

CHAPTER- I

1. THE TRACT DEALT WITH

1.1 NAME AND SITUATION:

This Working Plan is a revision of earlier Working Plan which was written combindely of Mandi and Joginder Nagar Forest Divisions (1999-2000 to 2013-14) by Sh. Ajay Kumar Sharma, IFS. Now separate Working Plan has been proposed for Joginder Nagar Forest Division. This plan covers about 25% geographical area of Mandi District. The forests included in this revised working plan are situated in Mandi District covering Joginder Nagar, Padhar, Lad Bharol, Dharampur, Sarkaghat Tehsils and Tikkan, Sandhole, Kotli Sub Tehsils. Initially this division was formed in 1987 with the total Forest area 15403.5 ha and was divided into three ranges namely Joginder nagar, Ladbharol and urla and was part of earlier working plan. Later in 1994, two another ranges namely Kamlah and Dharampur of Suket Forest Division were included in this division with total Forest area 4099.41 ha. and was part of Sh. Nanak Chand, IFS working plan for Suket Forest Division from 1986 to 2001. In 2014 due to rationalization of sanctuaries, some area of Nargu Wild life sanctuary under Kullu wildlife Division was transferred to this division and created another new territorial range namely Tikkan with Forest area 6040.90 ha. At present, the whole Forest area of this Forest Division is 25543.81 ha. and is divided into six ranges, namely Joginder Nagar, Urla, Lad Bharol, Dharampur, Kamlah and Tikkan. The tract of this division lies between latitudes 31°-42' to 32°-02' N and longitudes 76°-40' to 76°- 58' E. The headquarter of this Division is located at Joginder Nagar in Mandi District. This Division is bounded in the North by Kangra Distt., on the South by Bakkar Khad and Hamirpur Forest Division, on the East by Uhl River and Mandi Forest Division and on the West by Palampur Forest Division. River Beas runs in East West direction through this tract and separates the tract from Mandi Forest Division.

Joginder Nagar town is connected to distt. headquarter at Mandi by metalled Pathankot to Mandi National Highway (NH 154) traverses the tract of this division for 42 Kms from Ghatta to Gawali. Joginder Nagar-Sarkaghat-Ghumarwin State Highway also traverses through this division and connects this area with plains. Almost all tract of this division is connected through roads only with the exceptions of few remote areas. All the link roads are important and useful from forestry point of view.

The working period of previous working plan was upto 31-03-2014 and stand expired on 31-03-2014 and was extended upto 31-03-2017. The PWPR for the preparation of new working plan has been approved by the Govt. of India vide letter No. 13- 7(6)/1997- ROC dated 26-03-2014.

1.2 CONFIGURATION OF THE GROUND:

The configuration of this division is as follows:-

West	Saroun-Kamlah Range	N 31° 42' 49" E- 76° 41' 08"
North East	Bhubu Jot Tikkan Range	N 31° 57' 4.30" E- 76° 58' 40.52"
East	Mayot-Urla Range	N 32° 45' 55" E 76° 46' 30.03"
North	Dalah-Urla Range	N 31° 53' 18.53 E 76° 54' 42.96"
South	Ghatta J/Nagar Range	N 32° 2' 19.92" E 76° 40' 2.91"

The altitude varies widely from 548 m near Sandhole to 2920 m at Tika Garh.

The area of this division is characterized by the following main Ridges: -

- Ghoghar Dhar
- Bhabhori Dhar
- Sikander-Janitary Dhar

- **GHOGHAR DHAR**

It is an outline of Dhauladhar range. It enters into Joginder Nagar Forest Division near Mahrola and then runs through Harabagh and Jhatingiri, to the East of Mandi Pathankot Road. It is very steep and does not give of any main branch on the Eastern side. Only Harabagh dhar and Makora dhar take off from Badan and Phuladhar Tibba respectively from this ridge on the Western side. These ridges run along North East and South West and are covered by good chil forests.

- **BHABHORI DHAR**

It runs in North South direction from North boundary near Ghatta upto river Beas. It is also known by the name of Tramat dhar near Ahju and Bhabori dhar down below. This dhar is lower than the two dhars mentioned above. It is highest near Kudnu measuring 1845 meters. It does not give any main spur but many small spurs generally originate from it.

- **SIKANDAR-JANITARY DHAR**

From the ridges described above, a series of spurs run in different directions and enclosed between them are small and bigger valleys. Valleys between Ghoghar Dhar and Nargu Dhar are narrow and steep. Valleys to the South of river Beas are wider with gentle slopes. Altitude also varies considerably. Nargu peak is 4038 meters and the ridges near

Sandhol only 548 meter high. The slopes are very steep and precipitous in the North East portion, moderately steep to very steep and precipitous in the East of Ghoghar Dhar and moderate in the area West of Ghoghar dhar. The only plainish area is a very small strip between Bajaura & Panarsa.

Most of the tract is drained by river Beas and its tributaries. River Beas enters into this tract from Kullu Valley. It forms boundary of Mandi Forest Division with Jogindernagar division from Kufri upto Thana planau and leaves the division at Sandhol.

1.3 GEOLOGY, ROCK AND SOIL:

The tract forms a part of the lesser Himalayan Region. River Beas is the main drainage channel and several streams joining it exhibit dendritic and trellis type of drainage pattern. The tract lies partly on rocks belonging to the central Himalayan zone of unknown age and partly on tertiary shales and sandstones of more recent origin. The fault line separating the younger sedimentary rocks from older Himalayan series runs almost North to South along Ghoghar dhar. In East of this boundary fault lies slates and shales which are laminated, gritty and very hard and weather slowly. Closely mixed up with shale and slates are the metamorphic rocks viz. mica, schist, horn blende, schist and quartzite. Very thin purple to maroon shales are also observed at places in addition to greenish basalt forms the upper crest of Ghoghar Dhar. Procopius and gneiss cap all the hills of Uhl catchment. Local people extract slates for the purpose of roofing their houses. Good quality slate quarries are very few and even this slate does not compare well with that extracted from Kangra, Nachan & Suket Forest Divisions. It is coarse and brittle and can only be used in the form of thick slabs. To the West of boundary fault occur conglomerates, sand stones, grits and occasional lime stone belts. These are sedimentary rocks attend by earth's pressure and belong to Nachan & Sabathu of Shimla group range. Shimla group comprising silt stone, shale quartzite of various shades are found towards the North- West side of the tract. The carbonaceous schist porphyroblastic gneiss-chronite schist sequence of the Kullu group is thrust over by the biotite-garnet schist quartite- carbonaceous schist of the vaikrita group in the North West. The rocks of Vaikrita group are introduced by biotite-mascovitegranodiontes ranging in age from 450 million years to 365 millions years. The rocks of the vaikrita group are uncomfortably overlain by conglomerates, pebbly phyllite and quartzites of Manjir formation which in turn is overlain by the carbonaceous shale, sands stone sequence.

Joginder Nagar Forest Division is known for rock salt deposits. Other reported mineral occurrences are Limestone, clay and slates.

1.3.1 ROCK SALT:

Rock salt occurs in Gumma areas of the tract and it appears to be connected with the tertiary beds. These salt mines are the only one of its types.

1.3.2 Clay:

Gneissic rocks found to the East of the boundary fault give rise to sandy loam soils, the cohesive power and the fertility of which depend on their organic matter content. Because of thick forest cover, the organic matter content is quite good. Consequently, the permeability and moisture retaining capacity of soil is good and as a result of this the stream contains perennial water supply and incidences of soil erosion is also low. The soil of water hills, situated to the west of boundary fault is generally clayey loam with pockets of pure clay. The soil is poor in organic content and permeability is very poor. This soil has a very scanty vegetative growth and could be easily eroded. Rate of runoff is very high during rainy season and stream dries up during summer.

From silvicultural point of view all types of soils found in the tract dealt with are suitable for forest growth. Even the clayey soils are well drained because of the steepness of the slope. It is therefore, the organic matter content and the depth of the soil which exercise influences on the type of vegetation. The soil of fir forests is very rich in humus and where as that of Deodar and Kail forests have adequate organic matter. Soil of chil and scrub forests is poor in organic matter content and therefore is friable and liable to be easily eroded.

1.4 CLIMATE:

Because of great variation in altitudes, the climate pattern shows great variation accordingly. It is bitterly cold in the high hills during winter where as heat during summer is very oppressive in the lower hills. Major portion of the tract however, enjoys a temperate climate. The climate in the lower zone can be described as sub tropical. Broadly speaking there are three types of season viz. winter, summer and rainy season.

1.4.1 Winter:

Winter season lasts from November to March in most parts of the tract. In the lower hills, there is heavy frost and fairly high snowfall is experienced at higher elevations. Rain and snow during winter season are caused by North-Western air currents. Snow fall starts at high elevations in the end of November or early in December. The snow comes down to 1200 meters elevation but it seldom stays long. Joginder Nagar town is at an altitude of 762 meters and had snowfall during 1961, 1973's winter and recently again during winter of 1991. Total snowfall at 3000 meters elevation averages about 3.00 meters. Bulk of the snow fall is received during January and February in normal years. Snow disappears before April from all places below 2500 meters elevation and by end of April, all the areas of the tract are clear of snow except some shady localities on the Northern aspect and nalas above 3000 meters elevation. Majority of the broad leaved planting is carried out during winter in the tract.

1.4.2 Summer:

Summer season lasts from April to end of June and is the driest period with maximum temperature going as high at places along river Beas during June. Except for some sporadic showers, the summer season is generally dry. This period is of intense phonological activity at the high level elevation. During summer season there is great danger of fire in chil forests. Hot and desiccating winds are common in this tract. At elevations higher than about 2000 meters, the summer season is quite pleasant.

1.4.3 Rainy Season:

Rainy season starts with the advent of monsoons either towards end of June or by the beginning of July and lasts upto the middle or sometimes the end of September. The bulk of annual precipitation is received during this time. The distribution of rain fall is not regular. Sometimes it rains exceptionally heavily and the rest of the rainy seasons may go dry. Such occasional exceptionally heavy cloud bursts cause havoc to tree growth and result in erosion, landslides and floods. After the rainy season is over the sky is clear and there is very little rain fall during October and November. During this period, the diurnal variation in temperature is quite marked. The soil loses moisture very fast and becomes dry. The growth of the plants slack off and the leaves of the deciduous species get cuticularized and fall off. All the areas above about 1000 meters elevation experience severe frost especially in the depressions leading to creation of frost hole in may forests.

a) Rain Fall:-

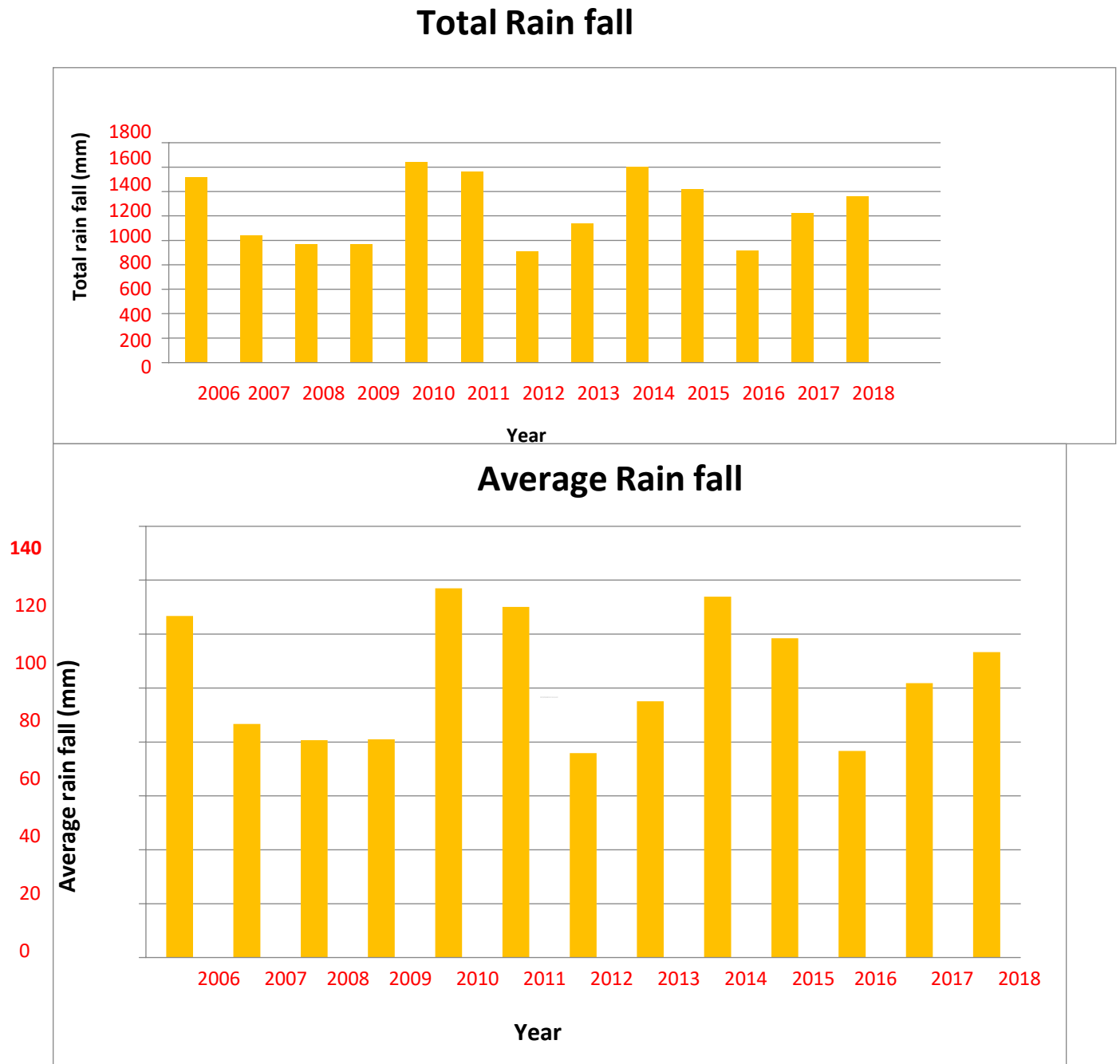
Rain fall data for the year 2006 to 2018 of Joginder Nagar Forest Division is given in the table below.

Table 1.1:- Detail of Year wise average and total rainfall in Joginder Nagar Forest Division

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Rain fall (mm)	1520.5	1040.4	967.7	972.7	1644.5	1575.5	910.6	1141.10	1606.6	1422	919.9	1222.4	1360
Average Rainfall* (mm)	126.7	86.7	80.64	81.05	137.04	130.11	75.88	95.09	133.88	118.5	76.65	101.86	113.33

*Average rainfall = (Total rain fall/12)

Figure-1.1 Year wise total and average rain fall in Joginder Nagar Forest Division



1.5 Temperature:

The temperature in different parts of tract varies according to altitude. The temperature is lowest in the months of December and January. It begins to rise

from the end of February, and it goes as high at certain places during June. Detail of Temperature recorded in respect of Joginder Nagar from 2009 to 2018 is as follows.

Table 1.2:- Year wise average maximum temperature from 2009 to 2018 in Joginder Nagar Division

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018 (Till Nov)
*Average emax. Temp.(⁰ C)	28.06	28.44	27.575	29.06	25.68	26.85	25.81	27.27	26.38	25.5

*Average maximum temperature= (Month wise total maximum temperature/12)

Table 1.3:- Year wise average minimum temperature from 2008 to 2018 in Joginder Nagar Division

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018 (Till Nov)
*Average eMin. temp. (⁰ C)	13.42	13.35	13.50	14.18	14.61	13.84	13.65	14.21	13.75	12.84	12.48

*Average minimum temperature = (Month wise total minimum temperature/12)

1.6 WATER SUPPLY:

The main streams and their tributaries rising in higher hills covered by well stocked forests of silver fir, spruce, deodar, kail and oak have perennial water supply while those have their origin in dry ridges or low lying chill areas having inadequate vegetative cover due to over grazing generally get flooded during the rains and dry up during summer. Water supply situation is satisfactory in the catchment of Uhl River and entire of Urla range except for the top of the ridges in the low lying areas where hill sides have been shackled of vegetative covering resulting in scarcity of water in the event of inadequate winter rainfall. Many hill villages of the lower zone, especially those situated on ridges, suffer from serious shortage of water if it does not rain during May and June. Small ponds are dug near these villages for storing water which is used for drinking by animals and men. In case of serious draught, drinking water is carried from far off places. The importance of vegetative cover in ensuring regular and sustained water supply is thus fully justified in these areas. In the areas having good forests, there is adequate water in the main streams to allow telescopic floating except

in the streams originating from chil areas. Except Uhl, there is no other stream the timber can be floated down without resorting to telescopic methods.

1.7 DISTRIBUTION OF AREA:

The forests are not found in a compact belt, but are generally scattered. The total forest area covered under this plan is classified into various legal categories as given in below.

Table: 1.4 Distribution of Areas in Ajay Kumar Sharma's Working Plan and Plan under Revision (ha.)

Working Plan	Name of Range	Forest Area (in hect.)			Goographical Area (Approx.) (in hect.)
		DPF (in hect.)	UPF (in hect.)	Total (in hect.)	
Ajay Kumar Sharma,s Plan	Joginder Nagar	6864.54	135.26	6999.80	
	Urla	5379.54	290	5669.54	
	Lad Bharol	2915.62	176	3091.62	
	Dharampur	1906.31	266	2172.31	
	Kamlah	1725.42	298.22	2023.64	
	G.Total	18791.43	1165.48	19956.91	66639.51
Working Plan	Name of Range	Forest Area (in hect.)			Goographical Area (Approx.) (in hect.)
		DPF (in hect.)	UPF (in hect.)	Total (in hect.)	
Plan Under Revision	Joginder Nagar	6438.86	135.26	6574.12	
	Urla	5437.56	290	5727.56	
	Lad Bharol	2925.82	176	3101.82	
	Dharampur	1896.66	266	2162.66	
	Kamlah	1843.68	93.07	1936.75	
	Tikkan	3374.19	2666.71	6040.90	
	G.Total	21916.77	3627.04	25543.81	77201.14

The total forest area is classified into various legal categories as given below:

Total geographic area = 77201.14Ha.

