis.

Diseases:

Some important disease occurring in prominent tree species of Jammu Forest Division are listed as in the Table. 14.5.

Table 14.5: Pest/ Diseases of some important species of Jammu Forest Division.

S.No	Name of the pest	Control measures
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	*Puccinea gracilenta*
7	Khair leaf rust	*Ravenelia Tandon*
8	Sissoo leaf rust	*Marevalia achrox.*

14.2.5.1 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 be adopted.

Apart from the above general guide lines the following control measures for most important diseases are prescribed.

1. Root rot of khair*: Ganoderma leucidum* causes serious mortality due to root rot in reforested stands. The plants are susceptible at all ages. The yellowing of foliage and gradual drying are symptoms shown by affected plants.

a. Old stumps and debris should be removed from the plantation site.

b. In young plantations, isolation trenches should be dug if disease incidence is serious.

c. Resistant species like Semal (*Bambax ceiba*) should be mixed with Khair crop in plantations.

2. **Vascular wilt of Sissoo:** The disease is caused by *Fusarium solani* and is already, serious in Jammu Forest Division belt.

Control Measures : The Sissoo plantation should be avoided in poorly drained clay soil.

CHAPTER – XV

WOOD BASED INDUSTRIES

CHAPTER- XV

Wood Based Industries

15.1 Introduction

Jammu forest division has a vast area of 699.29sq km and within its jurisdiction fall five tehsils with a total population of 13.57 Lacs (as per census of 2001). In all these areas many wood based economic activities are found which have direct or indirect bearing on forests. The number of industries found in the jurisdiction of Jammu Forest Division is given in the Table 15.1

Table 15.1: Wood Based industries falls in the Jurisdiction of Jammu Forest Division.

S.No	INDUSTRY		NUMBER
1.	RESIN BASED		4
2.	KATHA		4
3.	SAW MILLS	Jammu Forest Division	47
		Urban Forestry Division	137
4.	FURNITURE/JOINERY UNITS		542
5.	PLYWOOD AND BOARD		4

Source: Jammu Forest Division, Urban Forestry Division, District Industry Centre, Jammu

Since there is substantial industrial activity in the jurisdiction of Jammu Forest Division and these units are directly or indirectly dependent on wood either from private or govt sources, the management plan for Jammu Forest Division requires this aspect to be properly dealt with.

15.2 Broad Objectives

1. Conservation of adjoining forests and environment.
2. Sustainable supply of raw material to the forest based industries.
3. Promotion of alternatives to the timber based products

15.3 Study of Forest Based Industries

In order to have an idea about the various aspects of production process and the financial turn over , a random study of 31 saw mill/ furniture units, 3 willow cleft factories, 2 resin and turpentine units, 1 katha factory, 2 plywood and board factories was conducted by using questionnaire which were filled up through personal interviews and discussion with the owners/managers/workers of these units. The following information was collected:

- Source of wood
- Species used
- Products prepared
- Financial turn over

15.4 Results and Discussion (saw mills/furniture/joinery units)

Raw material

From the survey so conducted it was found that shisham, deodar, kail, safeda were the most used species. In the urban areas there is an increased trend in use of species imported from outside state, the reliance on species found in local forests and adjoining area has decreased. The imported species most frequently used in saw/joinery mills were found to be sal, teak, some imported pine species. The increasing use of composite wood was observed in furniture units. While in the rural areas the reliance was still noticed on the locally available species.The following table shows the species wise extent of use in general.

Table 15.2: Species commonly used by Furniture Units/ Saw Mills

S.No	Saw mills/Furniture units	
	Species	% users
1.	Shisham	77.41
2.	Safeda	64.51
3.	Jamun	58.06
4.	Deodar	51.61
5.	Kail	48.38
6.	Mango	48.38
7	Siris	45.16
8.	Kiker	41.93
9.	Sal	35.48
10.	Fir	22.58
11.	Chir	22.58
12.	Teak	16.12
13.	Phulai	6.45

15.5 Source of Raw Material

Table 15.3 gives an idea about the source of raw material used in furniture industries.

Table No.15.3 : Source of raw material

S.No.	Source of raw material	% units dependent
1.	Only local private source	38.70
2.	Only by Govt. Agencies	12.90
3.	private , govt sources	12.90
4.	Import besides other sources	22.58

15.6 Products prepared

The common items prepared by the furniture units/saw mills are

1. House hold furniture
2. Window/door frames
3. Doors/flush doors/window shutters
4. Planks/mouldings/battens

Table 15.4: Species commonly used by plywood industry

S.No.	Species used	% users
1.	Poplar	100
2.	Semal	50
3.	Teak	-

Table 15.5: Source of raw material used by plywood industries

S.No.	Source of raw material	%units dependent
1.	Farmer/saw mills	100
2.	Govt. agencies	--
3.	import	50

15.7 Resin and Turpentine Factories

While the resin and allied products industry is a significant forest product based activity in the jurisdiction of Jammu Forest Division, there is no pressure on the forests for raw material as no resin extraction in Jammu Forest Division was prescribed during last plan .In this plan too no resin extraction is proposed from the forests of Jammu Division. But as the output bears a relation with the raw material, there is need to keep a vigil on the output produced and exported from each of the factory.

Table 15.6 : Resin Factories

No. of resin/derivatives factories	Average Production capacity/year	Present status	Source of raw material
4	910 m t	Functioning	Local Forests , import

Table.15.7: Katha Factories

No. of katha factories	Avg. Production capacity/year	Present status
4	66 mt	Not functioning

Due to ban on felling of khair trees during the last 17 years since 1996 by the order of Hon,ble Supreme court vide No. 171 of Dt.10-05-1996, the katha factories are not functioning in the State. The lifting of ban on fellings in private lands is under consideration before the Hon'ble Supreame Court. The management plan in this regards has been prepared by HFRI-Shimla in collaboration with J&K Forest Deptt.

15.8 Strategies

1. Promotion of Agroforestry on private farm lands, village common lands, along roads and canals etc.

2. Promoting import of raw material to feed these industries.

3. Promoting timber substitutes and composite wood in Government constructions and popularized amongst general public also.

CHAPTER – XVI

PARTICIPATORY FOREST MANAGEMENT

CHAPTER-XVI

Participatory Forest Management

(A Tool for Sustainable Management of Forests)

16.1 Background

Joint Forest management has emerged as a new approach of participatory sustainable use and conservation of forests. The earlier policies of 1894 and 1952 were more towards meeting the goal of timber and industrial production from the forests. People's needs were not given much priority, because population was less and existing resources were sufficient to fulfill their bonafide needs. The conflict began with increase in population when forest department started applying checks on their increased demands. The 1988 policy put the people demand in front and advocated for management of forests near villages with involvement of people and they will have first charge on the forest products to meet their bonafide requirements. As a result G.O.I issued guidelines in June 1990 and till date 28 states have issued their own J.F.M resolutions. Forest policy of J&K state 2011 has also laid emphasis on:

i) Active involvement of every citizen in forestry activities in forest as well as in non-forest areas.

ii) Creating livelihood opportunities for forest dependent communities and their institutionalized involvement in the decision making process. Focus of the employment generation shall be on youth from local community and tribal communities.

iii) Keeping, provision for creating corpus as a mandatory component, and put adequate money in the same to cater watch and ward, fire protection and maintenance needs of the assets created, during and after the project period.

iv) Women folk from the local communities shall be involved in development of degraded forest fringe areas into highly productive tree strips incorporating appropriate proportion of fast growing tree and plant species. Cent percent share of produce will flow to the participatory community.

The involvement of local communities in rehabilitation and management of degraded forest areas is perceived to be vital for conservation of forest resources and now a days is a precondition imposed by funding agencies . The jammu and Kashmir Government through SRO 17 of 12-1-1999 has amended (RDF and village plantation) Rule, 1992. The amendment provides for constitution of village (Rehabilitation of Degraded Forests) committee for each village or group of villages for the purpose protection and management of degraded forests. In these rules the detailed organizational structure of village (RDF) committee, its functions , mode of working , agreement 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.

If successfully implemented, JFM will lead to environmental protection and sustainable development of the village as well as forest resources, which is the top most priority as per the J and K State Forest Policy – 2011.

16.2 Broad Objectives

- Protection and rehabilitation of degraded forest of the Division situated near the villages.
- To create additional income generating activities and employment opportunities.
- To increase the yield of products needed to meet people's requirements.
- To improve the socio-economic status of people living in forest fringe villages by way of planning and implementing development works and operationalizing F.D.A.
- To improve productivity of fringe forest so that local people can obtain goods and services on a sustained basis.

16.3 Socio-Economic Profile of Jammu Forest Division

The present study on socio-economic and socio-ecological aspects of Jammu Forest Division of Jammu province reveals that the forests plays an important role in the economy as well as ecological aspect of rural population. The people living adjacent to forests especially in Majalta tehisil of Udhampur (Jindrah Range), Chowkichoura area of Kalidar Range (Akhnoor Tehsil) and Shibba bamyal area of Jammu Range (Tehsil Jammu) are mostly dependent upon forests for their livelihood, fodder, fuelwood,, small timber for agricultural implements and employments. Most of the agriculture lands are rain fed, except tehsil R.S pura and Bishnah as revealed from the table 16.1

Table 16.1: Socio-economic survey of Rural villages falls in the Territorial jurisdiction of Jammu Forest Division(Tehsil wise)

Tehsil	No. of households	Total area of Rural villages (Ha.)	Cropped area(Ha.)	Irrigated area(Ha.)	Kerosine oil outlets	LPG outlets	Forest timber/Fire wood sale Depots
Jammu	75314	118229.08	87540.86	22390.80 (25%)	923 (1.2%)	2036 (20%)	5818 (7%)
Bishnah	18215	14860.08	12092.47	9993.35 (82%)	126 (0.69%)	257 (1.4%)	1738 (9%)
R.S.Pura	30303	114671.05	46175.95	44945.95 (97%)	410 (1.35%)	893 (2.94%)	3431 (11%)
Majalta	5158	17301.00	4503.00	187.00 (18%)	137 (2.65%)	310 (6%)	396 (7%)
Akhnoor	31081	120391.61	19703.02	6082.49 (31%)	906 (3%)	1962 (6.31%)	6846 (22%)

Source :- Census Book 2001

16.4 Effects of Socio-Economic Status on Forests

The socio economic status of forest fringe population is an indicator of dependence of local population on forest resources.

After analyzing the same it emerges that the socio-economic condition of R.S Pura tehsil is better than others as for as agriculture land is concerned, which is 97% irrigated followed by Bishnah which is 82% irrigated. Whereas Akhnoor and Jammu tehsils lands are mostly rain fed and falls in Kandi area.

People in Majalta tehsils have very less land holdings and are more dependent on forests than people in other tehsils for fuelwood ,fodder and small timber. Socio-economic status of people of Majalta tehsil can improved by providing employment by starting development works i,e plantation work, soil and moisture conservation works in **CAMPA** and other JFM schemes.

16.5 JFM In Jammu Forest Division

The Forest Development Agencies(FDA) will provide tremendous opportunity to the Department and the people to work together.

Keeping in view the present funds position of the department in FDA and geographical situation of the tract, the following suggestions are made regarding JFM.

1. If funds are available in a limited way it is recommended that RDF activities be planned in compact contiguous areas.
2. Further the subsequent plantation works should be taken up adjacent to the previous year's plantations so that monitoring and protection is effective.
3. The flow of usufructory benefits to the villagers is vital to win their co-operation. It is suggested that mature plantations be harvested in phases and benefits be shared as per the rules.
4. The species planted should be of fast growing, multipurpose trees which yield fodder, fuel wood and small timber. The shisham, bamboo, dhaman etc. are the potential species around which successful JFM can be built especially in the initial years. Bamboo can be harvested within 6-8 years. It is a multipurpose plant, dhaman is also a multipurpose tree and preferred by villagers for various purposes. Further the local species which supplement the raw material requirement of cottage industries be given preference e.g mango, jamun, sohanjana, aloe vera, dheu and mulbery etc.

16.5.1 Present Status of JFM in Jammu Forest Division:

The Social Forestry Division Jammu has been at the forefront of participatory forest management. The highly appreciable Social Forestry projects i,e Chinnota project in Tehsil Akhnoor and Nagrota project in Jammu Tehsil, which got Indira Gandhi Priyadarshani awards in rehabilitation of degraded areas by people's participation.

16.5.2 FDA In Jammu Forest Division :

27 JFMC,s were formed in Jammu Forest Division under National Afforestation Programme , out of which only 12 JFMC,s are functional for the last couple of years due to non availability of funds and other constraints. The activities undertaken in these JFMC,s are rehabilitation of degraded forests through Aided Natural Regeneration(ANR), Artificial Regeneration(AR), Sowing and Planting (SP), Entry Point Activities(EPA) and other soil & moisture conservation works. Detail of JFMC's formed under JFM scheme in Jammu Forest Division is as under in the table 16.2.

Table.16.2: VFC of Jammu Forest Division.

S.No.	Range	Name of VFC	Name of Revenue Village	Present Status of VFC
1	Jammu	Panjgrain	Panjgrain	Non-functional
2		Jagti	Jagti	Functional
3		Marh(co.7,8/N)	Marh	Functional
4		Shibba	Shibba	Non-functional
5		Keran	Keran	ñ
6		Kheri	Kheri	ñ
7		Chinore	Chinor	ñ
8	Bahu	Raika	Raika	ñ
9		Bagoona	Bagoona	ñ
10		Paddal	Paddal	ñ
11		Sumbli	Sumbli	ñ
12		Sunjwan	Sunjwan	ñ
13		Deon	Deon	Functional

14	Jindrah	Chani Mansar	Chani Mansar	Functional
15		Taraha	Taraha	Functional
16		Suketar	Suketar	Non-functional
17		Jindrah	Jindrah	ñ
18		Palli	Palli	Functional
19		Tajoor	Tajoor	Non-functional
20		Jansal	Jansal	Functional
21		Cheani	Cheani	Non-functional
22		Pathwar	Pathwar	Functional
23		Peoni	Peoni	Non-functional
24	Kalidar	Ghai Jagir	Ghai Jagir	Functional
25		Goddar Khalsa	Goddar Khalsa	Functional
26		Balli Nathal	Balli Nathal	Functional
27		Malla Pukherni	Malla Pukherni	Functional

Source :- Jammu Forest Division

During the field survey and inspection of JFM works in the Jurisdiction of Jammu Forest Division. It was observed that there is need to further convince and involve the local population. Special VFC should be formed in each Range of Jammu Forest Division for protection and development of local Medicinal Plants.

16.6 Future Strategies with JFM

i) Village Forest Committees are to be framed in these areas in which forest fringe people especially women folk who are stake holders should be involve at each level i,e planning, execution and monitoring level for better protection and development of forests. Care and share method is to be adopted for sharing of usufructs of forests e.g fodder, fuelwood, small timber and other NTFP can be shared between Forest Department and forest fringe people. A sort of revolving fund can be created by selling grasses, fuel wood and NTFP to locals or in the market by which socio-economic condition of the people can be uplifted.

ii) Development of an institutional mechanism to inform and educate people about increasing productivity and produce of their land holdings.

iii) Promotion of Agro forestry and village forests in all areas particularly in rural areas having less landholding.

iv) Imparting job oriented training in utilizing and in value addition of NTFP obtained from forests while implementing FDA works.

v) Promoting cultivation of, in demand NTFP species yielding higher economic returns on their farmlands in comparison to traditional but low yielding crops.

For fruitful results of above mentioned strategies following things to be adhered effectively:

i) To strengthen the JFMC,s / VFC's with good results.

ii) To lay more stress on the areas where it failed to show results.

iii) To understand the reasons of failure.

iv) To built up rapport with people.

v) To conduct motivational visits to the areas where JFMC,s have shown good results.

vi) To keep provision of funds under training and awareness.

vii) To take up the new potential areas as given:

a) **Kalidar Range:** Village Balli (Co.no.35/K) of Khour Block, village Sundla, Ghar majoor (Co.no. 40,41,42/K) of Choura Block.

b) **Jammu Range:** Village Tanda (Co. no. 3,4/N), Kattal battal (Co. no. 2/N) of Nagrota Block.

c) **Jindrah Range:** Village Suketar (Co.no.1,2/T) of Tunnel Block, Jhajjar kotli (Co.no. 1/J), village Kanyala (Co. no.5,6/J) of Jindrah Block.