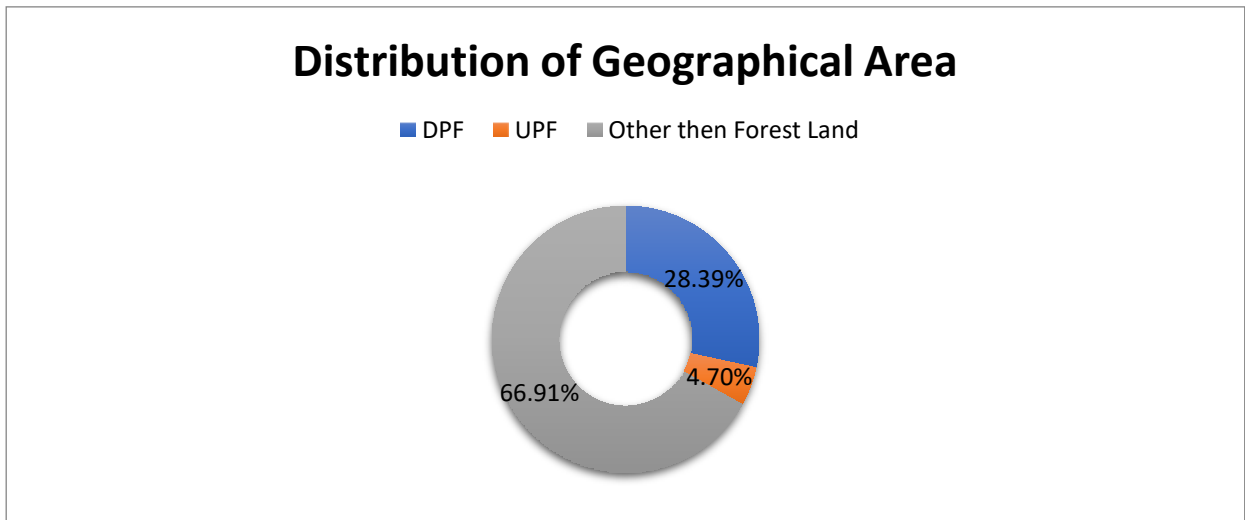
Total DPF cover = 21916.77 = 28.39%.

Total UPF cover = 3627.04 = 4.70%.

Total forest area cover = 25543.81 = 33.09% (DPF+UPF)

Part other than total forest area = 51657.33 = 66.91%

Figure 1.2:-Represents Distribution of Forest cover of Joginder Nagar Forest Division



The above area of D.P.Fs is divided into 371 forests for intensive management. These forests are further been divided into compartments and sub-compartments having areas between 20 and 40 hectares. Only in some cases the area of compartment exceeded 40 ha. This is because such forests are either remote or require only protection. **Appendix-1** gives detail of demarcated protected forests. The areas and boundaries of old DPFs have been taken from old maps. In case of new DPFs revenue maps have been reduced to the 1:15000 scales with the help of pentagraph. Such maps do not show any natural features or contours.

1.8 STATE OF BOUNDARIES:

Demarcated Protected Forests have been delimited on the ground with the help of main as well as intermediate boundary pillars constructed of loose stone masonry and distances have been maintained/ indicated between one B/pillar and the other pillars and no magnetic bearings (Forward and Backward) were recorded for any pillar making it an easy affair for encroachments. A large number of newly demarcated protected forests do not have boundary pillars. The position is still worse in respect of un-demarcated protected forests where the boundaries are simply indicated by the cultivations of particular village.

1.9 LEGAL POSITION:

With the dawn of independence on 15th August, 1947, the erstwhile Mandi State merged with the Centre on 15th April, 1948 and was subsequently constituted in the present civil district of Mandi. The forests now constituting Joginder Nagar Forest Division falls in the Civil District Mandi. The legal position, rights and concessions are briefly described below:-

Prior to the integration of princely States in Himachal Pradesh on April, 15, 1948, ruler of erstwhile Mandi State was the owner of all types of land including demarcated as well as un-demarcated protected forests. After formation of Himachal Pradesh, the ownership of all demarcated as well as un-demarcated areas including pastures and ghasnies not assessed to land revenue was vested in Himachal Pradesh Government subject to the rights of users.

After the re-organization of forest department, Indian Forest Act, 1927 was made applicable in the newly formed State of Himachal Pradesh vide Government of India, Ministry of States, Notification No.146-j dated December 6, 1950. Thereafter the provision of Chapter-IV of Indian Forest Act, 1927 have been made applicable to all forest lands and wastelands in Himachal Pradesh, which are the property of Government or over which the Government have proprietary rights or to the whole or any part of the produce of which the Government is entitled as recorded in the forest settlements or land revenue settlements or land revenue records of the integrated States.

And whereas in T.N. Godavarman Thirumalpad V. Union of India the Supreme Court of India held that the Forest (Conservation) Act, 1980 must apply to all forests irrespective of the nature of ownership of classification thereof. It was further held that the word 'Forest' must be understood accordingly to its dictionary meaning. This description covers all statutory recognized forests, whether designated as reserved, protected or otherwise for the purpose of Section 2 (i) of the Forest (Conservation) Act, 1980. With the changing scenario and realizing the importance of biodiversity and ecology scope of forest has been extended even to the private lands in the state. HP Government vide notification No. FFE-B-E (3)-31/2001-I dated Shimla 19-02-2011 has extended the definition of forests to the private lands. The abstract of notification are reproduced below:-

In compliance of Interim order dated 12.12.1996 of Hon'ble Apex Court in Writ Petition (C) 202 of 1995 titled- T.N. Godaverman Vs Union of India and others State Government constituted an Expert Committee has decided that 'compact wooded block' above 5 ha which are not recorded as 'forests' in the revenue record shall be treated as 'forests'. Central Empowered Committee constituted by Hon'ble Supreme Court suggested that the definition of 'Forests' as defined by the State of H.P. needs further clarification by way of certain definable parameters. Hon'ble Supreme Court has ordered the State of Himachal Pradesh to issue the appropriate notification in this regard. In compliance of the above order of the Hon'ble Apex Court, the definition of Forests is notified by Government of Himachal Pradesh on dated 19/02/2011. The excerpt of notification is reproduced below:-

1. “If the private area is notified under Indian forest Act, 1927 or other Act or is entered as van/ban/vani/ jungle in the revenue record it will be treated as forest.”

2. **For other type of areas not recorded as indicated in point 1.** There are two components under this definition:-

3. **Compactness** of the area above 5 Ha and **Woodiness** in this area above 5 ha

a) **Compactness** of an area above 5 ha would be an area of private land with itself or in contiguity with other adjacent private khasras only

b) **Woodiness** in this area of above 5 ha would be as defined below:-

Accordingly, the definition in different agro-climatic zones would be as under:-

i) **Temperate areas:-** These areas consisting of conifer forests of deodar, fir, spruce, kail, and of oaks, rhododendrons and other broad leaved species will be defined as under:-

“A compact wooded private area of more than five hectares constituted by itself or in contiguity with private khasras of one or more than one land owners and having more than 400 trees of natural origin and not of plantation origin per hectare of Class-III and above in this compact wooded block will constitute a forest.”

ii) **Sub-tropical areas:-** These areas consisting of Chil, Khair and other broad leaved forest species will be defined as under:-

Chil forest: - The above definition for temperate area will hold well in these forests.

Khair and other broad leaved species: - A compact wooded private area of more than five hectares constituted by itself or in contiguity with private khasras of one or more than one land owners and having more than 800 trees of natural origin and not of plantation origin per hectares of less than class III or for a mixed crop (mature and young) the trees being worked out by taking one mature tree equal to two young trees and vice versa in this compact wooded block will constitute a forest.

1.10 RIGHT AND CONCESSIONS:

Forest settlement was carried out in 1917 when the rights and concessions of the local people admitted in the forests were recorded. The state forests are not having any private rights existing against it, but in practice the state has permitted certain kinds of usages (bartans) on waste land whether high forest, scrub or grass land to meet the reasonable domestic and agricultural requirement of the people and such usage will be maintained in so far as it is compatible with the system of forest conservancy suited to the requirement of the state and the people. The bartans are appended to cultivated land assessed to revenue. The rights are limited to the reasonable agricultural and domestic requirements of the people and the timber applied for in excess could be refused. The timber obtained by the bartandar at privileged rates cannot be sold or bartered. The bartan is subject to the condition that the bartandar will be responsible for the protection of the forests in which the bartan is exercised. The said forest is to be protected against illicit felling, fire and illegal grazing. In case of failure, the rights could be curtailed or suspended. Another condition attached with bartan is that the forests, whether demarcated or un-

demarcated, cannot be burnt to get fresh growth of grass. Only the grasslands with no tree growth can be burnt under controlled conditions once during winter and villagers must ensure that it does not spread to the forests.

1.11 SUMMARY OF PRINCIPAL RIGHTS:

The principal rights recognized at the Forest Settlement are; breaking up of land for cultivation, timber for building purpose, wood for burning the dead bodies, wood for agricultural implements, grazing, grass cutting and lopping; wood for marriage ceremonies, collection of medicinal herbs, flowers and fruits etc. The sale proceeds of grass from the area closed by the Government and fruits of trees belong to the village proprietors. Government is entitled to protect, improve and reproduce the forest growth and to sell trees to the traders and non-right holders, only after meeting the requirements of the right holders.

1.12 BREAKING UP OF LAND FOR CULTIVATION:

Large scale lands have been granted to landless people in the past, before the enactment of the Forest Conservation Act, 1980, and with the enactment of the Forest Conservation Act, 1980 no forest land now can be diverted for any non-forestry purpose without the prior permission of the Government of India. Thus, the power of the Deputy Commissioner has been curtailed under the provision of this Act. However, encroachments are prevalent throughout the Division. For agricultural and other non-forestry purposes large-scale forestlands have illegally been encroached upon. This has caused set back to the forestry works.

1.13 TIMBERS FOR BUILDING PURPOSE:

People largely depend on timber for construction of houses. Timber for bonafide requirements can be granted to the right-holders at concessional rates. These rates are as under:-

- i) Rs.500/- per Cubic Meter standing volume for Deodar and Rs. 250/- per Cubicmeter standing volume of other species.
- ii) Right holders suffering from natural calamities shall be given trees free of cost.

A number of instructions/notifications were issued in the past regulating grant of T.D. to right holders. However, Government vide notification No.FFE-B-E (3)-43/2006-Vol.II dated 26.12.2013 has framed Himachal Pradesh (Timber Distribution to the Right holders), Rules, 2013 with amendments thereafter also. According to these rules T.D. shall be granted to the Right Holders who have their recorded rights in the Mandi State Forest Settlement Reports (**Attached as appendix IX, Vol. II**)

for the grant of Timber Distribution for construction. Maintenance of residential house, cow sheds etc. for bonafide domestic use. The rules also envisage that no Timber Distribution under these rules shall be made for ten years if the right holder has sold trees yielding timber for construction of houses from his private land holding. In case right holder has land holding which qualifies him for grant of timber at more than one place, he may be granted timber at both places but the rates of trees shall be doubled at the second place. The right holder shall give undertaking about the details of land holdings and while applying for Timber Distribution at second place, details of timber already obtained against land at first place. No timber shall be granted to and owner on the basis of land purchased after obtaining the permission of the Government under section 118 of the Tenancy and Land Reforms Act, 1972, irrespective of the date of purchase of such land. Timber shall grant only to the head of family as per the Panchayat records. Timber shall be granted for the construction, repair and addition or alteration of house and cow shed to be used only for bonafide domestic purposes. T.D. shall not be granted to the Right Holders, of trees for the purposes are not available silviculturally in the forest where concerned right holders have Timber Distribution right. However, in such cases trees may be given from other forests at 50% of market rate of trees; provided right holders of those forests have no objections. Rights other than for timber for construction, repair and addition or alternation as contained in forest settlement reports shall continue to be exercised by the right holders. Timber Distribution Rights shall be subject to active cooperation and participation of Right Holders in forest conservancy. In case any Right Holder fails to perform his duties for apprehending offenders extinguishing fire or commits any forest offence, his right of Timber Distribution shall be suspended for sixteen years from the date of omission or commission of such offence and Timber Distribution Right of a Right Holder shall be suspended for sixteen years if he is found to have mis-utilized the timber obtained in Timber Distribution under these rules.

1.14 GRAZING:

The right holder are permitted to graze their cattle, buffaloes, sheep and goats for the whole year without any restriction in forests not closed for grazing by any specific order. Grazing fee was fixed even for local grazing of sheep, goats and buffaloes. Grazing of cows and buffaloes was allowed free for migratory graziers coming from Chamba, Kullu and the rates of grazing were higher than those for Mandi graziers. The rates fixed for migratory graziers were fixed long ago and need revision.

1.15 LOPPING:

The right of lopping broad leaved trees was allowed without limit and restrictions except in the areas worked for fuelwood and charcoal supply. Lopping of Deodar was prohibited under Mr. Maynard's rules. Lopping of Kail and chil was stopped

under Forest Settlement and these species are not lopped except superstitiously. The lopping of silver fir and spruce trees is permitted up to half the height of the trees and no tree under 3 feet girth can be lopped. Biotic pressure is increasing due to increase in human and cattle population and people are resorting to heavy lopping of trees around habitations which is resulting in the death of trees and recession of forest away from habitations. It has thus become imperative to restrict lopping strictly according to rules.

1.16 NON TIMBER FOREST PRODUCTS:

Collection of sale of flowers, fruits, medicinal roots, honey and nirgal is permitted. Cutting of grass had also been permitted even in the demarcated protected forests except where such areas are closed for regeneration. Extraction of slates from the forests is not permitted. Removal of bark from Oak and other suitable broad leaved species for tanning has been allowed from standing trees, provided removal of bark does not endanger the life of trees. In case of conifers, bark can be removed from the trees marked for felling. Collection of fallen needles of conifers and fallen leaves of Oaks and other broad leaved species is also permissible provided no iron take is used for their collection. Extraction of torch wood is permissible from stumps of all conifer species provided hammer markets are not disturbed during torchwood extraction. It is not permitted from dry or green fallen trees of all conifer species. Same bartans are allowed in the un-demarcated forests as in demarcated protected forests. In the Demarcated Protected Forests only those acts are allowed which are clearly admitted in the record of bartan. While in Un-demarcated Protected Forests, all acts are allowed except those which are especially prohibited.

CHAPTER-I

2. THE FORESTS

2.1 COMPOSITION AND CONDITION OF THE CROP:

The vegetation found within tract shows great diversity with the change in climate due to great variation in altitude which ranges from 548 meters to 2920 meters almost every type of forest form high level birch –rhododendron down to northern tropical dry mixed deciduous forests found in the tract. Different forest types generally follow definite altitudinal zonations except where microclimate changes due to change in aspect, rock and soil. Vegetation inversion i.e. forest types which otherwise occur at higher altitudes get projected in the lower zone and vice versa; could also be seen. The forests are not uniformly distributed throughout the tract but are generally confined to high hills. In the lower hills the extent of forests is very small as compared to the area under cultivation and waste lands and the forests interspersed with the cultivation give the impression of honeycomb.

The forests found within the tract have been classified into the following types according to Champion & Seth's classification of forest types.

Table 2.1: The Forests Found in the tract

Major Group.	Type Group	Sub Group	Forest Types
Dry Tropical	5-Tropical Dry Deciduous forests.	5-B Northern Tropical dry deciduous forests.	5B/C2 Northern Dry Mixed deciduous forests.
Montane Sub Tropicals.	9-Sub Tropical PineForests.	-	9/Cib: Upper or Himalayan Chir Pine Forests 9/Ci/DSI: Himalayan Sub tropical Scrub 9/Ci/Ds2: Sub tropical Euphorbia Scrub.
Sub-Tropical dry Ever green.	10-Sub Tropical Dry Ever green	-	10/CIA Olea cuspidata Scrub forest.

Montane Temperate Forests.	12-Himalayan Moist-Temperate Fts.	12-Ci Lower Western Himalayan Temperate forests.	12/Cia-Ban Oak forests (Q. incana) 12/Cib-Moru Oak Forests (Q. dilatata) 12/Cib (a,b)DSI/Oak Scrub. 12/Cic-Moist deodar forests (Cedrus) 12/Cid-Western mixed Coniferous forests (Spruce, blue pine, Silver Fir). 12/Cie-moist temperate deciduous forests. 12/Cif-Low level blue pine forests (P. WalliChiana)
	C2	Upper West Himalayan temperate forests.	12c2a-Kharsu Oak fts. 12c2b-West Himalayan Upper Oak/Fir forests 12.Ds1-Montane Bamboo brakes 12/Ds3-Himalayan temperate pastures 12/Ci/Ds2 Himalayan Temperate Secondary Scrub.
Sub Alpine Forests	14-Sub Alpine Forests	14-C West Himalayan Sub Alpine birch/Fir Forests Betula/Abies	14/Cia West Himalayan Sub Alpine fir Forests 14cib West Himalayan Sub alpine Birch/Fir/ Forests.
Alpine Forests	15 Moist Alpine Scrub.	-	15CI-Birch Rhododendron Scrub forests.