It is just a proposal, rest it is left to the discretion of territorial DFO for the selection of area in consultation with local people.

viii) Care to be taken that only motivated people make it to executive body through democratic process.

CHAPTER – XVII

WILDLIFE MANAGEMENT

CHAPTER-XVII

Wildlife Management

17.1 Wildlife of Jammu Forests Division:

The present wildlife Department has its origin in the game Preservation Act, 1942. Functioning of the department is governed by Jammu and Kashmir wildlife (Protection) Act, 1978, largely modelled on the Central wildlife Protection Act, 1972. The wildlife wing existed as game preservation wing in the Forest Department of Jammu and Kashmir till 1979. A Directorate of Wildlife Protection came into existence, vide Government Order No: 132-FST of 1979 dated 13-08-1979. The Jammu and Kashmir Wildlife Protection Department as it exists now came into existence in the year 1982. The Jammu and Kashmir Wildlife (Protection) act 1978 was later on Amended in 2002.

17.1.1 This Division has three wildlife sanctuaries. The Division in the past had some good reserves popularly known as "Rakhs" which were exclusively maintained for the hunting pleasures of erstwhile rulers. Now these areas are under the controlled of wildlife protection department and management of these areas is vested upon this department. Earlier these sanctuaries were Ramnagar sanctuary in Ramnagar Block of Jammu Range, Nandini sanctuary in Nandini Block of Jammu Range and Mansar – Surinsar sanctuary in part of Mansar Block of Jindrah Range. Now the scientific management of these wildlife sanctuaries are exclusively done by Wildlife Protection Department of Jammu and Kashmir.

Three wildlife sanctuaries and one wetland falls in the jurisdiction of Jammu Forest Division. These are Ramnagar wildlife sanctuary, Nandini wildlife Sanctuary, Mansar-Surinsar wildlife Sanctuary and Gharana wetland.

17.2. Gharana Wetland Conservation Reserve:

The state of Jammu and Kashmir due to its diverse climatic conditions and altitudinal variation plays host to a rich variety of bird and animal life In Jammu region of the State a small village on Indo-Pak border, Gharana, is a heaven for migratory birds. Owing to rich avifaunal diversity a marshy area of about 0.75 Square Kilo meters' has been notified as Wetland conservation Reserve under the provisions of Jammu and Kashmir Wildlife Protection Act. This reserve is famous for migratory waterfowls.

17.2.1 Location:

The reserve is situated near R.S.Pura town at a distance of about 35 Kilo meters from Jammu City. The reserve is very close to Indo-Pakistan International border

17.2.2 Climate and Altitude:

The climate of the area is subtropical and the major source of precipitations is monsoon rains. The altitude of the area is about 350 m above mean sea level.

17.2.3 Vegetation:

The main vegetation of the marsh is Typha elephantina (common reed) water hyacinth and plantago spp. The area is infested with weeds. The Reserve area is surrounded with crop. Paddy and wheat are the main crops grown by the villagers.

17.2.4 Avifauna:

About fifteen to twenty thousand birds pass their winter at Gharana. Apart from migratory birds some resident species are also found in the area. Some bird species use the area as transit camp.

No serious attempt was made in the past to maintain an authentic record of the bird species found in the area. However, on the basis of observation made during last two seasons i.e 2002-2003 and 2003-2004 a record has been maintained of the birds observed in the area. The birds usually start arriving in the mid March. About sixty seven species of the birds have been recorded in and around the reserve area till mid March 2004.

17.2.5 Birds Recorded at Gharana:

The other bird species recorded at Gharana are listed below. This record is based on the birds recorded / sighted from December 2002 to mid March 2004.

a) Little Grebe
b) Great Cormorant
c) Grey Heron
d) Cattle Egret
e) Great Egret
f) Black-Crowned Night Heron
g) Black stork
h) Bar-Headed Goose
i) Ruddy Shelduck
j) Black-Shouldered kite
k) Pariah Kite
l) Grey francolin
m) White-Breasted Waterhen
n) Red-Wattled Lapwing
o) River Tern
p) Rock Pigeon
q) Laughing dove
r) Rose ringed Parakeet
s) Asian koel
t) Greater Coucal
u) Common Kingfisher
v) Pied kingfisher

17.3 Ramnagar Wildlife Sanctuary

Ramnagar wild life sanctuary declared in the year 1990 vide notification/SRO No. 136 dated 10-04-1990. The Sanctuary comprises of all three types of vegetation that are found in the Division i,e Chir, broadleaved, & Scrub. It is situated very close proximity to Jammu city. The sanctuary is just 2 kms from Jammu city. The Jammu –Srinagar National highway passes through the western portion of the sanctuary. It has altitudinal range from 419mtrs to 611mtrs above MSL. Ramnagar sanctuary is dominated by broadleaved species. The main fauna found in the sanctuary are Nilgai, Barking deer, wild boar, Rhesus monkey, Jackal and Jungle cat etc. apart from variety of snakes and other reptiles. The sanctuary also supports Indian mynah, Blue rock pigeon, peafowl, Red jungle fowl, Jungle Crow, Bee

eaters, Bulbuls ,Golden oriole and sunbirds etc. as avifauna. The general condition of the forest in this sanctuary is good. The area is covered with dense mixed scrub forest with *Acacia modesta* as the predominant species, *Acacia nilotica ,Acacia catechu, Aegle marmelos, Cassia fistula* include some other floral species of the area.

Table No. 17.1 Area statement of Ramnagar Wildlife Sanctuary

S. NO.	Range	Block	Comptt.	Area (in Ha.)
1	Jammu	Ramnagar	1	248
			2	221
			3	277
			Total	**746**

17.4 Nandini Wildlife Sanctuary

Nandini wildlife sanctuary declared as sanctuary in the year 1990 vide Government Notification i,e SRO No. 137 dated 10-04-1990. It is named after the village Nandini, is located 28 kms from Jammu and occupies the south western slopes of Nandini Ridge and the Jammu – Srinagar National highway divides the Sanctuary into two halves.The Nandini wildlife sanctuary contains chir forests forming top canopy along with broad leaved species in the understory. The main tree species in the sanctuary are *Acacia catechu, Mallotus philippensis, Aegle marmelos, Albizzia lebbeck and Zizyphus jujuba.* There are eight prominent mammal species in the area prominent viz, leopard, wild boar, barking deer, rhesus monkey, goral, jackal and porcupine etc. The sanctuary also supports avifauna like Indian mynah, blue rock pigeon, peafowl, redjungle fowl, black and grey partridge etc.

Table No. 17.2 Area statement of Nandini Wildlife Sanctuary

S. No.	Range	Block	Comptt.	Area (in Ha.)
1	Jammu	Nandini	1	167
			2	211
			3	242
			4	212
			5	485
			Total	**1317**

17.5 Mansar-Surinsar Wildlife Sanctuary

The Mansar – Surinsar wild life sanctuary came into existence in the year 1990 vide Government Notification No.i,e SRO 138 dated 10-04-1990. It is located between 32 41’ 29” to 32 49’ 28” North latitudes and 74 59’ 59” to 75 09’ 12” East longitude and is about 60 kms away from Jammu. It includes two famous Lakes of Jammu region. Mansar and

Surinsar lakes have significant ecological, social and religious importance. These lakes support rich bio-diversity and provide habitat to a large number of waterfowl, birds and other aquatic flora and fauna. It represents mixed scrub vegetation mixed with broad leaved species like *Acacia spp., Mallotus Philippensis, Dalbergia Sissoo, Ficus spp* etc. The main faunal species that are found in this sanctuary are goral, wildboar, barking deer, leopard etc. apart from the avifauna such as black partridge, red jungle fowl, peafowl, grey partridge, green pigeons, blue rock pigeon etc. Some migratory birds are also spotted here.