2.2 5B/C2 NORTHERN DRY MIXED DECIDUOUS FORESTS:

This type of forest is generally confined to elevation below 1200 meters above the bank of Beas and its tributaries in Urla, Lad Bharol, Dharampur and Kamlah ranges of Joginder Nagar Division. The important species found are *Acacia catechu*, *Salmalia malibarica*, *Erythrina variegata*, *Lannea coromandelica*, *Bauhinia variegata*, *Ougeinia oojenensis*, *Kydia calycina*, *Emblia officinalis*, *Anogeissus latifolia* and *Azadirachta indica*, *Dalbergia sissoo* and *Albizia spp.* are

found scattered. The above mentioned species are not uniformly distributed throughout. In the lower area *Lannea coromandalica* and *Dalbergia sissoo* are the main species with *Salmaalina malabarica* scattered here and there. Along the river bed *Dalbergia sissoo* grows in pure patches at certain places. Chil trees scattered here and there are also not very uncommon.

The under growth i.e. shrubs commonly found are *Mallotus philippinensis*, *Carissa opaca*, *Murraya koenigii*, *Adhatoda vasica*, *Woodfordia fanticosa*, *Indigofera pulchella*, *Dodonea viscosa*, *Nyctanthes arbor-tristis* and *Euphorbia royleana*. The ground cover generally is very thin and composed of grass with scattered species of *Flemingiaspp*, *Cassia tora*, *Ageratum*, *Conyzoides* and *Trifolium species*. *Bauhinia vahlii* is the most common climber in these areas. Other climbers found are *Caesalpinia sepiara*, *Rubus paniculatus*, *Acacia pinnata* and *Pueraria tuberosa*.

This type of forest is the grazing ground for local cattle and migratory graziers. It is therefore overgrazed and over lopped trees is found. Areas around the habitations are victims of indiscriminate felling for fuel and stocking consequently is very poor. The forest growth around these areas is to be protected and preserved. Heavy lopping & grazing pressure on *Anogeissus latifolia* is taking heavy toll of this spp.

2.3 9CIB UPPER OR HIMALAYAN CHIR PINE FORESTS:-

In this tract chil forests occur between 600 meters to 2200 meters elevation. Within this altitudinal range, its distribution mainly is dependent upon the aspect and other site factors. It extends over J/Nagar, Urla, Lad Bharol, Dharampur, Kamlah and Tikkan Ranges are forming extensive pure forests below and above Mandi-Pathankot road-(NH-20). Scattered chil forests occur between Siyuri and Ghatta in Joginder Nagar Range. Most of the chil forests are remarkable pure with only scattered trees of *Quercus*, *Rhododendron arboretum*, *Lyonia* in the nallas and shady places. On the Northern aspect chil is spreading through Ban Oak forests. Deodar projects in chil forests along the nallas on the Northern aspects. Kail also is trying to establish itself on the Northern aspect.

The density of under growth and its composition varies according to the location of forest and the magnitude of biotic interference. Generally the under growth consists of bushes of *Berberis Spp.*, *Rubus spp*, *Carissa spp*, and *Flemingia bracteata*. On the cool Northern slopes which is somewhat damper for chil forests, the undergrowth is fairly thick and is composed of mainly *Flemingia bracteata*, *Rubus ellipticus*, *Prinsepia utilis*, *Myrsina africana* and *Berberis spp*. Common grasses found in these forests during rainy season are *Pedicularis carnosus*, *Heteropogon contortus*, *Agrotis alba* and *Plectranthus strictus*. During summer the soil is benefited of vegetative covering and remains covered with fallen needles. Almost all chil forests are generally young, predominantly poles to middle aged with maturing and mature trees seen scattered singly here and there.

The ecological status of chil is a controversial. It is considered as a climax species by one school of thought and a sub climax by other. From the floristic composition of chil forests given above it would appear that under mesophytic Conditions, Chil are replaced by broad leaved species like Ban, Rhododendron or medicinal plants. Fire in Chil forests is a regular feature. Ban Oak is accepted as the climax vegetation for most part of chil zone it may be deduced that not too far back, Ban Oak with its other associates was in complete possession of this area and has now been pushed to more sheltered position by repeated fires. In spite of repeated fires and intense biotic interference, these broad leaved species has not given up their claim and are constantly invading the chil zone from their more advantageous positions in the sheltered places. Chil thus appears to owe its existence to repeated fires and is not the climax vegetation of the zone.

2.4 9/CI/DS-1 HIMALAYAN SUB TROPICAL SCRUB:

All the extensive grassy slopes within the altitudinal zone occupied by chil are forming this type. The trees growth is very sparse due to extreme dry and shallow nature of the soil. Occasional Chil or Broad leaved species could be located. Bushes are also found scantily. The open shrub formations occupy the grounds. Probably the scrub whatever is left, on degradation, will show its origin but both edaphic and biotic factors are involved in determining what persist.

These areas are generally used as grazing grounds or ghasnis and are burnt during Feb. & March in order to get fresh flush of tender grass. Grasses growing in such localities are *Chrysopogon fulvus*, *Heteropogon controtus*, *Themeda anathera*, *Cenchrus ciliaris*.

2.5 9/CI/D52 SUB TROPICAL EUPHORBIA SCRUB:

This type of forests occur at the same altitudinal zonation as the northern dry mixed deciduous forests but are found on the Southern and Western aspects where soil is extremely shallow and wanting. Euphorbia royleana forms consociations on rocky spurs with gritty soil. Their distribution is related to edaphic factors but under biotic pressure they extend and become denser and purer owing to elimination of less resistant species. Some scattered species viz. *Lannea grandis*, *Salmaliamalaberica*, *Kydiacalycing* and *Ficus* spp. can be seen along the slopes above Beas River. These areas are winter grazing grounds of migratory graziers.

2.6 CIA OLEA CUSPIDATA SCRUB FORESTS:

Groves of *Olea cuspidata* seen growing at places in Tikkan Range only represent this type of forest. *Olea cuspidata* is distributed mainly on the flatter alluvial ground above Panarsa where it has mostly been cleared for cultivation. Government is promoting grafting of *Olea curopea* (garden variety) over the

indigenous type with a view to yield more olive oil. There is an Italian Project with Horticulture Development of the State which is actively involved in this.

2.7 LOWER WESTERN HIMALAYAN TEMPERATE FORESTS

2.7.1 12/C1a/BAN OAK FORESTS (*Quercus leucotrichophora*):

Ban Oak forests are widely distributed in the tract occurring between an altitude of about 1000 to 2500 Meters and found in almost all the Ranges. The occurrence of Ban Oak shows a wide altitudinal distribution. Fairly extensive patches of ban with excellent growth are present with in Uhl valley and along Ghoghar, Bhabhori Dhar, Janitary dhar and Dagwan Dhar. In Uhl valley the area under Ban Oak is more than that under conifers. Besides growing in compact patches, Ban grows in Nalas and as an under storey in chil and deodar forests. In the recent past, Ban has been subjected to severe lopping, hacking and felling. Now green felling of Ban has been banned by the Govt. However, dry standing and uprooted ban trees are worked for extraction of fuelwood and charcoal to meet with the requirements of charcoal/fuelwood. The common associates of Ban Oak are *Rhododendron arboretum*, *Lyonia ovalifolia* and *Pieris ovalifolia*. In Nallas and shady depressions, deciduous species like *Aesculus indica*, *Acer species*, *Cedrella serrata* also contribute to the top canopy. In the upper zone Ban Oak grows mixed with *Quercus dilatata* and *Quercus semicarpifolia*. Main species forming undergrowth are *Myrsine africana*, *Barberis* spp., *Prinsepia utilis*, *Indigofera* spp., *Desmodium* spp., *Rubus niveus*, *Viburnum cotonifolium*, *Salvia glutinesa*, *Daphane papracea* and ferns and grasses occurs in nalas. *Strobilanthes* and *Polygonum* spp are found in the damper sites.

Ban Oak is the stable climax of this zone. Kail and Spruce in upper zone and chil in lower zone may invade ban oak forest when aided by biotic interference. Such mixed oak community represents secondary succession and this may revert back to pure ban of biotic factor is excluded.

2.7.2 12/C1b MOHRU OAK FORESTS (*Quercus dilatata*):

Mohru Oak occupies comparatively smaller area of the tract and found in small pockets in Uhl valley particularly in Urla Range and higher zones of adjoin jogindernagar range. It either mixed with Ban Oak or Kharsu Oak or in small patches in Kail or Spruce forests. The floristic composition of this type is generally the same as described for Ban Oak forests. As it is a better fodder than the other two oaks, it has been very heavily lopped especially near habitations. As a result the trees are stunned and poor in growth. Trees are generally of bigger diameter classes and younger age classes and regeneration are absent because of excessive lopping and heavy grazing.

2.7.3 12/CI (ab) DSI OAK SCRUB:

This type of forest is found in the areas. As it is good in fuel and fodder value and is an excellent timber for agricultural implements. Ban Oak is lopped badly and reduced to more scrub. Oak and other associate species are low, stunted trees now. The undergrowth is composed of bushes of *Berberis spp*, *Prinsepia spp*, *Spiracas*, *Indigofera* and *Wikstroemia* etc.

2.7.4 12CIc MOIST DEODAR FOREST (*Cedrus deodara*):

This forest type occurs generally between an altitude of 1500 Meters and 2700 Meters. On Northern slopes and along nalas it comes down to a much lower elevation. Main blocks of Deodar are Urla, and Tikkan ranges. Barot, Deogarh and Silbudhani specially of Urla. Scattered deodar forests occur in Jogindernagar range also. The overwood in deodar forests is thus either pure deodar or mixture of deodar and Kail or spruce depending upon the elevation and site factors.

The understorey is composed of *Quercus incana*, *Acsclus indica*, *Juglans regia* and *Cedrella serrata* in nalas. The undergrowth consists of *Berberis*, *Prinsepia utilis*, *Plectranthes rugosus*, *Artemesia vulgaris*, *Lonicera angustifolia* and *Daphne papyracia*, Ferns, *Iris spp*, *Desmodium spp*, *Sarcococca saligna* and *Wikstroemia canescenns* occur in the mesophytic localities. The Herbaceous growth consists of *Salvia glutinosa*, *Viola serpens*, *Fragaria vesiea*, ferns and grasses. Climbers are *Hedera helix*, *Rosa muscata* and *Clematis montana* & *Vitis himalayans*. Deodar is very exacting species and gets disturbed by slight change in the habitat in the sense that it gets replaced quickly by its associates and is thus may not a climax species.

2.8 SPRUCE DEODAR FOREST:

Along the upper limit of deodar zone, spruce grows mixed with Deodar, the former predominating in nalas and shady places and the latter along the spurs. Deodar and Spruce are generally not intimately mixed but occur in groups and blocks. Kail is also found along the spurs which are dry. The age class distribution is irregular with middle aged class predominating in tension belt areas and spruce spreading under deodar Biotic interference plays an important role in determining the proportion of deodar and spruce in such forests. Around habitations spruce is lopped and deodar is given protection resulting in increased proportion of deodar. In nalas and cooler sites where conditions are more mesophytic, the proportion of spruce increases.

2.9 PREDOMINANTLY SPRUCE FORESTS:

This type of forests forms a narrow belt above deodar spruce forests and below spruce silver fir forests. The over wood is mainly of spruce with scattered

silver fir trees. Scattered trees of Kail and deodar may also be found along the spurs. Deciduous species like horse chestnut, Walnut, Maple, Bird cherry and Darle (*Cedrella serrata*) are found in the nallas. Ban Oak or Mohru Oak in the lower portion and Kharsu Oak in the upper portion also occur in small pockets. The undergrowth and herbaceous flora are fairly thick. Vitis Himalayana is the common climber. Spruce is not the climax vegetation of this zone and is gradually replaced by silver fir.

2.10 SPRUCE SILVER /FIR FOREST:

As mentioned above, this type of forests occurs above the predominantly spruce forests and below Western Oak Fir forests between an altitude of 2500 to 3500 meters. Fir forests of Uhl valley fall in this type. Spruce predominates the lower portion and along spurs while the upper portion and nallas are occupied by silver fir.

Silver fir is spreading under spruce and predominates the younger age classes. Common associates amongst deciduous species are walnut, maple, birdcherry and Betula. Kharsu grows at the top and Mohru in the lower portions. The understorey is thin and consists of scattered *Taxus baccata*. The undergrowth is fairly thick and consists mainly of *Viburnum contonifolium*, *Desmodium* spps, *Spirea lindlyana*, *Deutzia corymbosa*, *Prinsepia utilis* and *Berberis* spps. Main species forming the herbaceous flora are *Strobilanthes* spps, *Ainslea aptera*, *Iris* spps, *Fragaria vesica*, *Polygonum* spps, *Rosa* spps & grasses. Vitis semicordata is the common climber.

2.11 PURE SILVER FIR:

Pure silver fir stands form this type. Spruce is virtually absent and even the broad-leaved trees are conspicuously absent except for a few scattered trees of Kharsu, Betula and Maple. The crop is open and the understorey is absent barring few scattered *Taxus baccata*, and poles of silver fir. The undergrowth and herbaceous flora are fairly thick and composed of same species as given in spruce silver fir mixture. Young regeneration is almost absent. Grazing incidence is low and fires are unknown. Raw humus is fairly deep except along steep slopes and nalla beds.

2.11.1 12/C1e MOIST TEMPERATE DECIDUOUS FORESTS:

This type is found between an elevation of about 1800 to 2750 meters in moist and hollow depressions, along the nallas. The overwood composition is horse chestnut, bird cherry, walnut, maple. These species either grow in pure stands or in mixture of varying proportions. The understorey is usually thin and the ground flora is very rich consisting of species of the fir zone. Because of the

conditions being extremely moist, the conifers retreat from these sites but on comparatively drier sites kail invades in the lower zone and silver fir invades in the upper zone. Replacement of these broad leaved species by conifers suggests that these deciduous broad leaved forests are only of serot type but as a rule this type of forest appear to be definite edaphic climax.

2.11.2 12/Cif LOWER LEVEL BLUE PINE FOREST (*PINUS WALLICHIANA*):

These occur in pure and extensive patches growing from an elevation of about 1500 to 2500 m between chil and fir zone. Mostly Kail occurs in pure patches in the lower zone while spruce comes in mixture in the upper zone and replaces it completely in the nalas and cooler sites. Deodar grows mixed with kail between an elevation of 1800 and 2000 m. Understorey is comprised of Ban Oak in the lower zone and in nalas and that of Moru oak in upper zone and in sheltered places. Horse chestnut, walnut, birdcherry and so on also grow in nalas either scattered or in groups.

These forests are fairly well stocked & generally are even aged. Trees of middle aged classes predominate with older age class. Younger classes generally are less. Kail trees exhibit fairly good height and diameter growth and most of the forests are quality II. Incidence of *Trametes pinii* is fairly high especially in areas near habitations. Fires are not common in these forests. Fire is destructive as kail is not fire hardy but because of its exceptional reproductive powers fire tends to maintain and even extend kail in some areas at the expense of its coniferous competitors.

2.11.3 12C2a KHARSU OAK FORESTS (*QUERCUS SEMICARPIFOLIA*):

Kharsu Oak forests occur between an altitude of about 2500 to 3500 m along the top of Mahrola, adjoining up to Devidarh. Pure stands of Kharsu Oak are found on the Southern slopes. In the patches of pure Kharsu, the understorey is generally missing and undergrowth is composed of scattered bushes of *Viburnum*, *cotinifolium*, *Desmodium*, *Cotoneaster bacillaris* and *Indigofera* spp. The herbaceous growth also is not very thick under pure patches of Kharsu Oak but on Northern aspects where kharsu grows mixed with conifers, the ground cover is fairly thick and is composed of *Fragaria vesica*, *Primula denticulata*, *Polygonum* spp, *Sexifraga ligulata* and *Anaphalis triplinervis*, Varieties of lichens and mosses are also available.

Stocking generally is not good. Middle age class predominate Timber extracted is used for making agricultural implements by the local people. Young regeneration is found in patches at places.

2.11.4 12/C2b WEST HIMALAYAN UPPER OAK/FIR FORESTS

These types of forests are present between an altitude of 2900 to 3350 meters. They mostly occur in the Northern aspect and the sites which are sheltered. These forests generally form a narrow strip along the fir forests. It is a two storeyed forest with silver fir forming the upper storey and Oak forming the under storey. Kharsu Oak occurs in pure patches along the spurs. The species composing the under growth are the same as described in silver fir-spruce forests. The herbaceous flora is also luxuriant and same as found in silver fir-spruce forests. *Vitis semicordata* is the common climber found in these forests. Silver fir regeneration under kharsu oak.

2.11.5 12/DS I MONTANE BAMBOO BRAKES:

Arundinaria falcata (Nirgal) and *Arundinaria spathiflora* are the two bamboo species found as under growth in the spruce silver fir forests of Uhl valley. Scattered clumps are also seen in Dharampur Range. At certain places, nirgal and bamboo forms thick brakes and takes complete possession of the ground. Bamboo brakes are gregarious in habit.

2.11.6 12/DS-3 HIMALAYAN TEMPERATE PASTURES:

Favourable sites on ridges and slopes where grazing has taken place, have gradually been cleared forming pasture land. The main grasses growing in these areas are *Themeda spp*, *Chrysopogon spp*, *Heteropogon spp*, *Dactylis glomerata* etc.

2.11.7 12C1/DS2 HIMALAYAN TEMPERATE SECONDARY SCRUB:

These types of forests occur in the lower hills. Because of nearness to villages and easy accessibility, these areas are heavily grazed and browsed. The area is generally cleared of tree growth. This type of forest occurs in parts of J/Nagar, Urla and Tikkan Ranges where Ban Oak areas are completely cleared. Fairly this growth of *Spiraea spp*, *Rubus*, *Prinsepia utilis*, *Flacourtia indica* and *Berberis canescens* fills the area with scattered multinated Ban Oak and some *Rhododendron arboreous* trees are found here and there. Grazing is heavy and erosion fairly active.

2.11.8 14/C.La WESTERN HIMALAYAN SUB ALPINE FIR FORESTS:

These forests occur above the birch of forests and are found intimately mixed with it. *Rhododendron* species forms the undergrowth in such forest. *Betula utilis* and Kharsu also grow in varying proportions. The nalas found in this zone are blank because of snow slides. The herbaceous flora is fairly rich. The species

forming the undergrowth and ground flora are *Viburnum cotonifolium*, *Salix spp.*, *Rhododendron arboreum*, *Rhododendron companulatum* and *Cotoneaster bacillaris*. The herbaceous flora consists of *Primula denticulata*, *Caltha palustris*, *Potentilla spp.*, *Ranunculus spp.*, and *Anaphalis triplinervis*.

2.11.9 14C1b WEST HIMALAYAN SUB ALPINE BIRCH/FIR FORESTS:

These types of forests occur in the Northern most part of the tract between an altitude of 3000 to 3900 meters. Kharsu and *Betula utilis* are found with some scattered silver fir trees. *Rhododendron camapanulatum* and *Rhododendron arboreum* form the understory. The undergrowth constitutes *Cotoneaster bacillaris*, *Viburnum cotinifolium* etc. The density of undergrowth is variable but the herbaceous flora is rich everywhere and consists mainly of *Primula denticulate*, *Crlthapalustria*, *Poleatilla spp.*, *Ranunculus spp.* and *Anaphalis triplinearvis*. A large number of herb species also grow in these parts.

2.11.10 15/C/1 BIRCH RHODODENDRON SCRUB FORESTS:

It occurs above sub alpine forest types only in small pockets. Low evergreen scrub growth, usually one meter high, occur in small patches and is broken by patches of grass. Main species growing in these formations are *Contoneaster bacillaris*, *Salix alba*, *Lonicera spp.* and *Virburnum species*. Ground cover generally is composed of grasses and annuals.

2.12 INJURIES TO WHICH CROP IS LIABLE:

The forests of Joginder Nagar Forest Division are exposed to various causes of injuries like Fire, Man, Animals, Plants, Insects, Fungi, Nature and Isolation Shocks etc. which area described in detail.

2.12.1 FIRE:

Fire has caused huge losses to forest wealth. Forest fire being the potent form of injury, has destroyed timber and living trees. It requires a large chunk of funds to rehabilitate the brunt areas. There have been losses of extensive forest covers. It destroys the ecology of the area as well. Grazing value and fertility of the soil is also reduced as a result of fire. The trees which survive severe fires are unable to recover their original vitality and do not put on normal increment. Besides doing incalculable damage to the forest growth, fires result in excessive erosion and increased run off.

The fires are frequent during the dry months of April, May and June and again in October and November. Fire takes place either due to carelessness or deliberate mischief of the villagers. In chil forests, fires are generally started by the villagers to get fresh growth of grass. Too close resin channels are another aggravating cause for the death of tree. Burning of the area needs to be controlled.

Pure Kail forests are more inflammable than deodar forests. Kail trees are killed outright in the event of severe fire. Young deodar plantations which have fairly thick under growth and which have not been regularly thinned are very susceptible to fires. Spruce and silver fir is fire tender and is killed by light fires. Ground fires through thick humus accumulated in fir forests are very dangerous. Ban Oak and other broad leaved species suffer more than chil and fire is mainly responsible for extermination of these species in chil forests. Mohru Oak and Kharsu Oak are also fire tender. The following table summarises the areas burnt by accidental fires during different years.

Table 2.2: Summarizes the areas burnt by accidental fires from 1993-94 to 2021-22

S.No	YEAR	AREA (Ha)
1.	1993-94	31.3
2.	1994-95	14
3.	1995-96	118
4.	1996-97	166
5.	1997-98	0
6.	1998-99	86.8
7.	1999-2000	11342.97
8.	2000-01	32.4
9.	2001-02	11.5
10.	2002-03	827.20
11.	2003-04	893
12.	2004-05	5
13.	2005-06	58.50
14.	2006-07	32
15.	2007-08	95
16.	2008-09	76.5
17.	2009-10	332.60
18.	2010-11	55.25
19.	2011-12	17
20.	2012-13	177
21.	2013-14	21.5
22.	2014-15	135.80
23.	2015-16	39
24.	2016-17	346.35
25.	2017-18	128.50
26.	2018-19	680.05
27.	2019-20	280.50
28.	2020-21	26
29.	2021-22	447.9

2.12.2 MAN:

Felling damage to forests by illicit felling is common throughout the tract. Incidences of felling of trees by villagers keep taking place. Incidences of mass tree felling are very rare.

2.12.3 LOPPING:

Near the habitations, lopping of Ban Oak and other low level broad leaved species such as Biul, Kachnar, Chimmu, Jhingan, Siris, Khirak, Semal, Ficus etc. is very common. Some of the demarcated forests in the lower areas, which once carried good from are going to be converted into scrub within no time of indiscriminate lopping continue. Among the conifers, spruce growing near villages has suffered most because of excessive lopping. Lopping of spruce is permissible only upto half the height while trees of less than 3ft. in girth cannot be lopped. Even isolated or small patch of spruce trees in otherwise pure deodar or kail stands have been heavily lopped. Though lopping of Kail is prohibited but the same has also been lopped and thus been exposed to attack of Tramatespini and some root fungus. Chil also is lopped at places resulting in reduction of vigor and consequently in reduction of resin yield. Ban trees acquire gnarled appearance when lopped repeatedly. Mohru also getlopped where it occurs around the habitations.

2.12.4 GRASS CUTTING:

The villagers have got recorded right for grass cutting in the forests. While cutting the grass from the forests, the young seedlings are also cut by the villagers resulting in regeneration failure. Grass cuttings in regeneration areas should, therefore, be permitted with cautions and under the supervision of protection staff.

2.12.5 DEBARKING:

Ban is debarked by cobblers for tanning material. Chil bark is removed for roofing of Machans and Dogris. The damage incidentally is not to a great extent and is confined to forests neighbouring the villages. Only Spruce and Silver fir trees are debarked for making ridge pieces for roofs especially for dogris situated in the fir zone, spruce poles completely debarked at the base often die. Walnut trees are also debarked to extract Dandasa and considerable damage is done to the trees. Debarking of walnut trees to extract Dandasa is on the increase as dandasa fetch good price in the market.

2.12.6 ANIMAL GRAZING:

Almost all the forests of the tract except for the high fir forests are grazed pretty heavily because of the unrestricted rights of grazing admitted for the local people. Besides browsing and trampling of young seedling by the

cattle, overgrazing has also resulted in striping hill sides of vegetative cover and consequently increase in soil erosion and run off. Harmful effects of overgrazing are noticeable in all the chil forests and more so in forests adjoining habitations. Grazing during rains, especially by buffaloes, pulverizes the soil and compacts it so that it is no longer able to absorb rain and thus increases run off and soil erosion. Even Deodar and Kail forests are being damaged considerably by incidences of over grazing. It is not letting the natural regeneration survive. On dry over grazed sites near villages, deodar is of very poor quality and natural regeneration is conspicuously absent. Overgrazing is also resulting in depletion of the ground cover thereby deteriorating the site quality. The accessible parts of spruce forests are also suffering because of this evil. The areas of Silver Fir and Spruce away from villages are, however, not overgrazed. Harmful effects of over grazing are more pronounced on Southern slopes, waste lands, alpine pastures, un-demarcated forests and newly demarcated forests. In the above listed areas, continuous grazing has destroyed the soil cover of good grasses and leguminous plants. Coarse unpalatable grasses and thorny shrubs have replaced them. These species cannot provide adequate cover to the soil. Besides the local cattle, the migratory sheep and goats which come for grazing, do lot of damage. Goats and buffaloes are worse than cows and sheep and attempts should be made to put a curb on their number.

2.12.7 WILD ANIMALS:

Bears debark young deodar and kail poles. Branches of Oak are also broken by bears to get acorns. Porcupines gnaw off the bark from the base of Deodar and Kail poles and dig out and eat chil saplings. Monkey pull out seedlings of chil from the plantation areas and dig out walnut and other edible seeds and fruits sown in the nurseries and plantations. Woodpeckers make holes in the bark of Deodar and chil poles. Flying squirrels and nut crackers destroy large quantities of Deodar Kail and Chil cones and consume the seeds. The damage done by wild animals in this division is not appreciable.

2.12.8 PLANTS:

a) CLIMBERS:

In Kail and Deodar forests *Vitis semicordata*, *Hedra helix* and *Sehizandra grandiflora* are common. *Rubs paniculata* and *Bauhinia Valhi* are found in the lower areas. These climbers do not cause much damage except for in plantation areas where climbers tend to suppress the young plants.

b) WEEDS:

Weeds are undesirable in plant growth. Weed growth poses a very serious problem in the high fir forest. For example, *Strobilanthes spp*s and *Iris*

hepetensis from fairly thick undergrowth at places that inhibits natural regeneration. Heavy undergrowth of *Spiraea spp* is not letting any natural regeneration to come up.

c) PARASITES:

There are no serious parasites which cause any considerable damage in the forests of the tract.

2.12.9 INSECTS:

In 1935, insect attack had taken the form of an epidemic. Since then insect attack have been taking place but very sporadically. *Scolytus major*, a bark beetle, causes damage to Deodar poles and saplings on rocky and dry sites. *Euzophera cedrella* attacks deodar cones and destroys seeds of Deodar. The cockchafer grub, *Melolontha spp* and worms eat away the roots of young deodar in nursery and plantations. *Agrotis spp* causes damage by cutting the seedlings at the ground level. *Ectropis deodare* sometimes causes appreciable damage to deodar, longifolia and *Gyptorhynchus brandisi* attack sick chil trees in the forests.

Polygraphus spp, attacks Kail cones and destroys seeds. *Platypus brulormis*, the shoot hole borer, attacks felled and sickly standing chil trees and niddles them with holes. It is very common in chil forests and reduces the value of the timber if conversion is not done quickly. Appreciable damage is done in silver fir and spruce trees by *Brachyxyetus spp* which causes the young shoots to wither and fall off.

2.12.10 FUNGI:

a) TRAMETES PINI:

This is a very serious and dangerous fungi and it has caused damage to Kail appreciably. Fungal spores settle on the exposed wood and from there spread to the heartwood converting it into a spongy mass. In case of severe attack, the loss of timber is enormous. No Kail forest is absolutely free from this fungus.

b) FOMES ANNOSUS:

In badly drained area, the roots of Deodar are attacked and then it spread to the pole as well causing the death of the tree. It spread centrifugally in the soil. The damage due to this fungus is not much and only sporadic casualties have been noticed. Since the fungus is soil borne, digging of trenches around infected poles and uprooting and burning the infected material will be helpful. Growing deodar on well drained soil is another remedy.

c) PERIDERMIMUM CAMPANULATUM & PERIDERMIMUM BREVIS:

These fungi attack the needles of Chil & Kail respectively and kill them.

d) PERIDERMIMUM CEDRI:

The leading shoots of Deodar are attacked at first and then gradually the whole tree is killed.

e) PERIDERMIMUM PICEA:

The fungus has been noticed in the spruce forests. The infected branches should be immediately cut and burnt.

f) FUSARIUM SPP:

It causes damping off of deodar. It attacks the roots of Deodar. Bad drainage and poor aeration of the soil is the main cause of this disease. Deodar should therefore always be grown on well drained soil.

2.12.11 NATURAL CALAMETIES:

a) SNOW:

Commonest of all the damage caused by nature is snow. This type of damage occurs chiefly at high altitudes. Generally congested group is more susceptible to snow damage. The trees may get uprooted, their tops may get broken, and the boles may bend near the base due to heavy snow fall. Un-thinned Deodar plantations suffer heavily from snow. In young plantation or regeneration areas, where the weed growth is heavy the seedlings are smothered by the weight of dead weeds which are pressed upon them from the uphill side due to the weight of snow. Snow slides do not let any tree growth come in the nallas in Silver Fir zone. Snowfall taking place during March-April is generally wet snow and it inflicts more damage than dry snow.

b) HAIL & STORMS:

Hail and storms are the factors which cause appreciable damage in the forests during March to April as these are quite frequent during these months. Young seedlings of Deodar and Fir are the main casualties since germination has just taken place at this time. Strong winds after heavy snow or rain result in uprooting of fairly large numbers of trees in the forests of this tract every year.

c) LIGHTNING:

Solitary trees at places get burnt when lightning struck these trees. In certain cases the whole of the tree does not get burnt but the tip is broken and the bole splits up. The damage due to lightning is noticed in Jhatingari and

Silhaswar Forests of this division.

d) DROUGHT:

Lower areas especially Southern slopes are affected by drought during May- June and sometimes during Oct. Nov. as well. These areas are fairly over grazed. Mortality of seedlings is pretty high in the plantations done on eroded areas where the soil depth is not much. Deodar seedlings get badly affected by drought. Besides killing young seedlings drought increases fire hazard in hill and other low lying areas.

e) ISOLATION SHOCKS:

Isolation shock is the phenomenon where trees and regeneration die when suddenly exposed to more light and sun and strong winds. Fir trees and Spruce trees die of isolation shock easily as compared to other species.

CHAPTER-II B

2.13 FOREST FAUNA

2.13.1 GENERAL:

Wide range in altitude results in marked variation in the climatic conditions met within the different parts of this division. The climate is tropical and sub-tropical in the lower areas, temperate in the middle portions. During winter, it snows down to an elevation of about 1500 meters but does not lie for a long period below 2000 meters.

The wide range of altitude, temperature, and rainfall results in a diversified and rich forest flora, varying from Northern tropical dry mixed deciduous forests to alpine pastures. The forests, are however, not uniformly distributed through out the tract and are mostly confined to higher hills and interior valleys. The forests in the lower areas are scattered and have sparse tree growth.

Very varied and interesting wildlife is found in this division as a result of great variation in elevation, topography, climate and forest cover. Wild animals and bird capable of living under different climate conditions ranging from tropical to arctic climate and form a thick forest cover to sparse tree growth are found in this tract. We have in our forest's wild animals of different sizes, shades, and habits, like wild animals, a great variety of wild birds are also found. Our forests will be very much poorer without the varied wildlife, we have in them.

2.13.2 IMPORTANCE OF WILD LIFE:

The value and importance of wild life from cultural, aesthetic, scientific, economic and recreational point is immense and is recognized all over the world. With this end in view, the very idea of preservation of wild life forms a part of our religion and culture which is as old as civilization itself. We have seen wild life is woven into the mythology and folklore of the land. It finds a place of pride in the Hindi scriptures. Our sacred and legendry books are full of love for wild life. One has merely to recall the significant passages from Kautilya's Arth- Shastras, which provides severe punishment for entrapping, killing or molesting deer, Bison, Bird or fish in protected areas. Fifth pillar epic of Ashoka the Great, which is as old as third century B.C. depicts, Ashoka's commandments for giving protection to wild animals, birds, fish and forests. Vedas are full of hymns in veneration of animals. Our religion would become very much poor without this feeling of loving kindness towards animal life. We must preserve this singularly precious heritage.

Wild life is important from the cultural, scientific or biological, economic, recreational and aesthetic point of view also.

2.13.3 CULTURAL VALUE OF WILD LIFE:

Indian mythology, art and literature are bound intimately with animals and birds in a hundred verses are echoed in the prayers of the Vedic hymns, praising the cattle Nandi as the Vahan of Shiva, Garuda of Vishnu, Swan of Saraswati and Peacock of Kartikeya, while Lakshmi is surrounded by elephants. How Krishna leans against a Kadamba tree attended by cows or driving them home at sun set to the gates of Vrindaban is depicted in thousand pictures. Similarly, lion is the charger of Durga in her fight against the forces of darkness and barbarism. It is because of this association that lion has become the symbol of Dharma.

2.13.4 SCIENTIFIC AND BIOLOGICAL VALUES:

In some quarters there is an erroneous notion prevalent that the wild animals are instrumental in damaging the field crops and domestic animals. Hence out of ignorance many people resort to indiscriminate destruction of these animals. The fact is other way round. The herbivorous animals do not damage the field crop if sufficient food is available in their natural habitat. The animals check the cover growth of vegetation and their population provides food for the carnivore. If man does not indiscriminately destroy the wild animals, the Carnivorous animals will not lift his domestic animals or attack him. When the natural balance of wild animal population is upset by the callousness of human beings, they invade the fields and human habitations. The birds are helpful and useful to man in innumerable ways. Apart from their beautiful look, feathers and sweet songs, they devour millions of crop pests and rodents. They also scavenge the forests; bring about pollination of flowers of some of the fruit and forest trees and help in dispersal of seeds. But for the help of birds in destroying the crop pests, which multiply at a tremendous rate, it would have been rather impossible to raise field crops. These pests live on wood, living on plant leaves, flowers and fruits and eat 2 to 200 times of their body weight per day, on alarming magnitude indeed. Thus, the contribution of bird population in maintaining the vegetation cover on earth and help in raising the field crops for food cannot be over emphasized. And hence the importance of balance in the constituents of nature nevertheless, the animals damaging crops, lifting domestic animals and man eaters have to be killed and thus the balance restored.

How then, can we dis-associate ourselves from these creatures Ancient oriental wisdom constantly emphasized on the unity of all earthly life and sciences bringing us back to some point. And yet, we appear to be utterly impervious to the urges of the wisdom distilled either from ancient philosophy or from modern science. It is also wise to remember that we can destroy a species but surely, we can never recall it.