Table No. 17.3 Area statement of Mansar-Surinsar Wildlife Sanctuary

S. No.	Range	Block	Comptt.	Area (in Ha.)
1	Jindrah	Mansar	7	1075
			9	895
			11	365
			12	450
			13	600
			14	475
Total				**3860**

17.6 Bahu Conservation Reserve :

Bahu conservation reserve is also called as Bahu Game Reserve. It is situated on the left bank of River Tawi opposite Jammu city. The By-pass Jammu-Nagrota road passes through it. It is an old Rakh comprising Bahu, Pulpar, Raika, Raghuda & Bajalta villages. The area it habitat of wildlife species such as, wild boar, barking deer, porcupine, jackals etc. The birds such as red fowl, peacock, turtle dove are also found in this area. The vegetation of the area consists of broad leaved species such as phulai, khair, shisham, simbal, bamboo, kamila, kakoa, kambal, dhaman along with other local shrubs such as santha, branker & other local grasses.

Table No. 17.4 Area statement of Bahu Conservation Reserve

S. No.	Range	Block	Comptt.	Area
1	Bahu	Bahu	1	110
			2	195
			3	55
			4	90
			6	170
			7	118

			19	195
			20	112
			22	75
			23	87
			24	125
			63	264
			64a	180
			65	140
			66	153
			Total	**2069**

Source : Jammu Forest Division

17.7 Scientific Management of Wildlife Areas

To conserve preserve protect and improve upon the wildlife of the area by adopting advanced wildlife management techniques for ecological, recreational and educational purposes. Following are the management techniques to be followed for wildlife conservation out side the sanctuaries.

17.7.1 Habitat Management:

As these areas face tremendous biotic pressure as regard to grazing due to permanent and nomadic live stock population, grazing should be completely and effectively banned in these areas to avoid any interference due to biotic pressure. This can be done by developing forest fringe areas near villages by raising fuel wood/ fodder species and by relocating nomadic graziers to other areas.

17.7.2 Water:

This is the most important factor for sustenance of wildlife in an area. Adequate number of water holes should be provided throughout the area. These water holes should be uniformly and strategically located as they control the movements of wildlife species. These water holes should be desilted periodically and their contamination should be effectively checked.

17.7.3. Cover:

This is another important aspect of habitat management. Cover is used for hiding escape shelter, breeding and food. Obligate species that are very choosy about the habitat should be thought of.

a. Adequate number of snags, uniformly spread all over the area should be provided. There are about 30 species of birds that drill cavities in trees that are used by 67 species. Birds are highly selective in breeding and for them snags are essential.

Provision of snags also ensures diversity of species of owls and prevents epidemics from spreading.

b. Adequate number of down logs, uniformly spread all over the area should be provided. These down logs are uneconomical logs and host a variety of insects and rodents. These logs are also used by leopards for safe keeping of cubs. These logs reinforce biological chain.

17.7.4 Food:

Almost all wildlife species are very choosy about food and have defined food habits. Adequate number of trees of fodder value should be provided all over the area. The food values of different parts of different species like flowers, leaves, bark, roots and tubers should be the main criteria for provision of these species. Adequate number of salt licks should also be provided in these areas.

17.7.5 Space:

Management of optimum space for mobility of different wildlife species is an important aspect of wildlife management. Both overcrowding and under crowding of wildlife species in a defined area are detrimental in maintaining ecological balance of the area. This can be done by conducting periodic census of wildlife species of the area and by regulating their population for a given area.

17.7.6 Fire Protection:

Protection against forest fires is a must in wildlife areas. Adequate measures should be taken to avoid any eventuality arising out of forest fires in these areas. These measures include creation of fire lines at regular intervals and control burning in selected areas.

17.7.7 Biotic Pressure:

Most of the wildlife areas support thick human population around them, human interference should be effectively controlled. No human activity should be allowed in core areas of these sanctuaries and regulated human activities should be permitted in outer and buffer areas. Compensation should be provided for damage to livestock and crops of neighbouring population by wild animals. Periodic vaccination of cattle of neighbouring area is a must to avoid spreading of epidemics in wildlife.

17.8 Management of Sanctuaries

1. Adequate number of paths and trails should be created in these sanctuaries for spotting wildlife. These paths should be maintained regularly. A good number of inspection paths exist in these sanctuaries at present.
2. Watch towers at strategic locations should be created for observation of wildlife.
3. Periodic census of important wildlife species should be carried out for observation of wildlife.
4. Tourist facilities should be provided in these areas. This can be done by organising conducted tours for visitors, school children etc. Each conducted tour should have an expert guide.
5. Forests around these sanctuaries should be managed so as to create a healthy environment for free movement of wildlife around the forests.

6. Research and monitoring on habitat and ecological process is an essential component of the planning for a sanctuary. Research within sanctuaries provides data and insights which are of local or national value. It can contribute to the national inventory of flora and fauna and to a mapping of the genetic resources available in the area. Monitoring of evolutionary and ecological changes and of human impact on ecosystems can provide crucial data for continuous planning and management.

7. Captive Breeding: Though in a natural ecosystem animal populations hesitate themselves through free breeding there may be instances when captive breeding be required. This usually happens when a species is endangered and individuals of that species need to be released into wild after being bred in captivity.

8. An important function of sanctuary is to raise the level of awareness of visitor's and help to develop an understanding of the environment. This can be achieved through published material giving information about area and about the plants and animals to be seen. This not only enhances the visitors ability understand what they see on the spot but continue to provide information afterwards.

9. An essential pre-requisite for managing and monitoring a sanctuary is the availability of maps, indicating the vegetation, physical features water points, wildlife distribution villages and numerous other features found in each area. Such maps would also be of use to tourists and researchers.

10. Periodic audio visual programmes for visitors, seminars, debates etc. also contribute toward creating awareness among people.

Over the past few years, the new concept of conserving our biodiversity has come up, which says "Attract and involve the common people for the conservation of our fauna and flora". The main publicity of wildlife conservation can be done by celebrating wildlife weeks or wetland days etc. which involve general public and school children etc.

The conservation role of Nature Interpretation Centres (NIC) in Protected Areas(PA) of Jammu District e,g Manda is likely to expand in the coming decade, visit any of the protected Areas (PA), it requires a lot money, time and patience to have the sighting of the animals, while getting an information about biodiversity of the areas from the NIC, is the easiest and cheapest way. As for as their educational function, some NIC / Public awareness centre have programs that present the organisms through visual displays or movies as integral part of complex communities and explains how these species can survive in healthy and natural productive environments.

CHAPTER – XVIII

DEVELOPMENT PROJECT

CHAPTER-XVIII

Development Project

18.1 Introduction

Earlier the working plan dealt primarily with extraction of timber and other revenue earning sources from the forests and developmental aspects were not given adequate attention. Due to large and increasing extent of degraded areas especially in the subtropical belt of the state the emphasis of forest management shifted from revenue earning to rehabilitation of these areas. The National Forest Policy envisages that the total forest cover should be the 33% of the geographical area. The project is being formulated to treat , maintain and establish the most threatened areas as to compensate the loss of tree cover and to restore the degraded forests to the natural status. Due to increasing dependence on forests for livestock grazing ,increasing removal firewood from the forests, encroachment of forest land, Forest fires, smuggling and poaching in forests, diversion and fragmentation of forests, habitat destruction, unsustainable landscape management practices and absence of a regulatory mechanism of common property resources and of late the diversion of Forest for Non-forestry purposes like the construction of roads, transmission lines , Raillway projects, Dams, Colonies etc. and all these are affecting the quality of air, availability of water and soil fertility and threaten biodiversity of forests are under great pressure and are depleting. If steps are not taken to prevent this , it can nullify the achievements in biodiversity conservation.

Among the results of depletion of forest wealth are soil erosion, sedimentation, ground water depletion, low water yield from reservoirs and floods. Forest degradation has affected biodiversity, and 54 endemic species are now in the categories of rare, endangered or threatened species.