2.13.5 ECONOMIC VALUE:

There is economic side of wild life too. This implies the benefits or profits we may get from the use of wild animals. The monkeys, for instance, have been

useful in research for cures of human diseases. The mus pods of the musk deer are of great repute.

2.13.6 RECREATIONAL & AESTHETIC VALUE:

The beauty of wild animals and birds fascinates the bird watchers, sport enthusiasts, photographers-amateur and professionals, animal and bird ecologists and biologists, and the gaiety hunters, the tourists from within and outside the country. The country side blessed with natural beauty bearing beautiful woods, wild animals and birds attract a multitude of tourists for sightseeing, sport and rest in such surroundings. Tourism earns substantial revenue for the state. Besides, revenue, people of the areas including hoteliers, transporters etc. are also benefitted in many ways.

2.13.7 GENERAL:

This division has a varied topography, climate and forest cover and is as such endowed with a variety of fauna. The main among the mammals and birds found in the tract are the following.

2.14 MAMMALS



Goral (*Naemorhedus goral*)

2.14.1 Ghoral (*Naemorhedus goral*):

It is found in the area East of GhogarDhar. Ghoral is not uniformly distributed throughout this area but is mostly concentrated in Chohar valley. This goat antelope is found on rugged grassy and rocky hill sides covered with open tree growth. This animal is reported to be occurring in fair abundance in the tract about 90 years back. It has suffered very much at the hands of poachers because of its great value and has consequently receded to more interior and difficult areas. The general colour of Goral is yellowish grey diffused with black. They generally associate in

small parties of 4-8 feeding on rugged grassy slopes. They usually come out in the morning and evening but are seen throughout the day in cloudy weather. The ringed or dodged horns which curve slightly backwards are 10-12 cms long. The Young are born in May-June. This is the critical time when they need cover and plenty of food.



Kakkar (*Muntiacus muntjak*)

2.14.2 KAKKAR (*Muntiacus muntjak*):

This is small deer mostly found in thickly wooded areas and coming out for grazing in open grassy blanks. It feeds on grass, leaves and wild fruits. The colour of the animal is Rufus grey to brown. The antlers in male are small, consisting of short brow line and in un-branched beam. They are set on bony hair covered pedicels which extend down each side of the face as bony ridges. Munt-jak frequents in thickly wooded hills. They are seen singly or in pairs or in small family parties. The typical call from a distance sounds much like the bark of a dog. It is given out at intervals usually in the morning or evening, sometimes after nightfall.

2.14.3 Kastura (*Moschus moschiferus*):

It is found sporadically in area above 2500 meters below Nargu peak and along Hathipur Dhar. It is very much prized for its musk and has consequently suffered large scale destruction at the hands of local people and the poachers. Musk deer is nearing extinction in the area and requires immediate and complete protection. It has now been declared as protected species and it's shooting and capturing is prohibited. It is a little creature not more than 20" at the shoulder unlike the other deer's, the musk has no antlers. It has long canine teeth, attached to lower jaw. The colour of the animal is usually dark brown pale beneath and the hairs are long needle like. Musk deer lives singly or in pairs and are generally met within birch forest above the zone of pines. They come out for feeding during morning and evening. The food consists of grass, leaves and flowers.

Sambhar (*Cervus unicolor*)



2.14.4 Sambhar (*Cervus unicolor*):

This largest deer is also occasionally met with in the lower areas. It is not very common and only a few animals are reported to be found. On account of its being found in comparatively easy and accessible areas, it has met the fate of large-scale destruction. The remaining few animals can also not escape for long unless very strict protection measures are taken. This large deer has more nocturnal habit and it retreats into heavy forest cover at dawn. It feeds on grass, leaves and wild fruits. Its coat is coarse and brown in colour with yellowish tinge. Its height at shoulders may be upto 140 Cms and may weight upto 300 Kgs. It is capable of moving very silently in eventhe dense forests.

2.14.5 INDIAN WILD PIG (*Susscrofa cristatus*):

Wild pig is found in the lower areas. During the past few years, the wild pig has been indiscriminately killed by local people and outsidepoachers and their number is now very small.

This notorious and omnivorous animal lives in grassy, bushy and also thickly wooded areas. It fees on field crops, roots and tubers of wild plants and even insects. It feeds during morning and evenings. It is black in colour, the skin is covered by a sparse growth of bristles which form a conspicuous mane.

2.14.6 INDIAN PORCUPINE (*Hystrix indica*) :

This destructive rodent in found in all areas of this division upto the elevation of about 2500 meters. It adopts itself to any type of land but favours rocky hill sides where it lives in burrows dug by it. The burrows consist of an entrance gallery and a few emergencies exist. The burrows of galleries some times are 15-18

meters in length. The porcupines are characterized by the spines borne on the neck, back and hind quarters. The spines or quills on the shoulder are 15 to 30 cms long and those on the back are shorter and stout, when provoke, porcupines erect their quills and rattle their hollow tail quills. It's mode of attacking the enemy is peculiar. It launches itself backward with incredible high speed and strike its hind quarters against the enemy driving its strong spines deep into it. They are very much destructive to field crops and gardens when adequate food is not available in the forest. The porcupine feeds on field crop, fruits, roots and tubers.

2.14.7 FLYING SQUIRREL (*Glaucomys sabrinus*):

It is found from an elevation of about 1000 to 3000 meters. It is nocturnal in habit. They eat fruits of various tree species and also eat the insects, hiding under the bark. Damage they do to forest crops thus compensated by the help they render by eating injurious insects.

2.14.8 THE INDIAN HARE (*Lepus nigricollis*):

This rufous tailed hare is found in lower areas of this division. It likes bushy forest growth and generally lives in the neighborhood of cultivation and villages. During summer when the grass is scarce, it enters even the house compound for fresh leaves of grass. It is in general, nocturnal in habit. By day it comfortably sleeps in a bush. This animal, though small is hunted for its flesh.



**KALA BHALU/ RICHH / HIMALAYAN BLACK BEAR
(*SELENARCTOS THIBETANUS*)**

2.14.9 KALA BHALU OR RICHH OR HIMALAYAN BLACK BEAR (*Selenarctos thibetanus*):

Black bear is found throughout the tract generally between an elevation of 1500 and 3000 meters. In winter months, when the higher areas are under snow, it descends down to lower elevations. It is a solitary animal living in caves, hollow tree trunks or in areas infested with heavy bush growth. Being omnivorous, it lives on a variety of foods ranging from wild flowers, fruits, roots tubers, berries, insects of all sorts and honey. It has to know, where and when and how to procure all these things. It has also been stated that they occasionally eat eggs and carrion, in their search for food black bears have to climb trees for fruits & to nab bee-nests. During rains it migrates to the vicinity of villages where it damages the maize crops & fruit trees. It also debarks young deodar and Kail to lick exuded sap & resin.

2.14.10 BAGHERA OR LEOPARD (*Panthera pardus*):

Baghera is found throughout the tract upto an elevation of 2500 meters. It is very reclusive creature and generally remains close to habitation & often carries away, sheep, goats and dogs. It prefers scrub forest or open country. It does not normally attack human beings unless provoked. In addition to the animals mentioned above, all other animals viz. Himalayan Langur, common monkey, jackals, foxes are also commonly found.

2.14.11 BIRDS & PHEASANTS:

Among game birds found in the tract the following are the important ones:

i) MONAL (*Lophophorus impejanus*):

Of all the Himalayan pheasants, this is one of the most beautiful. It is found in abundance above 2450 meters elevation in spruce, fir, Kharsu and birch forests. Monal is rarely found above the tree line though for feeding purposes, it may sometime prey in the grassy slopes above the snow line also. During winter months it descends down to an elevation of about 2000 meters. The male bird is characterized by brilliant metallic green head, glistening purple upper part and velvety black breast and a crest of beautiful feathers. The female is a plain looking brown bird. In autumn, the monal feeds chiefly on grubs & maggots which it finds under the decayed leaves. In winter it often feeds in the wheat and barley fields. The male is very much sought for plume and the female is killed for its meat. Monal breeds in May & June.



THE RED JUNGLE FOWL (*Gallus gallus*)

ii) THE RED JUNGLE FOWL (*Gallus gallus*):

It is found in the scrub forests upto an elevation of about 1500 meters but during summer months it ascends to an elevation about 2000 meters. Though it is met with through-out the tract within the above altitudinal zones, the lower areas of Joginder Nagar and Urla range have comparatively more population of Red jungle fowl than the other areas. It is spotted on the fringes of cultivation and forests clearing in the morning & evenings. It is very shy and cunning bird scuttles into cover on slightest disturbance or suspicion.

**KALESHA / WHITE CRESTED KALEEJ PHEASANT
(*Lophura leucomelanos*)**



iii) KALESHA OR WHITE CRESTED KALEEJ PHEASANT
(*Lophura leucomelanos*):

It is found throughout upto an elevation of 3000 meters. It generally likes thick forest and is usually found in pairs or small flocks of 5 or 6 birds. Though found in forests yet it prefers thick clumps of bushes or thorny thickets near cultivation. The scale is black above, glossed with steel blue, with a whitish rump, brownish grey under parts and long tail of glossy black sickle shaped pointed feathers. Female is chiefly reddish with place scale markings brown crest & scarlet eye patch.

iv) KOKLASS PHEASANT (*Pucrasia macrolopha*):

It is very common pheasant and is found throughout the tract on steep forested hill sides at elevations above 1800 meters and is of almost the same size as the domestic fowl, the male is grey above, streaked blackish, chest nut below. A brown lying down crest, between two long metallic green horn blue tufts feting out behind its metallic green head, its characteristic feature. The female is black and brown with buff streaks above, buff with black streaks below & prominent white through.

2.15 WILD LIFE SANCTURY:

With the increased number of crop protection guns and also increase in human population, the pressure on the wild animals and birds, has increased tremendously. Poaching also has become very rampant. It was felt very necessary to give relief to the fast disappearing fauna of the tract, the Nargu wild life sanctuary was created in the year 1999 vide H.P. Govt. Notification No. FFE_B-F (6)-16/1999.

2.16 WILD LIFE PRESERVATION AND MANAGEMENT:

In the fore-going paras, the miserable condition of wild animals and birds and their annihilation even from the sanctuary area, has been described. Indiscriminate killing of birds and animals by poachers, granting of too many crop protection licenses for fire arms and also increase in human population have been responsible for this apathetic state of wild birds and animals. Some of the important measures which should be adopted for the preservation and propagation of wild life are:

- i) Crop protection gun licenses be granted only in areas where there is a real danger from the wild animals to the fields. In case of any misuse of guns, the licenses be cancelled and guns confiscated.
- ii) The vigilance to check poaching and shooting be increased and whenever, an offender is apprehended, his gun is confiscated. The civil

administration and forest department should cooperate in apprehending the offenders and putting down this crime.

- iii) Prizes and certificates be instituted to be awarded to the subordinates of forest department, police and also the villagers who help in detecting the offence and apprehending the offenders.
- iv) Public, village leaders and all other be educated to preserve the wild life. Its importance from economic, aesthetic and biological balance in nature, points of view be brought home to all by showing pictures, giving short talks and putting up suitable posters at prominent places.
- v) Posting of wild life guards to check any poaching particularly in winter when the animals and birds migrate to lower elevations.
- vi) Provision of salt lick and water holes for the wild life, be made at suitable places.
- vii) Elimination of all grazing from the sanctuary areas so that enough food for the wild life to live on and to prevent spread of disease in the area through grazing animals.
- viii) Hay be stacked at various places in the sanctuary area for the use of wild life during the winter.
- ix) Suitable shrubs and bushes which provide food and shelter to the animals and birds should be propagated in the area. All shrubs on the fruits of which wild birds feed like Principia, Rosa, Viburnum, Spirea and Focus merit special mention. Where exotic fodder plants such as Clover can be safely introduced in not far distant parts of the same tract, the cultivation of these crops could be added to the local grazing supplies.

2.17 BRUSH PILES AND SLASH DISPOSAL:

Brush piles supply valuable safety cover for wild life in the forests, especially in the open woods. Slash disposal should be left piled rather than burnt unless hazards dictate its destruction.

2.18 ECOLOGY OF WILD LIFE:

Study of animal ecology involving the knowledge of interdependence of plant and animal population fluctuate, food chains propagation and succession is very necessary for proper management of wild

life. Hardly any information has so far been collected on this aspect for this tract. The field staff both of wild life wing and territorial wing should collect data about wild life ecology so that it may be of help in planning proper wild life management. Enlightened and improved methods of management of wild animals and birds, proposes adequate inventories and without such surveys and censuses, estimates of population of wildlife in any areas, will continue to be a matter of guess.

2.19 Essentials of Wild Life:

The tract has attraction or lack of attraction to a species according to how well it supplies, the essential. It is known to all that these essentials are food, cover and such other requirements as the species may need. Obviously, the critical time of the year will be most important and, in this area, the pinch period is usually winter. The number for which an area can provide essentials and thus carry through pinch period is designated as carrying capacity. It stands to reason that an area will not be able to maintain more than its carrying capacity in safety and that all above this capacity is subject to loss. But measuring the cover, determination of forage and range capacity, proper use factor for big game is not so easy as it may seem. Infected determination of density and composition of the vegetation is baffling at times.

2.20 Tract of Wild Life:

It is a fact that no sincere efforts were ever made in the past to save range and habitat conditions for the sake of wild animals of this tract and so, heavy incidence of grazing was recorded. Over grazing and damage to the forest as well as to the wild life has generally been under emphasized because of the economic factor involved. Reduction in grazing intensity is urgently needed in the sanctuary area at least not only for the sake of wild animals but also as a measure of protection of the range and animals in their rehabilitation. Though the principle of multiple use calls for grazing as one of the methods of utilizing forest resources, yet grazing requires rigid regulation not only from the stand point of forest reproduction but also from the stand point of wild life.

CHAPTER-III

3 UTILIZATION OF THE PRODUCE

3.1 AGRICULTURAL CUSTOMS & NEEDS OF THE PUBLIC POPULATION:

3.1.1 POPULATION- Density of human population is generally more in lower areas of the tract while the higher hills and interior valleys are sparsely populated. The population of the area has been increasing steadily over the years which are evident from the following census figures as below:-

Table 3.1 :- Population

Census year	Total population of the Mandi District.	%Age of growth per annum	Density per Sq km.
1991	776372	20.40	197
2001	901344	16.92	228
2011	999777	10.92	253

Population of the tract is mainly agricultural except about 13% residing in towns. The land holdings are invariably small and that is why farming practices used are relatively primitive. Farm Yard manure is used to fertilize the fields only by very few. Farmers can afford to pure nitrogenous and phosphatic fertilizers in their fields. Even proper rotation of agricultural crop is not followed. Owing to all these factors, the agricultural production is not sufficient. Besides their agricultural pursuits, people keep a number of cattle, sheep and goats. The quality of live stock is poor and animals are generally maintained for manure. The tract has very high density of cattle. The statistics of cattle population is as below:

Table 3.2 :- The statistics of cattle population

Census year	Cow	Buffaloes	Horses	Donkeys	Mule	Sheep	Goats	Pig	Total
1991 (1992)	430331	107676	2014	315	2607	196041	203270	219	942473
2001 (2003)	437536	84301	2374	343	4808	129844	189745	-	851068
2011 (2012)	439767	69320	2278	183	5114	113953	195465	568	827034

To supplement their meager income, many people work on construction

of roads and buildings and on works undertaken by block development and other agencies. Other avenues of employment are forestry and soil conservation works, collection and sale of minor forest produce etc. With forest exploitation works on decrease, employment generated by raising plantations provides an opportunity to people to supplement their income. Raising fruits orchards in suitable localities especially in Urla and Tikkan Ranges is quite profitable and enterprising venture and areas under orchards are expanding steadily.

3.1.2 NEEDS OF PUBLIC:

People meet their needs of timber for construction and repair of house, agricultural implements, fuel, fodder, grasses for their cattle, building stones and various medicinal herbs, fruits etc. from the forests. Settlement carried out during 1917 for Mandi has admitted these rights. Right holders are granted trees at concessional rates which were fixed way back in 1917 and very nominal. Right holder rates of trees of different species and different diameter classes are as under: -

Table 3.3:- Rate In Rs/Tree of dia Classes

Spp.	RATE IN RS/TREE OF DIA CLASSES IN CM					
	BELOW 30 CM	30-40 CM	40-50 CM	50-60 CM	60-70 CM	70-80 CM
Deodar	0.25	0.50	0.88	1.00	2.00	4.00
Kail	0.25	0.50	0.75	0.75	1.00	1.00
Chil	0.12	0.25	0.37	0.37	0.50	0.50
Fir	0.12	0.12	0.12	0.12	0.25	0.50

As these rates are very nominal, the right holders are unmindful and least caring of the enormous wastage during conversion and even indulge in misappropriation of timber which is illegal and unlawful in view of the rising prices of wages and all the commodities. The rates have been revised and increased vide H.P. Govt. notification No. FFE-B-E(3)43/2006-Vol-II dated 26.12.2013 as under:-

- i) Rs.500/- per Cubic Meter standing volume for Deodar and Rs. 250/- per Cubic Meter standing volume for other species.
- ii) Right holders suffering from natural calamities shall be given trees free of cost.

Indicative market rates for the year 1992-93 to 2013-14 are given as para 3.6.

As a result of great improvement in the economic condition of the people, increase in population and joint family system becoming obsolete, the demand for timber has considerably increased. The following table summarizes the timber granted in cubic meters to right holders during the period 1999-2000 to 2021-22.

Table 3.4:- Summarizes the timber granted from 1999-00 to 2021-22 through T.D. and Free grant in respect of Joginder Nagar Forest Division in cum

Timber Distribution (T.D.

YEAR	DEODAR	KAIL	CHIL	RAI	B/L	TOTAL (cum)
1999-2000	-	3.96	1283.2	-	26.55	1313.71
2000-01	309.3	173.99	1047.23	--	7.35	1537.87
2001-02	133.64	123.9	1451.27	17.00	18.63	1744.44
2002-03	66.18	106.2	1324.96	42.5	292.04	1831.88
2003-04	146.49	130.98	1675.56	29.75	39.28	2022.06
2004-05	192.48	53.02	1681.48	--	88.36	2015.34
2005-06	126.12	60.18	943.79	45.47	34.66	1210.22
2006-07	--	--	--	--	--	-
2007-08	--	--	--	--	--	-
2008-09	--	--	--	--	--	-
2009-10	--	--	--	--	--	-
2010-11	--	--	--	--	--	-
2011-12	--	--	--	--	--	-
2012-13	--	--	--	--	--	-
2013-14	--	--	--	--	--	-
2014-15	26.21	14.09	625.39	0.70	12.143	678.33
2015-16	--	--	15.5	-	1.50	17.0
2016-17	110.63	146.61	504.70	57.9	--	819.84
2017-18	68.01	38.3	593.19	59.85	25.28	784.63
2018-19	229.24	118.96	576.03	70.06	8.46	1002.759
2019-20	60.23	26.72	106.63	2.55	11.441	2057.571
2020-21	22.21	7.38	163.81	21.66	--	215.06
2021-22	45.56	51.93	223.65	51.36	4.3	376.8

FREE GRANTS (cum)

YEAR	DEODAR	CHIL	Rai	TOTAL(cum)
1999-2000	-	42.93	-	42.93
2000-01	10.02	17.81	12.75	40.58
2001-02	2.46	12.06	-	14.52
2002-03	-	--	-	-
2003-04	8.54	7.2	-	15.74
2004-05	9.11	29.9	-	39.01
2005-06	7.08	45.38	-	52.46
2006-07	-	-	-	-
2007-08	-	-	-	-
2008-09	-	-	-	-
2009-10	-	--	-	-
2010-11	-	-	-	-
2011-12	-	-	-	-
2012-13	-	-	-	-
2013-14	-	-	-	-
2014-15	-	26.7	-	26.7
2015-16	-	19.43	--	19.43
2016-17	30.3	6.75	-	37.05
2017-18	10.2	116.66	-	126.86
2018-19	--	-	-	-
2019-20	-	-	-	-
2020-21	3.34	14.38	24.60	42.32
2021-22	1.64	3.65	-	5.29

3.1.3 FUEL WOOD AND CHARCOAL:

The demand for fuelwood and charcoal also increased with the increase in population. People have recorded rights for collection of dry and fallen wood from the forests which is not sufficient to meet their requirement. Indiscriminate felling of Ban Oak in the past has left little scope to fell more Ban Oak trees which is the main source of fuel wood and charcoal in the tract. Even otherwise Govt. has banned the felling of ban trees. The average requirement of an average family residing in the snow areas of the tract is about 280 to 350 Qtls per annum. In the lower areas where it does not snow, the annual fuel wood requirement comes 90 to 160 Qtls. The total requirement of fuel wood by villagers is enormous and would prove ruinous for the forests. Now emphasis is being given to farm forestry so that the farmers grow trees on their land which would meet their requirement for fuel wood. Improved chulhas, LPG and solar cookers are also being provided by the various

development agencies of the state as well as center. Presently fuel wood depot is being maintained at Jogindernagar where the sale of fuel wood is being done by H.P. State Forest Corporation.

3.1.4 NON-TIMBER FOREST PRODUCTS:

Besides the above discussed commodities, the local people exploit forests to meet with their requirements for building stone, slates, torchwood, Oak bark for tanning, collection of medicinal herbs and other such Non Timber forest produce.

3.2 MARKET & MARKETING PRODUCTS:

The principal marketable products are timber, resin, fuel wood, charcoal and certain medicinal herbs.

3.2.1 TIMBER:

Timber of Deodar, Chil, Kail, Fir and Spruce already has a market in neighbouring states of Punjab and Haryana. The main markets being at Pathankot and Yamuna Nagar. Deodar timber is in great demand for railways sleepers. The demand for Deodar and Kail continues to be on increase in the form of constructional timber. With good net work of roads i.e. easy accessibility, nationalization of working of forests, resin, fuel wood, charcoal etc. has become economical. HPSFC carries out the exploitation work and then the timber is transported to depots at Bhadroya (KGR), Dhanotu (MND), Baddi (Parwanoo) (SLN) and Mantaruwala (Paonta)(SMR) and Nurpur (KGR). The timber is auctioned in these depots by the H.P. State Forest Development Corporation. Total volume of timber removed since 1999-2000 to 2021-22, year wise is tabulated below

Table 3.4: Timber extracted by purchasers/Forest Corporation

TIMBER EXTRACTED BY PURCHASERS/FOREST CORPORATION						
(in m3)						
YEAR	DEODAR	KAIL	CHIL	FIR	B/L	TOTAL
1999-2000	-	-	-	-	-	-
2000-01	-	-	666.55	-	-	666.55
2001-02	-	-	5243.74	-	-	5243.74
2002-03	33.265	27.56	856.82	22.94	2007.80 5	2948.39
2003-04	-	-	1352.09	-	-	352.09
2004-05	-	-	1798.84	-	2994.78	4793.62
2005-06	28.250	-	425.028	-	901.1	1354.378
2006-07	-	-	419.69	-	-	419.69
2007-08	-	-	-	-	-	-

2008-09	-	-	603.56	-	-	603.56
2009-10	-	-	122.20	-	703.05	825.25
2010-11	-	-	404.03	-	32.343	436.373
2011-12	-	-	-	-	-	-
2012-13	-	-	595.76	-	31.161	626.921
2013-14	-	-	1792.40	-	-	1792.40
2014-15	-	-	140.42	-	-	140.42
2015-16	-	-	158.27	-	-	158.27
2016-17	-	-	157.40	-	-	157.40
2017-18	-	-	72.93	-	-	72.93
2018-19	-	-	27.81	-	11.603	39.413
2019-20	-	-	498.5	-	51.792	550.292
2020-21	-	-	268.31	-	55.7048	324.0148
2021-22	-	-	182.57	-	84.751	267.321

3.2.2 RESIN:

Resin is extracted from chil forests since 1987 onwards by H.P. State Development Corporation. Resin so extracted is transported to resin and Turpentine factories at Bilaspur/Nahan for further processing. The Quantity of resin extracted from 2000-01 to 2021-22 in Jogindernagar Division is tabulated below:-

Table 3.5 Resin extracted from 2000-01 to 2021-22

YEAR	NO. OF BLAZES	RESIN EXTRACTED (QTLS)	AVERAGE YIELD PER THOUSAND BLAZES (QTLS)
2000-01	131856	Not available	
2001-02	129606		
2002-03	109901		
2003-04	108872	3970.56	36.47
2004-05	107386	4174.09	38.37
2005-06	106376	3903.99	36.70
2006-07	119846	4179.03	34.87
2007-08	119475	4287.95	35.89
2008-09	119475	4373.9	36.61
2009-10	119475	4513.76	37.78
2010-11	118838	4055.94	34.13
2011-12	122949	3967.56	32.27
2012-13	124949	3972.12	31.79
2013-14	124302	4185.24	33.67
2014-15	109414	3789.00	34.63
2015-16	109987	3507.48	31.89

2016-17	118363	4147.43	35.04
2017-18	123283	3357.39	36.72
2018-19	129935	3494.75	37.18
2019-20	133405	3891.62	34.28
2020-21	140251	3830.94	36.61
2021-22	140168	4187.86	33.47

3.2.3 MARKET:

- i) **TIMBER:** There is heavy demand of timber in the District Mandi. The timber extracted and carried by H.P. State Forest Development Corporation to sale depots is put to auction every month and timber dealers from Punjab and Haryana purchase the same in open auction and transport timber to market.
- ii) **RESIN:-** Entire resin is processed in rosin and turpentine factories at Nahan and Bilaspur.

3.3 METHOD OF EXPLOITATION AND THEIR COST:

Prior to November 1982 the forests were sold standing to purchasers on royalty basis who used to make their own arrangements for felling, sawing and carriage etc. The felling used to be done by saw or axe, conversion used to be done by saw or axe, conversion used to be done there itself (in situ) in scantlings. The most convenient size converted by the purchasers used to be 305x26x13 cm. With the nationalization of working of forests since November 1982, the trees of different species are now being sold to Himachal Pradesh State Forest Development Corporation (HPSFDC) every year, in the form of lots. The trees in the lots are felled by axe and saw combined and are converted into logs of convenient sizes. Use of power chain saw has also started. These logs then are converted into conventional scants there itself in the forests. The most popular and in demand size these days is 305cmx26x13 sleepers, generally used in construction works and in industrial use. Kail, fir and chil timber is also extracted in the form of Hakeries and dimdimas. Ballies extracted from the thinning materials and from lops and tops are also readily saleable. The cost of extraction varies with the nature of terrain and length of carriage leads etc.

Table 3.6:- The cost of extraction of timber /cum is calculated below:-

S.No.	ITEM OF WORK	COST PER CUM
1.	Felling including lopping & rapping	50/-m ³
2.	Sawing including mate commission	Deo, Kail, Fir 1893/- & Chil 1600/-M.C 15%.

3.	Manual carriage (average lead 2.22).	227/- per m3 per Km.
4.	Truck transportation/m3 to sale Depot.	241.90 Sawn size 293.75 otherper m3
5.	Loading of timber/m3	91.00
6.	Unloading of timber/m3	54.60
7.	Engraving of timber per 100 scants	150.00
8.	Establishment charges/m3	25%.

3.4 RESIN TAPPING:

Enumeration for resin blazes is carried out well in advance during the preceding winter season and the number of resin blazes is calculated lot wise. The lots are handed over to Forest Corporation in January every year. The average cost of extraction of resin per quintal has been worked out as under (on the basis of scheduled rates).

Table 3.7:- The average cost of extraction of resin per quintal

S.N	ITEM OF WORK		COST
1.	Setting up the crop (per thousand)		2497/-
2.	Collection of resin/Qtls including mate commission.		
	Sanctioned ScheduledRate	For Moderately HotArea Rate per Qtl.	For Cold areasRate per Qtl.
	Upto 20 Qtls.	769	916
	20.1 to 25 Qtls.	868	1048
	25.1 to 30 Qtls.	1031	1244
	30.1 to 35 Qtls.	1211	1505
	40.1 to 45 Qtls.	1357	1637
	45.1 and above.	1424	1735
3.	Cost of tins & other material		219.25
4.	Cost of transportation from forest depot to RSD by M/labour/Mule & RSD to R& T factory Bilaspur.		
i)	By mule/manual carriage Qtls/km & unloading etc.		Mule/manual carriage Rs.49/- per Qtl/per Kms.Loading/Unloading 200/-per cum.
ii)	RSD to factory through truck		Upto 25 Kms 34.56 & for everyone Km Beyond 25 Km 0.48.

5.	Rent of R.S. Depots	11965/- per month.
6.	Royalty/blaze (Tentative rate per blaze).	51/-

3.5 LINE OF TRANSPORT (EXPORT):

Earlier the timber used to be transported through floating in Khads and in river Beas, Uhl (Ghall) when contractor system was in vogue. With the net work of roads extending in length and breadth of the division, khad floating and river floating has come to almost a halt and timber is now transported in trucks through the road network. Khad floating is resorted to only in the interior areas where it is feasible and economical and roads do not exist.

3.6 PAST & CURRENT PRICES:

The rates for sale to non right holders and other government departments for different species are fixed by government on the suggestions by Pr.CCF.HP. the rates in Rs. For the year 1999-2000 to 2013-14 are tabulated for comparison sake.

Table 3.8:- The commercial Rate of different species from 1999-2000 to 2013-14

Diameter classes in Cms.	Deodar		Kail		Chil		Fir	
	99-00	13-14	99-00	13-14	99-00	13-14	99-00	13-14
10-20	1133	2857	1085	2283	306	745	626	1584
20-30	5241	10954	4172	8750	1041	2608	2298	6338
30-40	15373	33337	10385	26631	3789	7825	6678	19241
40-50	30136	67150	23252	53642	7945	23660	13354	38483
50-60	46456	117631	43949	93588	13079	39496	29958	67232
60-70	72941	168589	67738	134676	18765	55331	39833	96207
70-80	94343	235739	89132	188318	24754	79177	52578	134464
80-90	115746	319557	107698	255675	30865	94827	65305	172947
90-100 & over.	136711	370575	120908	295982	37156	110662	78034	211439

3.7 MEDICINAL HERBS:

People have rights for collection and sale of medicinal herbs. The important medicinal herbs collected by the local people are *Viola*, *Mentha sylvestris*, *Dioscorea spp.*, *Verbascum thapsus*, *Valarina walichii*, *Swertia paniculata*, *Viscum spp.*, *Polygonatum*, *Verticilatum*, *Podophyllum emodii*, *Gentiana karrooa*, *Coleus*

automatics, Anemone spps, Tenacetum longifolium, Tinospora cordifolia, Rhododendron campanulatum, Serpentina spps, Cinamomun tamala, Thymus surphyllum, Hydrocotyle aristica, Cileus roots. The collection and export of medicinal herbs is regulated by Himachal Pradesh forest department notification No. Ft.12-306/57-II dated 5.9.1962.

CHAPTER-IV

4. ACTIVITIES OF HP FOREST DEVELOPMENT COR. LTD.

4.1 GENERAL:

H.P. State Forest Corporation Limited is undertaking of the HP Government came into existence on the 25th of March 1974. This Corporation deals with the marketing of mainly Timber, fuelwood, bamboos, Khair, Resin, turpentine oil and subsidiary products. The Corporation has been mainly created with the following objectives:-

- i)** To carry out the extraction of timber and resin on scientific lines by adopting suitable modern techniques.
- ii)** To eliminate the Contractor's agency in respect of works of H.P. S.F.D.C. Ltd.
- iii)** To obviate the chances of illicit felling of trees, illicit tapping of resin and other malpractices.
- iv)** To work the forests on commercial lines by recycling of funds for works and also by raising funds from financial institutions as per requirements.

The corporation has a long experience of timber harvesting and extraction operations, marketing and is in a position to provide expertise for the purpose. Since the entire resin tapping work is being done by the Corporation, it has developed modern techniques for resin tapping and expertise in the respect is available for training as well as execution of works.

4.2 HARVESTING/EXPLOITATION OF TIMBER:-

Due to nationalization of forest exploitation and ban on green felling imposed by HP Government, only dry and fallen tree referred to as salvage are handed over to Divisional Manager, HPFSDC Ltd. Mandi for harvesting /exploitation who has jurisdiction over this division. Deodar, Chilet etc is regularly exported from this division. The main timber market is at Dhanotu. The timber is sold by open auction at H.P. State Forest Development Corporation depots at Dhanotu and subsequently exported out of the state. Generally speaking, chil timber of this area is not of good quality and is, therefore, not popular in the trade. Timbers of miscellaneous broad- leaved species like mango, mulberry, shisham, semal, siris etc. is consumed locally for construction and agricultural implements etc. The position of trees handed over to Divisional Manager Mandi for the last twenty years is given below:-

Table 4.1: Salvage Removals since 1993-94 to 2019-2020 from Joginder Nagar Forest Division.

Year	Nature of marking	Chil	Deodar	Kail	Rai/Tosh	OBL	Total	Vol. in cum	Royalty in Rs.
1993-1994	Salvage	423	0	0	0	2963	3386	2117.13	234434
1994-1995	Salvage	294	0	15	63	2078	2450	2086.6	284148
1995-1996	Salvage	797	0	0	0	2039	2836	1078.34	216395
1996-1997	Salvage	1361	0	0	0	1616	2977	1623.85	136360
1997-1998	Salvage	227	0	0	0	1547	1774	829.36	159778
1998-1999	Salvage	0	0	0	0	0	0	0	0
1999-2000	Salvage	0	0	0	0	0	0	0	0
2000-2001	Salvage	741	0	0	0	0	741	666.55	177529
2001-2002	Salvage	9330	0	0	0	0	9330	6130.45	2942617
2002-2003	Salvage	1741	0	0	15	2521	4277	2983.95	744491
2003-2004	Salvage	1365	0	0	0	0	1365	616.06	95011
2004-2005	Salvage	2742	0	0	0	3967	6709	4793.57	253517
2005-2006	Salvage	1125	241	0	0	1149	2515	1399.956	483995
2006-2007	Salvage	582	0	0	0	0	582	419.69	201382
2007-2008	Salvage	0	0	0	0	0	0	0	0
2008-2009	Salvage	1055	0	0	0	0	1055	603.49	260134
2009-2010	Salvage	298	0	0	0	523	821	825.25	389718
2010-2011	Salvage & R.A Lots	1696	0	0	0	129	1825	436.373	246868

2011-2012	Salvage	0	0	0	0	0	0	0	0
2012-2013	Salvage	1032	0	0	0	181	1213	626.921	471932
2013-2014	Salvage	4611	0	0	0	0	4611	1792.40	1242129
2014-2015	Salvage	381	0	0	0	0	381	140.42	108684
2015-2016	Salvage	193	0	0	0	0	193	158.27	100818
2016-2017	Salvage	351	0	0	0	0	351	157.40	84209
2017-2018	Salvage & RA	55	4	16	0	10	85	72.92	72617
2018-2019	Salvage & RA	27	0	0	0	46	73	39.413	5773
2019-2020	Salvage & RA	1754	0	0	0	275	2029	573.68	386742

The HPFSC gets the exploitation work executed through contractors called Labour Supply Mates (LSMs). The employment to skilled, semi-skilled and general is provided almost throughout the year except in winter months. On an average 2.7- man days per cum of standing volume handed over to forest corporation are generated. If the total standing volume in a year varies from 3000 to 5000 cum then the total man days generated would be 8000 to 13500. The timber harvested/ exploited from this division is sold in an open auction as HP State Depots at Dhanotu (MND).