A total of 250 Hac. area has been identified to be treated over a period of Five year with the last two year deviated towards the maintenance of created assets. To ensure the participation of the locals and success of the project, the area will be developed as per the JFM pattern and the natural regeneration will be maintained and allowed to rise besides artificial plantation in the gaps.

18.2 Project Area

18.2.1 Location :

The project area is situated in the Jammu district. A total of 250 Hac. rea has been identified at different sites for treatment in five years. The sites identified for the treatment are as under:

Table 18.1: Project Area

S. No.	Name of Range	Name of Site
1	Jammu Forest Range	Block Nagrota I & II = 250 Hac.

Administratively the proposed areas fall under NES block Nagrota of Jammu district. The soils are primary soils, shallow and immature. Lower and middle areas of the division

comprise of Sandy, Conglomeratic soil with boulders and pebbles. The soil depth is moderate to low.

18.2.2 Climate :

Area of the division has sub-tropical climate, geologically the area falls in the Shiwalik mountain range of the outer Himalayas. The area forms part of Chenab and Tawi basin. Quartzite is the main rock component of the area.

With 10-42 degrees of the temperature range . Monsoon is experienced from 15th july to 31st August and showers are also experienced during Feb, and March. April May and June are dry months and the incidents of fire are common during the period . No area of the division experience snowfall and frosts and mists are uncommon. A considerable part of the division is called Kandi area which is characterized by severe summers and less rainfall.

18.2.3 Forest Flora & Fauna :

Forest Flora :

The forest of the project area represent typical sub-tropical vegetation. The lower altitudinal zonation is dominated by the shrubs as we go high these shrubs are found mixed with scattered chir, on moving further up, pure Chir patches are found.

The main species of the project area are *Acacia nilotica, Acacia modesta, Acacia catechu, Albizzia lebbeck, Butea monosperma, Pinus roxburghii, Cassia fistula, Dalbergia sissoo, Emblica officinalis, Mangifera indica, Mallotus philippensis, Bombax cieba and Grewia optiva etc.*

The forests of the project area are classified into the following as per " Champion and Seth" classification

i . Himalayan Sub-Tropical Pine Forests(Type 9/ci)

This Forest subtype covers about 39% of the project area representing the Chir bearing area. The chief florists are *Pinus roxburghii, Acacia catechu, Dalberga sissoo, Butea monosperma, Ficus spps.* etc.

Forest Fauna :

The Rakhs were maintained by the erstwhile Maharajas for their hunting pleasure. These Rakhs being the protected areas provided adequate protection and suitable habitat for the Wild animals of the areas. However due to the increasing human and livestock population the habitat shrank rapidly with the number of wild animals and their variety depleted considerably.

The wild life species found in the area are as :

a. *Leopard: Panthera pardus*

b. Jackal: Canis aureus

c. *Jungle cat: Felis chaus*

d. *Indian Fox: Vulpes bengalensis*

e. *Common Indian Hare: Hystix indica*

f. *Barking deer: Muntiacus muntjak*

g. *Indian wild bore: Sus scrofa*

18.3 Injuries to which crop is Liable :

Biotic Interference :

The most extensive damage to the forests is caused by man and his animals. The uncontrolled increase in the human and livestock population has resulted in the excessive biotic pressure on the forests.

Grazing :

The Forests of the project area are under heavy pressure of grazing by nomadic and permanent livestock population. The grazing pressure is more during winters, when the area receives nomads from their winter Behaks. The grazing in the forests has been unscientific, uncontrolled, and unregulated. The pressure of the livestock in these areas is much more than the carrying capacity, resulting in the depletion of ground flora and destruction of the young crop in the chir areas. Lot of resources and efforts have to be put on by the department to restrict the graziers to the allotted area. Area is subject to lopping by the grazers thus affecting the productivity of the Forests.

Encroachments :

Encroachments in the project area are there i.e. adjoining to National Highway and link roads.

Forest Fires :

The Forest especially chir forests have been experiencing damage due to the fire. However only ground fires are common in the areas but the crop becomes vulnerable due to the uncontrolled fire especially during summer months.

Firewood collection :

The collection of firewood from the forests has also resulted in the injuries to the crop. The trees are lopped and sometimes felled for the supply of fuelwood. Lopping is also being done for feeding the livestock. Collection of the grasses from the forests by the unscientific grass cutting also damages ground flora and young crop which are also cut and trampled along the ground.

Illicit Damage :

The illicit damage to the forests is very less because of the less dependence of people on forests for timber and other bonafide use. However trees at concessional rates are provided to the concessionist to meet their bonafide requirement.

18.4. Socio-Economic Conditions

The condition of the locals is poor, they are mostly dependent upon the agriculture to sustain their livelihood. The land holding is very less with poor productivity. The type of irrigation is rainfed, selling milk, milk products, mango crop, agriculture products are the alternate sources of income to the poor people of the area.

18.5 Human population

As per figures of 2001 census village wise population in the treatable watershed is as under in the Table. 18.2

Table 18.2: Human Population of Project area.

S. No.	Name of the site	Name of village	Male	Female	Total	SC / ST
1	Kattal Battal	Kattal Battal	668	603	1271	562
		Kore Jagir	233	215	448	113
		Nadore	334	294	628	295
2	Panjgrain	Panjgrain	248	237	485	88
		Damuni	96	115	211	78
3	Dhami, Seri Kalan	Dhami	165	160	325	44
		Seri Kalan	206	184	390	54
		Seri Khaurd	142	32	174	
4	Shibba Chappda	Shibba	277	228	505	101
		Pangali	141	152	293	100
5	Upper/Lower Drabi	Upper/Lower Drabi	216	191	407	150
		Shibba Nallah	250	220	470	95
6	Marh, Gondla	Marh	194	176	370	34
		Gondla	191	172	363	20
		Dhung	140	106	246	22
		Ghambir	93	77	170	5

18.6 Livestock

The live stock in the identified areas is mostly indigenous having poor quality. The milk yield is very low, people rearing the livestock supplies the milk and its products to Jammu. However lately the practice of dairy farming is gaining momentum in the identified areas. Livestock population of the area is as under in the Table 18.3.

Table 18.3 : Livestock population of project area

S.No.	Name of site	Name of village	Cow	Buffalo	Horse	Camel	Goat	Sheep	Total
1	Kattal Battal	Kattal Battal	315	205	20	10	1150	45	1745
		Kore Jagir	150	55	10		300	20	535
		Nadore	275	102	10	2	550	23	962
2	Panjgrain	Panjgrain	257	340	10	6	210	40	863
		Damuni	150	310	15	2	1800	90	2367
3	Dhami, Seri	Dhami	310	257	5	5	500	10	1087
		Seri Kalan	215	250	8	5	1500	30	2008
		Seri Khaurd	97	65	6	3	305	35	511
4	Shibba	Shibba	300	450	12	11	1800	100	2673
		Pangali	120	210	5	10	1850	50	2245
5	Upper/lower Drabi	Upper/lower Drabi	301	205	27	11	505	67	1116
		Shibba Nallah	250	500	10	8	2000	110	2878
6	Marh, Gondla	Marh	184	230	5	10	1820	50	2299
		Gondla	70	110	20	3	250	35	488
7	Dhung	Dhung	302	456	55	5	1105	220	2143
		Gambir	205	300	20	8	950	80	1563

18.7 Agriculture Land

Agriculture is the main source of the economy of the village and main profession of the people of the project area is Agriculture. The land holdings of the people are less however modern and mechanized farming has begun to make an impact on the area.

18.8 Forest Land :

The project area has 250 Hac of forest land which covers, portion of Jammu range of Jammu Forest Division. The area wise and species wise distribution of the area is as under : in the Table 18.4.

Table 18.4 : Forest Area

S.No.	Range	Name of Area	Comptt. No.	Chir	B/L	Blank	Total
1	Jammu	Kattal Battal	1/N	230	787	260	1277
		Panjgrain	2/N	475	804	--	1279
		Dhami, Seri Kalan	3/N	60	510		570
		Shibba	5/N	1104	156		1260
		Upper/Lower Drabi	6/N	922	97		1019
		Marh, Gondla	7/N	356	139		495
		Dhung	8/N	700	300		1000

Table 18.5: The following area is recommended for treatment and rehabilitation

S.No.	Name of the site	Proposed area for the treatment
1	Kattal Battal	70
2	Panjgrain	40
3	Dhami,Seri Kalan	30
4	Shibba	30
5	Upper/ Lower Drabi	20
6	Marh, Gondla	30
7	Dhung	30
	Total	250

18.9 Present scenario

The area is under great pressure from graziers, fire and is highly prone to the soil erosion. The lantana camara is invading the open area especially Shibba, Shibba Nallah, Nagrota and Gondla, Maira Dhabber etc.

18.10 Objectives of the project

The project has been envisaged to achieve the fallowing objectives.

1. To compensate for the loss of forest cover due to the diversion of the forest land for the Non-Forestry purposes over the last so many years.
2. To rehabilitate the degraded- denuded Forest area.
3. To conserve soil and moisture and to check the surface run-off of the water.
4. To increase the porosity of the soil and increase the water retention capacity of the soil.
5. To check the flow of soil silt into rivers and streams.

6. To provide the employment opportunities to the local people thus raising their living standard.

7. To improve the environment and ecology of the surrounding areas in the villages of catchment area.

8. And also to provide a extended corridor to the Wildlife of Ramnagar and Nandini wildlife Sancturies by provide conducive environment in these areas.

9. To improve the aesthetic and recreational value of the area.

10. To improve the quality of air , availability of water, soil fertility and preserve Biodiversity.

11. To create the awareness among the locals regarding the importance of forests.

12. To increase bio-mass production.

18.11 Project proposals

To rehabilitate the proposed area , based on the summary of facts discussed the following are the project proposal .

A . Protection from Bbotic Interference :

Before the work of rehabilitation of the area is undertaken it is recommended that the project area is fenced with PCC posts and 4- strand of Barbed wire. The same is also recommended to restrict the entry of cattle, human in the area.

B . Fire Protection :

The project area is highly vulnerable to the fire especially during summer months, so formation of fire lines , control burning of the leaf litter before the start of fire season, construction of water harvesting tank, construction of watch towers, creation of fire fighting cell, engangement of sufficient fire watchers during the summer months are recommended as fire control measures.

C . Afforestation :

Planting in 45 cm*45 cm*45 cm pits and 90 cm*45 cm*45 cm continous contour trenches are the two plantation models suggested to artificially regenerate the proposed areas. Further the plantation of Jatropha plants are also recommended all along the entire fence line .The species are selected as per the locality factors and keeping in view the demands of the locals. Fruit bearing plants and medicinal plants are also recommended for the project area.

Table 18.6: Some of the species recommended are as under

S. No.	Local Name	Botanical Name
1	Chir	*Pinus roxburghii*
2	Khair	*Acacia catechu*
3	Sisoo	*Dalbergia sissoo*
4	Jatropha	*Jatropha curcus*
5	Bamboo	*Dendrocalamus strictus*

6	Kartyar	*Bauhinia variegata*
7	Siris	*Albizzia lebbeck*
8	Amla	*Emblica officinalis*
9	Imli	*Tamarindus indica*
10	Bahera	*Terminalia belerica*
11	Harar	*Terminalia chebula*

D . Soil and Moisture Conservation Works :

Following are the proposals for the soil and water conservation.

i) Gully plugging works to check further extention of the gullies.

ii) Minor engeneering works in eroded areas and in slips prone areas to check the soil erosion and reduce runoff.

iii) Crate works on the sides of nallahs to checking further cutting of the nallahs.

iv) Planting of cuttings of soil binding species in vegetative spurs like Lannea grandis, Ipomea etc.

v) DRSM works in the areas are also recommended to check the soil and water erosion.

vi) Creation of continous contour trenches across the slope and planting of soil binding species in the pit. The dug out soil will be placed towards the flow of water to check the soil erosion and reduce run-off.

E . Patch Sowing :

In order to assist the natural regeneration the species like Chir, Khair, Siris are recommended for patch sowing in 30 cm*30 cm*15 cm patches.

F . Silvi-pasture development : -

A variety of grasses like Napier, Steria, etc are proposed in the project area. The fodder plants will be mixed with the proposed plantation model. The fodder plants will be planted along the periphery of the proposed area.

G . Entry-point activities :

In order to involve the people for the execution of the project the fallowing entry point activities are proposed.

a) 10% of the total money ear marked will be spent on the entry point activity as proposed by locals of the area, which will directly benefit them.

b) Conducting of the awareness camps, training programmes, seminars, debates, to generate the interest of the locals in the scheme.

H . Joint Forest Management :

Village Forest committees will be formed in the project area and these committees will be taken into confidence at all levels of planning, execution, management, protection of the project area.

I . Cultural Operations :

The proposed area has natural regeneration and the same is required to be sustained and developed and cultural operations are proposed for the maintenance and the development of the natural regeneration.

J . Maintenance :

In order to achieve the fixed targets, the maintenance of the units is proposed for a period of 3 years during the execution of the project which is extended further by two years. The beating up of the causality, repairing of the fence line, watch and ward is proposed for the effective maintenance of the project. The services of the village forest committees can be utilized for the same

Cost Structure

Table 18.6: The cost structure for the development of one hectare area

S.No.	Particulars of Works	Avg. Cost per hac (in Rs)
1	Fencing of the area with square PCC fence posts and 4-strand Barbed wire and carriage of the material upto the site @ Rs 50/rft	15000
2	Cutting , grubbing and removal of Lantana and other weeds from the area as per requirement of the site @ Rs 31251/Hac (20% of the total area)	31251
3	Planting of the plants as per requirement of the locals and the site quality. 500 plants per hectare in pits @ Rs 13.17/plant = Rs 6585 300 plants per hectare in Trenches@Rs21.20/plant=6360	12945
4	Plant production of 800 plants per hectare@ 7.98/plant including 20% mortality feature.	7660
5	Sowing of the seeds in patches, 500 plants per hectare in pits @Rs 3.35/patch.	1675
6	Tending and other cultural operations in the area 500 plants per hectare in pits @ Rs.2.83/plant	1415
7	Maintenance of the created assets for the three years Ist year (20%)= Rs 7121 IInd year(10%) = Rs 3560 IIIrd year(10%) = Rs 3560	14241
8	Soil and Moisture conservation works 10M3 per hac@499/m3	4990
	Total per Hac	**89177**
9	Infrastructure Development 20% of plantation cost.	17835
10	Forest Protection, Fire Protection, Communication Mobility, Overhead capacity Building etc 10% of Plantation cost.	8918
	G . Total	**115930**

Total Forest Area	=	7000 Hac (rounded off)
Forest area covered under project	=	250 Hac
Total cost of the project	=	290.00 lacs
Cost of Formation of Nursery(4Hac) L.S	=	5.00 lacs
Watch & ward 5 persons @4500/Month for 5 years	=	2.70 lacs
Grand Total	**=**	**297.70 Lacs**

Note :

The financial implications of the project have been worked out on the basis of existing rate structure . There may be variation in exact figures as the above figures only give an outline for the project.

18.12 Establishment :

The project is proposed to be placed under the charge of the rank of an Assistant Conservator of Forests, who Shall be assisted by other executive and supervisory staff. The headquarter of the project Officer shall be at Jammu and shall have all basic infrastructural facilities like building, vehicles etc. for smooth execution of work.