4.3 FUELWOOD AND CHARCOAL:

The coppice coupes composed of misc. scrub species are the main source of fuel wood and charcoal, which are mainly consumed locally in various towns. During previous working plan period from 1992-93 to 2013-14 no coppice coupes has been exploited in this division. Chil and Ban charcoal was also converted from the unfit trees and lops and tops which finds its market in activated carbon factories at Hoshiarpur and Amritsar, and with goldsmiths. However, fuel wood and charcoal is deficient in this division and demand is met with by imports from other divisions. Quantity of fuel wood and charcoal sold from retail sale depots of State Forest Corporation during the last five years is tabulated as under:

Table 4.2: Quantity of Fuel wood and Charcoal sold.

Year	Joginder Nagar	
	Fuel wood	Charcoal
2015-16	3199.00 Qtls	0
2016-17	1900.10 Qtls	0
2017-18	1224.17 Qtls	0
2018-19	836.92 Qtls	0
2019-20	1512.50 Qtls	0

Source: - Forest Working Division Joginder Nagar.

4.4 PULPWOOD:

Chil pulpwood from the small wood up to a minimum diameter of 10 cm. is not extracted in this Division.

4.5 RESIN TAPPING AND PROCESSING:

Resin is chief forest produce of this area and main source of revenue. Since 1.4.1975 the tapping operations are being done by the H.P. State Forest Corporation (Govt. Notification No. 10-26/72SF dated 30-05-1975). All the workable chil forests are being tapped for resin. With the coming into force of HP Resin Products (Regulation of Trade) Act, 1982, the resin from private forests is now being purchased by the Forest Corporation at the rates purposed any the Advisory Committee constituted under the Act and approved by the Govt. from time to time. It is a metabolic exudes being tapped from *pinus roxburghii* commonly known as Chil. In fact, it is most important source of revenue to the Government and also local people owning chil trees. The corporation has fully trained staff for this work and expertise in this respect is available for this purpose for resin processing and transportation. The large numbers of the local people find employment in its extraction and carriage. Resin extracted from this Division is supplied to corporation factories at Bilaspur.

4.5.1 TECHNIQUE:

Prior to 1984, the resin tapping was done by conventional French cup and lip method. This method involved deep and rather uncontrolled depth of blaze, coupled with frequent fire and highly velocity wind was responsible for heavy salvage removals. Improved "German Rill method" of resin tapping and tapping since 1988 is being done only through this method gradually replaced the conventional. This method has been enunciated in field guide to modern methods of resin tapping by Sh. V.P. Verma, IFS published by

Forest Research Institute and Colleges, Dehradun. A detailed guideline manual about this method has also been published by Directorate (North) of the H.P. State Forest Corporation Ltd. Recently “Bore Hole Method” of resin tapping has been introduced at the trial stage in H.P. Its quantitative and qualitative results in H.P. are yet to be analysed.

4.5.2 TAPPABLE DIAMETER:

Trappable diameter for rill method is fixed as 35 cm. This however is on the lower side resulting into large scale drying of chil trees. It is recommended that trappable diameter should be increased to 40 cm. Trees to be tapped are enumerated; punch marked and grouped in to sections of 1000 blazes each after every five years. This work of enumeration is to be completed during winter.

4.5.3 CROP SETTING:

Crop setting must be stated by 15th of February and completed by 15th March. It is important that the crop setting is completed in time so that tapping season is not delayed. The tree to be tapped should be cleared inflammable material over a radius of 1m.

4.5.4 BARK SHAVING:

With the help of Bark shaver the loose bark over a surface area of 45 cm in length and 30 cm in width is removed leaving a space of about 15cm from the ground level. The bark left should not be more than 2mm in thickness to facilitate freshening.

4.5.5 MARKING OF BLAZE AND GROOVE:

Blaze frame is put in vertical position on the debarked area and outer boundaries of the blaze marked with Black Japan so that lowest point is 15cm. from the ground level. Position of blaze and central groove area marked with the help of wooden board and marking gauge.

4.5.6 CENTRAL GROOVE CUTTING:

Central groove cut by drawing the groove cutter from the above downwards. Since in the first year the blaze is just 15 cm. from the ground level the groove cutter is moved upwards.

4.5.7 FIXING THE LIP:

The lip is fixed with the help of two horseshoe nails so that it makes an angle of 45 degree with the tree. A 5-cm long wire nail is driven into the tree about 2 cm. below the midpoint of the lip hanging the collection pot on it. The nails driven at an angle so that the pot hangs against the tree. It is suggested that instead of wire nails, bamboo nails should be used for hanging the pot with the tree. During fire in the forest these wooden nails will get burnt and the pot will be dislodged quickly from the tree. The iron nails hold the pot fast to the tree and the burning resin in the pot act like a blow lamp.

4.5.8 FRESHENING:

First rill should be drawn by moving the freshening knife from the lowest point of the general groove upwards along the blaze boundary in a way that the rill makes an angle of 40 degree with the central groove. The process is repeated on the other side of the central's groove. For the second and subsequent freshening which are repeated approximately at weekly intervals, the guide of the freshening knife should move touching the upper side of previous rill. The rill should be parallel to each other with an uncut bark (inter rill bark) of 5mm. in between two successive rills. The width of the rill is 6-7mm and depth 2mm, excluding two 2mm depth unsaved bark). The lengths of the rill should neither nor fall short of the blaze limit. One freshening is given almost every week and the blaze thus attains a height (Length) of 36-38 cm in one season. The tapping season is from 15th March to 15th November i.e. 8 months. The freshening is given four times in a month and thus the total number of rills is to be limited to 32 in a season. The width of the blaze is 20cm i.e. 10 cm on other side of the central groove.

4.5.9 APPLICATION OF STIMULANT:

The stimulant is nothing but a 20% solution of the mixture of sulphuric and nitric acids mixed in equal proportion w/w. It should be sprayed on the freshly cut rills by squeezing the plastic bottle and moving its nozzle in a steady motion along the rill. For obtaining good spray the plastic bottle should be held at 45- degree angle to the trees and its nozzle 3-5cm away from it. Precaution should be taken to remove the pot till the extra acid has run down the lip. The tendency to apply acid more frequently and in the higher concentration to obtain higher yield should be curbed.

4.5.10 COLLECTION OF RESIN AND CLEANING OF GROOVE:

Resin is collected in to collection can (Balti) by removing pot from the trees. The resin adhering to the pot is removed with the help of scraper. Central

groove is also cleaned after each collection with groove cleaned to avoid accumulation of resin in it. For improving labour output, collection of resin from the pots should be done with alternate freshening in March, April and August to October. However, from May to July collection may be done with each freshening.

4.5.11 REMOVAL OF LIPS AND POTS:

At the end of the tapping seasons the nails should be pulled out a lip and removed.

4.5.12 INSTALLATION IN SUBSEQUENT YEARS:

In the 2nd year the position of the blaze is marked above the top of the first-year blazes and other operations of the first year remain the same and repeated. After tapping for two year the blazes reach a height at which it is not possible to pull the freshening knife upward. Hence during 3rd year freshening is given by the pushing the freshening knife upwards from the central groove toward the outer edge of the blaze. Like this blaze is extending upward for four years. During 5th year a new blaze is made as the bottom leaving 7.5 cm. wide spaces from the outer edge of the first-year blaze.

4.5.13 USE OF GUIDE:

The use of guide with freshening knife by the tapper is compulsory.

4.5.14 TAPPING SEASON:

Tapping season extends from 15th March to 15th November. Freshening is not made from 16th November to 30 November, and during this period resin is scraped (raghod).

4.5.15 RESIN DEPOTS:

The resin collected from the forests is brought to resin depot at road side closed to the tapped area. A number of sections are attached to each Depot under the Charge of a Resin Watcher who maintains the accounts of the depot and supervises the works of labour in the forests.

4.5.16 PAST YIELD:

The detail of blazes tapped and the yield obtained during past 20 years is tabulated in table: -

Table 4.3:- Outturn of resin from 1998-99 to 2020-21 (per thousand Blazes) for Joginder Nagar Forest Division

Year	Total number ofblazes	Resin extracted (In Qtls)	Resin yields per section (Qtls.)
1998-1999	139476	5858	42
1999-2000	132305	5557	42
2000-2001	131856	5538	42
2001-2002	129606	5443	42
2002-2003	109901	4616	42
2003-2004	108872	4573	42
2004-2005	107386	4510	42
2005-2006	106376	4468	42
2006-2007	119846	5034	42
2007-2008	119475	5018	42
2008-2009	119475	5018	42
2009-2010	118838	4992	42
2010-2011	122949	5164	42
2011-2012	124949	5248	42
2012-2013	124949	5248	42
2013-2014	124302	5221	42
2014-2015	109414	4595	42
2015-2016	109987	4620	42
2016-2017	118363	4971	42
2017-2018	123283	5178	42
2018-2019	129935	5457	42
2019-2020	133405	5603	42
2020-2021	140251	5891	42

4.5.17 AREA AVAILABLE FOR RESIN TAPPING:

All the felled P.B-I and P.B-IV area of Chil Working Circle are kept out the purview of resin tapping. Only P.B-II and PB-III area of Chil Working Circle area prescribed for resin tapping. The chil trees found in other Working Circles are banned for resin tapping on account of poor growth, density and limited extent. The Divisional Forest Officer may stop resin tapping in any Forests where it is felt that the resin extraction work is likely interfere with the growth of the trees. Only rill method shall be used to carry out resin tapping. It is estimated that about one lac blazes will be available for resin tapping annually.

4.5.18 SUSPENDING RESIN TAPPING OPERATIONS:

Incise drying up of trees due to resin tapping is observed in some forests it should be closed immediately for tapping for a minimum period for three years. Re-tapping in these forests should be taken up only after the resins for drying up of the trees are analysed effective steps taken to be preventing recurrence.

4.5.19 FIRE PROTECTION:

All needles and other refuse within 1 metre radius of the trees tapped for reason should be removed and other instructions laid down in the H.P. Forest Manual Volume IV and other latest instructions must be observed carefully. It is better if bushes within 2m of these trees are cut. Areas being tapped for resin are very susceptible to fire and need intensive fire protection. Some sort of fire fighting equipment's should be provided in all resin depots to meet an emergency. All staff put on resin work should be taught the use of these equipments.

4.5.20 RESIN FROM PRIVATE FORESTS:

With the nationalization of the resin trade under "the resin and resin product trade Act, 1981") the resin from the private ownership is also purchased by the H.P. State Forest Corporation Ltd. The data on quantity of resin extracted from private-forests.

CHAPTER-V

5. STAFF AND LABOUR SUPPLY

5.1 STAFF:

The statement given below summarizes the position of staff in terms of sanctioned strength of permanent, non plan and plan of Joginder Nagar Forest Division as stood on 1.4.2021.

Table 5.1:- Joginder Nagar Forest Division sanctioned Posts and existing staff

SANCTIONED POSTS						
S.No.	Designation	Non Plan	Plan	12-Soil State Plan	17 Soil RVP	Total
1.	D.F.O.	1	-	-	-	1.
2.	A.C.F.	1	-	-	-	1.
EXECUTIVE STAFF						
1.	Forest Ranger	7	-	-	-	7
2.	Dy. Rangers	19	-	-	-	19
3.	Forest Guards	64	-	-	-	64
4.	MPW	3	-	-	-	3
5.	Kanungo	-	-	-	-	-
6.	Patwari	-	-	-	-	-
7.	Forest Workers	30	-	-	-	30
MINISTERIAL STAFF						
1.	Superintendent Gr.II.	1	-	-	-	1
2.	Sr. Assistant	3	-	-	-	3
3.	Clerk/Jr. Assistant.	7	-	-	-	7
4.	Peons	12	-	-	-	12
5.	Chowkidar	9	-	-	-	9
6.	Driver	1	-	-	-	1
7.	Mali	5	-	-	-	5
8.	Mali-cum-Nursery worker	4	-	-	-	4
9.	Chowkidar-cum-Cook	9	-	-	-	9
EXISTING STAFF						
S.No.	Designation	Non Plan	Plan	12-Soil State Plan	17 Soil RVP	Total
1.	D.F.O.	1	-	-	-	1.
2.	A.C.F.	1	-	-	-	1.
EXECUTIVE STAFF						
1.	Forest Ranger	5	-	-	-	5
2.	Dy. Rangers	16	-	-	-	16
3.	Forest Guards	59	-	-	-	59
4.	MPW	1	-	-	-	1

5.	Kanungo	-	-	-	-	-
6.	Patwari	-	-	-	-	-
7.	Forest Workers	19	-	-	-	19
MINISTERIAL STAFF						
1.	Superintendent Gr.II.	1	-	-	-	1
2.	Sr. Assistant	2	-	-	-	2
3.	Clerk/Jr. Assistant.	7	-	-	-	7
4.	Peons	13	-	-	-	13
5.	Chowkidar	7	-	-	-	7
6.	Driver	1	-	-	-	1
7.	Mali	5	-	-	-	5
8.	Mali-cum-Nursery worker	4	-	-	-	4
9.	Chowkidar-cum-Cook	1	-	-	-	1

5.2 EXECUTIVE CHARGES:

The boundaries of administrative charges keep on changing. In 1987 Joginder Nagar Forest Division was created with three ranges namely Jogindernagar, Urla and Lad Bharol . Again in 1992, the Joginder Nagar territorial Division was merged with Mandi Forest Division and Joginder Nagar Social Forestry Division started operating with its head quarter at Joginder Nagar. This continued only for one year (1992-93) and in April 1993, Joginder Nagar territorial Division again came into existence. In 1994, under the re-organization of Suket Forest Division, Kamlah and Dharampur ranges of Suket Division were excluded and were transferred to Joginder Nagar Division taking the number of to five as a part of Joginder Nagar Forest division. The Joginder Nagar Division had already been covered under the Working Plan of Mandi/ Joginder Nagar Working Plan by Sh. Ajay Kumar Sharma, IFS which was in operation from 1992-2014. The part of the area of Nargu wildlife Sanctuary of Wild Life Division Kullu was transferred in 2014 to this division after its reorganization which created and added one more new Range i.e. Tikkan to this division. At present, the total no. of ranges in this division are six namely J/Nagar, Urla, Ladbharol, Kamlah, Dharampur and Tikkan.

5.3 LABOUR SUPPLY:

Local labour is generally available for forest works like sowing, planting, cultural operations, road construction, soil conservation works and ordinary building works. Only during sowing and harvesting times, finding labour may be a problem. But due to the ban for engaging the local labour the forestry works is being done through the forest workers. The tender system for the operation of forestry works has been adopted.

CHAPTER-VI

6 PAST SYSTEM OF MANAGEMENT

6.1 HISTORY OF FOREST MANAGEMENT:

Forest management systematically on scientific lines started in 1880's. Before 1980 no attempt was made towards forest management and its conservation. In 1889 Mr. Maynard prepared forest Rules and jamabandi. Thus, history of forest management could be divided into three periods.

Period of 1880-1890.

Period of 1890-1917.

Period of regular Working Plans.

6.2 PERIOD OF MANAGEMENT BETWEEN 1880-1890:

After the forest exploitation work started in 1880. Deodar forests were leased to a Mr. Thelwal for 10 years who further transferred it to a private concern, Mandi Forest Company. This concern was to fell 1500 trees per annum at the price of Rs. 5/- per tree of 6-8 ft. girth. The girth was to be measured at a height of 4ft. from ground. The agreements made with the lessee used to govern the preservation and conservation of forests. In the said case of the lease, one of the conditions laid was that at least ten percent of trees would be reserved as seed bearers and the lessee would also plant and conserve not less than 10 deodar trees of every deodar tree felled. The lessee in this case indulged in over felling and as a result, the State suffered as a whole, stock of mature trees of deodar was removed in 19 years. The principle of sustained yield was not kept but this was the beginning of the forest exploitation.

In 1889, Mr. Maynard, who was counselor to Raja of Mandi prepared a Forest jamabandi for the state admitting certain rights for the villagers specifying the forests. Simultaneously regular demarcation of forests was also carried out and two types of forests emerged as a result.

Siyan: - Demarcated forests.

Bartan: - Undemarcated forests.

This demarcation was conferred urgently to deodar forests only as deodar was recognized as the only species of any market value during those days. This Jamabandi of Mr. Maynard was carried out by Kardars as proper staff was not available. This Jamabandi was alright for certain illaquas but was found to be inaccurate for other illaquas. Mr. Maynard for the first time framed definite Rules regarding the exercise of rights. Grant of timber was also systematized. Lopping of Deodar was prohibited. A small forest establishment was also created which consisted of a Jamabandi and four

Naib-Jamadars under whom rakhas were appointed. These efforts of Mr. Maynard towards systematic management were furthered by Mr. Fendall who extended the demarcation gradually to include most of the forests exploited by the State agency. All demarcated forests were listed and pillars were also created which could not stay for long due to want of repair.