18.13 Benefits and Justification :

The execution of the project will have the fallowing benefits.

i. Rehablitation of the Degraded Forests :

The project will help in improving the stocking of the area and the density of the area will also increase. The area is proposed to be fully stocked by the end of the project by managing the natural regeneration, protecting the area from the biotic interference, Tending and other cultural operations to minimize the inter/ intra species competition, the area will be supplemented by the artificial plantation.

ii. Soil and Water Conservation :

The velocity of the surface water will be reduced and the moisture retention capacity of the soil will be increased. The soil conservation works will surely help in conserving the soil and moisture in the project area.

iii. Extension of Gullies :

The gully plugging works and crate works will help in checking the further extension of the gullies into ravines. The surface run-off of the water will be checked thus increasing water retention.

iv. Fuel and Fodder Requirement of the Locals :

The bonafide requirement of the locals for fuel, fodder and small timber can be met out from the project thus minimizing the pressure on the forests.

v. Improvement of the Socio-Economic Status of the Locals :

The job opportunities to the locals will be enhanced by the engangement of the locals in the project activities I,e Creation, Nursery works , Plantation, Fencing work, Soil and Moisture conservation works etc.

vi. Improvement of the Environment and Ecology :

The Environment and ecology of the area will be improved by the implementation of the project.

vi. Improvement of the Aesthetic and Recreational Value of the Area :

By improving the environment of the area the aesthetic and recreational value of the area will be increased.

CHAPTER – XIX

MISCELLANEOUS REGULATIONS

CHAPTER – XIX

Miscellaneous Regulations

19.1 Buildings

The various buildings including office building inspection hut etc. presently being maintained by Jammu Forest Division have been enlisted in Annexure-10. Few new buildings have been constructed during the plan period out of those proposed in the past plan, i.e few guard huts and new Range office at Jindrah for Range officer Jindrah. A building of Range office Bahu Range is under construction at Gladni under **CAMPA** scheme.

19.1.1 The Division needs additional building to meet various requirement. Details of the buildings. Proposed to be constructed during the current plan period are given as under in table 19.1

Table 19.1: Details of Buildings proposed to be built during plan period.

S.No	Range	Name of the Building	Location
1	Kalidhar	Inspection hut	Malla
2	Kalidhar	Inspection hut	Balli
3	Jammu	Inspection hut	Nandini
4	Jindrah	Inspection hut	Jindrah
5	Jindrah	Inspection hut	Surinsar
6	Bahu	Inspection hut	Parmandal

19.1.2 In addition to these buildings residential accommodation for Block Forester should also be constructed at their Block headquarters at suitable location. Adequate accommodation is suggested to be built up for clerical staff and subordinate staff both at Divisional and Range level.

19.2 Forest Roads and Paths

The Division is very well connected with a network of roads. These roads are maintained by P.W.D and are mostly well maintained. There is also a good network of forest inspection paths almost all over the forest areas.

19.3 Bridges

A good number of bridges are maintained by P.W.D exist in the area. They are supported by culverts on seasonal nallas.

19.4 Forest Demarcation

As already mentioned in part I of this plan the condition of demarcation in this Division is quite deplorable. The boundary pillars are nonexistent and this has led to heavy encroachments in forest areas especially in Bahu Range.

19.4.1 With the release of CAMPA funds to Demarcation Divisions, it is expected that forest areas shall be properly demarcated and fresh boundary pillars with new design shall be put at appropriate places to clearly demarcate the forest area.

19.5 Fire Protection

The subtropical forests of chir and shrubs are highly susceptible to forest fires and incidences of forest fires and damages due to them have been quite alarming during the past decade. Adequate funds are required to be allotted for protection against forest fires. Fire protection measures have already been discussed in detail in proceeding chapters.

19.6 Social Forestry

The social Forestry project initiated in the state in the year 1982-83 has come a long way since its inception. The project has not only reduced the pressure of Forest Department considerably in respect of Rehabilitation of degraded Forests but has broken the barrier between the Department and the people for overall development of the area through participatory forestry. The achievements of this project in the state are commendable. The main activities of social Forestry project in the state are strip plantations, wetland plantations, rehabilitation of degraded forests, development of village woodlots, Farm forestry, and Institutional plantations and pasture development.

19.6.1 In Jammu District Social Forestry Project now department has many success stories to its credits of people's participation which can be seen in chinota village woodlot, plantation, Mandal Villages woodlot and Kaloa village woodlot development amongst others.

19.7 Minor Forest Produce

Jammu forest division has a potential of developing various minor forest produces for various purposes. A Minor Forest Produce (MFP) project has been initiated in the state as a centrally sponsored scheme. The project has established various nurseries for raising plants which are of medicinal and other uses. Prominent species that are being raised in nurseries are *Dendrocalamus strictus* which is an indigenous spp. *Bambusa arundenesa, Bambusa vulgaris and Mallocana bamboids* which are exotic species and are being raised on experimental basis. Other species which are being raised are *Termenelia belerica, Termenalia chebula, Amla and neem.* The project in collobration with Regional Research Laboratory has also raised plants of Discorea composita (Sub tropical variety*) Solonum khairianum*, Lemon grass and Jamrosa in nurseries. The project has successfully raised *Lemon grass* and Jamrosa, Amla, Behera, *Neem* and exotic bamboos at various locations. The project has also developed an arboretum of Medicinal plants at SCTS Miran sahib.

19.8 Forest Nurseries

A good number of nurseries are being maintained by Forest Department and allied agencies. List of nurseries being maintained by Forest Division, Jammu is given in annexure-11. These nurseries cater to various requirement of different agencies. With the start of **CAMPA** additional nurseries besides the existing nurseries have been created.

19.8.1 Apart from these nurseries Integrated Watershed Development Project and soil Conservation department also maintain their own nurseries at various locations.

19.8.2 The nursery techniques are too well known and have been discussed in detail in preceeding chapters for chir and other broadleaved species.

19.9 Maps

Various maps have been prepared and are being submitted alongwith the draft plan. Boundaries of compartments, Sub- compartments, Blocks, Ranges and Division have been clearly delineated on ground as shown in maps. Following maps have been prepared.

19.9.1 Working Plan Maps:

Four working plan maps one for each range on 1:50,000 scales have been prepared on the drawing paper mounted showing allotment of compartments to various working circles. All the maps are digitized by using satellite imageries and ArcGIS technology.

19.9.2 Stock Maps:

Range wise stock maps of each compartment / Sub compartment separately drawn on map paper especially designed on 1:15000 scale. Both soft copies and hard copies are prepared.

19.10 Compartment Descriptions

Range and block wise three copies of fresh compartment descriptions written up for each compartment and sub compartment separately are being submitted with the draft plan for the reference and record of Conservator of Forests, Working Plan Circle, concerned territorial Conservator of Forests, Divisional Forest Officer and Range Officer.

19.11 Compartment Histories

Compartment histories giving vital information's regarding various activities in compartments have not been maintained by the Divisional Staff either at Divisional level or at Range level. Fresh files of compartment Histories with description and stock map of various compartment of the Division have been prepared.

19.12 Draft Plan

The draft copy of the working plan is being submitted in duplicate.

CHAPTER – XX

ESTABLISHMENT AND LABOUR

CHAPTER – XX

Establishment and Labour

20.1 Establishment

The present strength of the staff of the Division is given in chapter IV of part I of this plan. The size of the establishment of Jammu Forest Division has hardly registered any increase over last one decade. Although the present staff may appear to just adequate, the Division requires funds for establishing good communication network at various levels. This includes telephones, Fax, Computers with internet facility at Range offices, Vehicles and wireless apparatus. These have become necessity, considering the multifarious activities of the department.

20.2 Ranges Block and Beats

20.2.1 As already mentioned Jammu Forest Division consists of four territorial ranges namely Bahu, Jammu, Jindrah and Kalidhar.

20.2.2 The headquarter of Jindrah Range is at Jindrah, Kalidhar Range is at Akhnoor and Jammu and Bahu Ranges is at Jammu.

20.3 Present constitution of the Division

Table 20: Constitution of the Division:

S.NO	Range	Block	Compartments		Total No. of Compt/SubComptt.
			From	To	
1	Jammu	Manor	1	4	4
2	Jammu	Paloura	1	4	4
3	Jammu	Ramnagar	4	---	1
4	Jammu	Nagrota	1	9	9
6	Jindrah	Jindrah	1	9	9
7	Jindrah	Puni	1	7	7
8	Jindrah	Mansar	1	6,8,10	8
9	Jindrah	Tunnel	1	5	5
10	Bahu	Bahu	1	66	78
11	Bahu	Balote	1	35	35
12	Bahu	Devak	8	18,20-22,24,25	16
13	Kalidhar	Chauki	1	21	21
14	Kalidhar	Samah	22	27a	6
15	Kalidhar	Pangarian	26	27b,28,29,36	5
16	Kalidhar	Khor	30	35	6
17	Kalidhar	Chora	37	45	9

20.3.1 Compartments 6,7a,7b,26 of Devak block of Bahu Range deleated from Jammu Division and transferred to Kathua Division during the course of the revision. And also Co. No. 7,9,11,12,13,14and 15 of Mansar block of Jindrah, comptt. No. 1,2 and 3 of Ramnagar block of Jammu Range and Co. No. 1,2,3,4 and 5 of Nandini, earlier being managed under wildlife working circle are to be managed excusably as per the Management plan of wildlife Deptt. forthwith. The said compartments are not to be taken into consideration as for as management plan of Jammu Forest Division is concerned during this revision.

20.4 Labour

The availability of skilled and unskilled labour is not much of a problem in this Division except during the peak periods of sowing and harvesting of the agricultural crops. In addition to local labourers, labourers from other parts of the state and the country are also available.

CHAPTER – XXI

CONTROL

CHAPTER – XXI

Control

21.1 Control Forms

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

Control Form (A):

Since no major felling are recommended during the currency of this plan this will not be of much use.

Control Form (B):

This form shall be maintained for yield realised from the issue of timber to concessionist and marking of dead dying and diseased stuff.

Control Form (C):

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

Control Form (D):

This is not required as no major markings are foreseen in the Division in the near future.

21.2 Compartment Histories:

These are the most important records of happenings in the forests. Unfortunately these are not being maintained either at Range or at Divisional Level. These must be maintained and updated regularly both at Range as well as Divisional level.

21.3 Divisional Journal

This document is very important. This must be maintained in the Division and updated regularly. It should contain detailed records of important information's of all kinds like regeneration, plantation, soil conservation works, their success or failure and reasons thereof, seed years, diseases, insects, past statistics of out turn of timber and fuelwood contracts, roads buildings and meteorological data etc. On the analogy of Divisional Journal records must be maintained at Range and block level.

21.4 Guard Books

The maintenance of guard books have by and large remained neglected. Each guard book must contain a small map of the beat showing the extent of the beat and compartment boundaries. These guard books must be checked by the concerned Range Officers at least once a month and by the D.F.O at least once in Six months. Closures formed in the beat of a forest Guard should be entered in Guard book with its Geo co-ordinates. Number alongwith location of Boundary Pillars existing in the beat should entered in the guard book. Proper handing over and taking over of charge with Guard Book be adhered on the transfer of official.

CHAPTER – XXII

FINANCIAL FORECAST AND COST OF THE PLAN

CHAPTER – XXII

Financial Forecast and Cost of the Plan

22.1 Revenue

Since the past decade the annual expenditure of Jammu Forest Division has been more than annual revenue as Jammu Forest Division does not have major revenue earning resources. 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. Extraction of timber for commercial purpose is ruled out. Extraction of Resin has also not been recommended. Minor revenue earning sources like Firewood, Grazing fee and Timber etc. are left to the Division. Therefore the expenditure is more than the revenue as has the case since 1998-1999. The revenue earned during the year 2012-13 was Rs. 1,11,34,369.00 against an expenditure of Rs.9,04,96,104.00.

Table 22.1: Revenue of Jammu Forest Division Since 2008-09 to 2012-13

S.No.	Year	Head	Revenue
1	2008-09	Firewood	Rs.727142.00
		Grazing	Rs.53297.00
		Timber	Rs.548442.00
		Other receipts	Rs.1282154.00
		Total	Rs.2627075.00
2	2009-10	Firewood	Rs.804999.00
		Grazing	Rs.58704.00
		Timber	Rs.3466965.00
		Other receipts	Rs.3096103.00
		Total	Rs.7426771.00
3	2010-11	Firewood	Rs.1425881.00
		Grazing	Rs.61645.00
		Timber	Rs.2718496.00
		Other receipts	Rs.768796.00
		Total	Rs.5007668.00
4	2011-12	Firewood	Rs.2049242.00
		Grazing	Rs.58422.00
		Timber	Rs.6026920.00
		Other receipts	Rs.1278611.00
		Total	Rs.9413195.00
5	2012-13	Firewood	Rs.2217325.00
		Grazing	Rs.82557.00
		Timber	Rs.8265636.00
		Other receipts	Rs.532228.00
		Total	Rs.11134369.00

SOURCE: JAMMU FOREST DIVISION

22.2 Future Revenue

In this Working Plan Resin extraction has not been recommended. Forests are in degraded condition and cannot give any revenue. Therefore till the forests are rehabilitated revenue from forest produce is not possible. However above mentioned heads in the table can generate some revenue.

22.3 Future Expenditure

Assuming an average expenditure of Rs. 1 Lac per Hectare for treating/regenerating an area about 510 Hectare annually will be Rs. 5,10,00,000 per annum.

22.4 Cost of the Plan

The total expenditure incurred in the revision of this plan works out as under:

A. Normal Budget Expenditure:

S.No	Budget Sub-head	Amount
1.	1-C-2-T.A	257205.00
2.	1-C-3-O.E(N.P)	112720.00
3.	14-Stocks and Stores	834795.00
4.	M.Vehicle(N.P)	168833.00
	Total (A)	**13,73,553.00**

B. Plan Expenditure.

S.No	Item of Work	Amount
1.	Field Work	10,93,000.00
	Total (B)	**1093000.00**
	Grand Total (A+B)	**24,66,553.00**
	Total Area Covered	**69929 Ha.**

22.3.1 The total expenditure in the revision of the plan was Rs. 2466553.00 for an area of 69929 Ha. This works out to be Rs. 35.27 per hectare.

CHAPTER – XXIII

SUMMARY OF PRESCRIPTION

CHAPTER XXIII

23 .1 Summary of Prescription

S.No.	Prescription			Section	Page
1	**Constitution of working circle**			7.3	58
	Chir Improvement cum Selection Working Circle				
	Rehabilitation cum Reboisement Working Circle				
	Grazing (Overlapping) Working Circle				
	Plantation (Overlapping) Working Circle				
	Non-Timber Forest Produce (Overlappping) Working Circle				
	Eco-Tourism Working Circle				
	Protection (Overlapping) Working Circle				
	Period of the Plan: 2013-14 to 2023-24				
2	**Chir Improvement cum Selection Working Circle**				
	Total area of the Working Circle	=	34327 ha.	8.3	65
	Silvicultural System	=	Selection System	8.10	70
	Special Objectives of Management	=		8.4	66
	Method of Treatment Prescribed	=		8.7.2,8.8.2	66,68
3	**Rehabilitation cum Reboisement Working Circle**				
	Total area of the Working Circle	=	35602 ha.	9.3	80
	Special Objectives of Management	=		9.4	81
	Method of Treatment Prescribed	=		9.6.3,9.7.3, 9.8.3	82,83,84
4	**Grazing (Overlapping) Working Circle**				
	General Constitution of the Working Circle	=		10.1	100
	Special objectives of Management	=		10.5	101
	Grazing and Settlelement fee	=		10.9	103
	Strategies to tackle Grazing Problem and Fodder Scarcity	=		10.10	104
5	**Plantation (Overlapping) Working Circle**				
	General Constitution of the Working Circle	=		11.1	106
	Special objectives of Management	=		11.2	106
	Method of Treatment	=		11.3	106
6	**Non-Timber Forest Produce (Overlappping) Working Circle**				
	General Constitution of the Working Circle	=		12.2	109
	Special objectives of Management	=		12.4.1	112
	Strategies	=		12.4.3	112
7	**Eco-Tourism Working Circle**				
	Introduction	=		13.1	119
	Special objectives of Management	=		13.3	120
	Strategies	=		13.4	120
8	**Protection (Overlapping) Working Circle**				
	Introduction	=		14.1	125
	Agencies of Forest Damages	=		14.2	125
9	**Financial forecast**				
	Revenue	=		22.1	181
	Future Revenue	=		22.2	182
	Future expenditure	=		22.3	182
	Cost of the Plan	=		22.4	182