6.3 PERIOD OF MANAGEMENT BETWEEN 1890-1917:

Mandi Forest Company's lease expired in 1910 and with it, the deodar trees also disappeared. Dead, rotten or malformed trees left unconverted were also sold to local contractors. Between 1895 and 1910, heavy fallings were carried out in chil forests and spruce forests. In 1910 again Raja of Mandi sold the deodar forests of Sutluj Valley to Shri Hira Lal, a contractor under similar conditions as were put in Mandi Forest Company's lease deed. Raja of Mandi had to cancel this contract only after a year, on the advice of British Government. During this period, the trees were sold before these were actually marked. The method used was "Hashab-pasand". The contractor used to select trees according to his choice and hammer was put on these trees. As a result, the best trees were felled and inferior stock was left standing.

6.4 PERIOD OF REGULAR WORKING PLAN :(1917 ONWARDS):

Year 1917 is a land mark in the history of forest management in Mandi, as the first regular forest Settlement was done in 1917 by Mr. Wright. Two categories of forests were established. These were demarcated forests and un-demarcated forests. The demarcated forests included all coniferous areas capable of yielding revenue, all those forests, which were required to be preserved for supply of timber, fuelwood to town, all siyan forests, and forest required for amenities and other purposes. Rest of the forests including large areas of Ban, Oak and other broad leaved species were categorized as undemarcated forests. All these rights etc. were drafted in detail in the form of a record. Simultaneously, Mandi Forest Regulation No.1 of Samvat 1975 was promulgated and made applicable to whole of Mandi State from 1st day of Chet, Samvat 1975 (correspondence to April 1918). This regulation put restriction on breaking of land for cultivation except with the permission from Darbar, setting fire to trees, felling or lopping of trees extracting torchwood from the holes of standing trees, selling of trees, removing dead leaves or surface soil, cutting grasses or grazing during the closed season, removal of or damage to boundary pillar and defacing or removing any mark of tree placed by forest officials. These restrictions in the form of Rules along with other provisions in the settlement report started the era of protection and conservation of forests.

6.5 WRIGHTS WORKING PLAN:

Mr. Wright wrote the first working plan for a period of 20 years in 1918 thereby inaugurating the scientific management of the forests. Mr. H. Wright, IFS, who was on deputation from Punjab, during 1915 to 1918, made an attempt to reconcile scientific forestry with Mandi Division. He gave workable prescriptions which were to be carried out with the limited staff. He emphasized that the plan should be completely revised once technical staff capacity is built up. Thus intensive methods of management were left under. It is the lack of skilled supervision. The stress was given on obtaining as much revenue as possible adopting simple methods of management, providing for maintenance of forest for a continued and undiminished supply of timber for meeting the local needs and for export as well. To achieve this objective of management, six Working Circles were constituted as under:-

The Deodar & Kail Working Circle.

The Thinning Working Circle

.The Chil Working Circle.

The Spruce Working Circle.

The Fuelwood Working Circle.

The un-regulated Working Circle.

6.5.1 THE DEODAR WORKING CIRCLE (15156 ha.):

All deodar forests were categorized in this Circle. The objectives of management (I) to remove deodar trees in such quantity that sustained, (II) to obtain regeneration of this species (III) to increase the proportion of deodar by removing trees of other species. This Working Circle was further divided into two felling series named Sutluj felling series and Beas felling series with an area of 7980 ha. and 7178 ha. respectively. As the present Working Plan is only covering the forests of the Beas felling series only the prescriptions and results of Working of Beas felling series would be discussed in this chapter. Total enumeration of Deodar and Kail were carried out down to 18" girth and spruce was enumerated in 3235 ha. area out of 7178 ha. total area. A system of selection felling was prescribed to manage the forests allotted to this working circle. The exploitable girth of 225 cms was fixed. Fairly heavy felling of deodar and Kail, retaining 10% of 1st class trees and seed bearers, was prescribed. Thus 90% of class I and 25% of II class trees were prescribed to be felled. After making an allowance for the right holders demand, yield of deodar was prescribed as 350 trees over a girth of 180 cm. on annum basis. All I and II class trees of Kail were prescribed to be felled. The annual yield of Kail and Fir/Spruce was fixed at 150 trees and 1000 trees respectively. A silvicultural removal

of trees of younger classes and thinning was also laid down. Deodar areas were expected to regenerate with light grazing but for the areas requiring effective closure, barbed wirefencing was prescribed.

6.5.1.1 RESULT OF WORKING:

Wright Working Plan was appropriate for those conditions prevailing at that time but certain factors like serious fire of 1921 necessitated reducing of the working period of certain forests thereby reducing the working plan period from 20 years to 19 years.

Over felling up to an order 7% was carried out but this little over felling did not have any harmful and damaging effect. The cleaning operations were carried out as per the prescription laid down in the Working Plan, which helped a great deal in getting better regenerations.

6.5.2 THE THINNING WORKING CIRCLE:

It included all forests containing immature crop of Deodar and Kail requiring thinning and areas of poor Chil Deodar and Spruce-Deodar mixtures which could be expected to lead to better deodar forests. The objective of management was (1) to improve the crop (11) to increase the proportion of deodar on suitable sites (111) to replace the diseased Kail by healthy crop. Total enumerations done to 45 cms, was carried out. The whole area was prescribed to be gone over for 10 years. These thinning were to be carried out to get rid of malformed, damaged or diseased trees. No cleaning was prescribed.

6.5.2.1 RESULTS OF WORKING:

The thinning wherever carried out, resulted in marked improvement of the crop but thinning was carried out in those forests where the commercial returns were sure which lead to fairly heavy thinning in some of the forests and some other forests were left unattended where silvicultural thinning were required. For want of cleanings, many areas having young crop suffered from congestion and were over shadowed by inferior species.

6.5.3 THE SPRUCE WORKING CIRCLE (13159.92 ha):

All spruce and fir forests including the sub alpine Kharsu and broad leaved mixtures were allotted to this Working Circle. No enumerations were carried out. One selection felling followed by complete rest for the remaining period of the plan was prescribed. Annual yield was fixed as 1000 trees of Fir of 180 cms. and above girth. All over mature greens and trees over standing over the advance growth were marked.

The balance of the yield prescribed was to be obtained by felling in groups of class I and class II trees. Tentative closure was prescribed for certain areas where regeneration was found to be absent due to grazing.

6.5.3.1 RESULT OF WORKING:

The prescriptions laid down were quite useful and benefitted the crop. As the demand for fir timber in the market was comparatively down, the yield prescribed remained in arrears.

6.5.4 THE CHIL WORKING CIRCLE (12013.76 ha):

The Chil working circle comprised all pure chil forests. The objective of management was to provide protection until the conditions were favorable for a system of concentrated regeneration felling. Their complete protection was prescribed. Markings were carried out only to meet the local people's requirement and the state requirement. No enumerations were carried out. Closures of areas kept for regeneration was also suggested.

6.5.4.1 RESULTS OF WORKING:

Prescriptions suggested gave a lot of benefit to the forests. Provision for protection yielded the desirable results. Closure provided also brought in excellent regeneration.

6.5.5 THE FUEL WORKING CIRCLE (988.26 ha.):

All Oak and broad leaved species forests reserved for supplying firewood and charcoal to town, were allotted to this working circle. Two felling series namely firewood felling series and charcoal felling series were constituted with areas of 276.62 ha. and 711.74 ha. respectively. Coppice with standard was the system of management adopted, 50 trees of best quality were to be retained as standards in one hectare ensuring a regular spacing. Five year after the felling, superfluous coppice shoots were also to be removed leaving only 2-3 vigorous shoots per stool.

6.5.5.1 RESULT OF WORKING:

All charcoal areas were worked fully but areas prescribed for felling under fire wood series remained in arrears because the demand for firewood was being met by unregulated felling carried out by the local people in the un-demarcated forests.

6.5.6. THE UNREGULATED WORKING CIRCLE (1686.64 ha.):

This circle comprised of all un-allotted demarcated forests like heterogeneous collection of grass reserves, devata's grove areas reserved for local bartans and areas unfit for regular working. The felling were only prescribed to fulfill the silvicultural needs of the crop and the local requirements.

6.5.6.1 RESULT OF WORKING:

The protection provided greatly benefitted the crop except for certain areas where the local demand was on the higher side.

6.5.7 SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN:

Wright suggested construction of seven inspection paths. He proposed that and expenditure of Rs. 500/- be incurred every year for the improvement of existing paths and new constructions as well. Construction of Guard Hut in each beat incurring an expense of Rs. 1000/- per year was also prescribed. Regular debris burning was prescribed after the exploitation work was over.

6.6 GORRIES PLAN (1937-38-1956-57):

Wright Working Plan was revised by Dr. R.M.Gorrie with the admin in view that "the problem of a large forest revenue surplus is legitimate objectives, but the social values of the forests are also of importance, particularly where peasants are so dependent upon the forests for great many of these daily needs". The objectives of management laid down in Gorries' working plan were to (i) ensure working of forests on sustained yield basis meeting the legitimate demands of right holders for fuel, fodder and timber and getting the maximum revenue for the state as well (ii) stress to be given on protection of forest against fire and excessive grazing and soil conservation (iii) raising of plantation of useful species in degraded blank areas.

Five working circles were constituted to achieve the above mentioned objectives:-

The concentrated regeneration working circle.

The selection working circle.

The fuel working circle.

The fuel working circle.

The protection working circle.

And two felling series namely Beas and Sutluj felling series were constituted.

6.6.1 THE CONCENTRATED WORKING CIRCLE:-

All good, well stocked deodar forests were allotted to this working circle. Shelter wood working was adopted for the first time in order to ensure good regeneration. The rotation was fixed at 140 years with a felling cycle of 20 years. Three periodic viz. PB-I, PB-II and PB un-allotted were created. PB-I comprised areas burnt during 1921's fire and those areas in which natural regeneration was sufficiently established justifying thereby the removal of overwood. PB-II comprised well stocked deodar patches where mature and over mature trees was predominant. The remaining forests were allocated to PB un-allotted. Out of total area of 61773.73 ha. in Beas felling series, areas allotted to PB-I, PB-II and PB un-allotted as 880.75 ha. 895.34 ha. and 4270.70 ha. respectively. Enumerations were carried out for 3718.62 ha. Only based on the result of enumeration and estimates, an annual yield was calculated by Van Montel's formula, Blanford's formula, Simmon's formula and by increment method independently and thus the yield of deodar was fixed 4367.44 m³. The exploitable diameter was fixed at 60 cms at breast height. A maximum of 15% deviation was allowed for volume yield for each 10 year period of Plan. Certain principles were to be observed while going for felling like in Southern slopes, where the regeneration is not established, the old trees were to be retained and branchy old trees surrounded by young seedling were to be removed. 50 well grown, healthy seed trees were to be retained per hectare in areas where regeneration was to be brought. Kail trees were to be opened up sufficiently to allow deodar to come up in PB-II areas. Heavy crown thinning were prescribed and in PB, unallotted. Light-cum-selection felling and thinning were to be carried out. In all these prescriptions deodar was given preference. The thinning were synchronized with the main felling for which year-wise felling programme was defined. The usual subsidiary cultural operation was also prescribed.

6.6.1.1 RESULT OF WORKING:

Regeneration did not keep pace with the felling because of two main reasons. One was that natural regeneration coming up in felled areas was not provided with effective closure and second was that natural regeneration was not supplemented with artificial regeneration. No planting was done where it was needed. PB-II areas also suffered because of removal of large number of maturing and mature trees resulting in poorer stands. In PB-unallotted, immature and over mature trees were removed in selection felling leaving behind mostly middle aged crop. Some forests prescribed for working were not felled whereas a few forests such as Sihaswar CII and Sakrurunai CI were worked without any prescriptions. Against the prescribed yield of 14308.78 cum, a volume of 13949.95 cum were removed. The conservative marking resulted in overall improved growing stock.

6.6.2 SELECTION WORKING CIRCLE:

Selection Working Circle constitute all coniferous forests which were not allotted to concentrated Regeneration Working Circle including inferior deodar forests, extensive diseased Kail forests, spruce and silver fir forests, ban oak areas with fairly high percentage of kail or deodar and pockets of upper chil belts. The management objective was to increase the percentage of deodar by judicious removal of competing species. The management system to be followed was selection system. A felling cycle of 20 years with 120 years rotation was fixed, sequence of felling was laid down but it could be altered provided all the forests allotted this circle were gone over once during the working Plan period.

6.6.2.1 RESULT OF WORKING:

Since the forests to this circle were heavily burdened with rights, regeneration could not come up due to heavy grazing. No regular thinning and improvement felling were carried out in Kail crop. The incidence of *Teammates pini* increased further due to excessive lopping. As such the growing stock of deodar increased nominally where as there was marked increase in the growing stock of other inferior species. Cultural operations were not carried out regularly. As a result young deodar suffered badly.

6.6.3 CHIL WORKING CIRCLE:

All chil forests were allotted to this circle. These forests were prescribed to be managed under shelter wood with more rapid removals of overwood. A felling cycle of 20 years and no definite rotation was prescribed. The yield was fixed on the basis of area, as the growing stock was not enumerated. Two felling series namely sales felling series and bartan felling series were constituted. A felling schedule giving priority for working up the areas of sales felling series was prescribed. Cleaning and thinning were prescribed in dense young sapling crop of chil. A prescription for controlled burning was also introduced.

6.6.3.1 RESULT OF WORKING:

The felling schedule laid down for the felling series was not followed and the forests were worked on the basis of convenience. As a result some forests were not worked while certain forests which were not even included in the felling schedule were worked. No thinning were carried out resulting in congestion of crop leading to decline in the quality of the crop. In the absence of definite allotment of PB-I, no regeneration felling were carried out. Further hardly any regeneration came up in any of these areas because of heavy grazing.

6.6.4 FUELWOOD WORKING CIRCLE:

This working circle comprised of scrub forests carrying a wide variety of species and pure ban oak area as well which were found within 8 miles radius of town. No schedule of the areas to be felled annually was prepared due to uncertainty of the firewood and charcoal requirements. Heavy selection markings were prescribed in oak forests to meet the demand of charcoal. For fuelwood, light selection marking removing majority nature trees and thinning in the younger crop was prescribed. Closer of felled areas at least for 5 years was prescribed.

6.6.4.1 RESULT OF WORKING:

The forests were worked purely on convenience basis, resulting in over working of accessible areas. The mature and over mature trees removed in selection fallings did not copies. No young regeneration came up. In the absence of effective closure of felled areas, young coppice shoots were browsed. In miscellaneous broad leaved areas also, in the absence of effective closure and not trying to restock the area after felling, resulted in disappearance of tree species and increase of worthless shrubs.

6.6.5 PROTECTION WORKING CIRCLE:

This working circle comprised of demarcated protected Fir forests, demarcated protection Ban forests and miscellaneous scrub forests. The prescriptions laid were rather loose and felling to be carried out on selection basis. While caring out markings, progress of regeneration and condition of fir timber market was to be considered. Since the demand of fir timber was low, only felling necessary to keep the crop in healthy condition were carried out. It was also provided that heavier felling than prescribed could be carried out if fir timber market improves. For the protection of ban oak and scrub forests, reduction in grazing incidence and control of lopping of oak was prescribed. Sowing and planting of suitable species was also prescribed.

6.6.5.1 RESULT OF WORKING:

The forests allotted to this working circle were not prescribed for working and thus the name of working circle was as misnomer. All approachable forests with better entrain were worked while other forests situated in remote valleys and difficult terrains were left un-worked resulting in over exploitation in some places and congestion and suppression at other places. Felling were not maimed at obtaining good regeneration. Moreover, over-grazing also hampered natural regeneration. Sowing and planting as prescribed in the working plan were not followed.

6.6.6 SPECIAL WORKS OF IMPROVEMENT:

Construction of a number of inspection paths and bridle panther were prescribed. The list of paths to be constructed was also appended.

6.6.7 BUILDINGS:

No extensive building programme as such was suggested. However construction of two Forest Guard Huts and six inspection huts was suggested. During the plan period only one inspection hut was constructed.

6.6.8 FOREST INDUSTRIES:

It was suggested that ‘Semal’ occurring in forests should be reserved and worked for export to feed match wood industry. The suggestion was however not implemented to utilize ban oak. It was suggested that its charcoal may be used for meeting the iron ore found in the tract. Even this was not carried out and ban oak areas remained un-worked.

6.6.9 FIRE PROTECTION:

The phenomena of control burning were introduced. Control burning was prescribed on a rotation of 3 years and was followed but prescription regarding construction of fire paths and fire lines was not followed.

6.7 R.V.SINGH’S PLAN (1957-58 TO 1976-77):

Gorrie’s working plan was revised by Dr. R.V. Singh. This working plan included all the Demarcated Protected Forests and many of the valuable un-demarcated protected forests which were not included in the previous working plan.

SEVEN WORKING CIRCLES WERE CONSTITUTED

The Regular Working Circle.

The Chil Working Circle.

The Selection Working Circle.

The Spruce Working Circle.

The Fuel Working Circle.

The Protection Working Circle.

The Plantation Working Circle (over lapping).

6.7.1 THE REGULAR WORKING CIRCLE (3672.5ha):

All forests including un-demarcated protected forests where Deodar and Kail represented the predominant species were allotted to this working circle. Total enumerations for demarcated protected forests were carried out. Area were divided into three periodic blocks with a rotation of 120 years. Definite allotment was made only for PB-I and PB-II and rest of the areas were put together as PB-un-allotted. The areas allotted to these periodic blocks were 585.58 ha, 892.34ha and 2194.61 ha respectively. The management system followed was as system of concentrated regeneration fallings called Indian Irregular Shelter Wood system. The yield from different PB's was to be controlled separately. A deviation of 20% of prescribed yield for each species and each PB and 10% for the whole circle was allowed at the end of 15 years. The trees of all species and diameter of 40cm and above in PB-I and PB-II and diameter of 50 cm and above for PB, un-allotted were to be counted against yield. No commercial fallings were prescribed in case of PB, un-allotted thinning and improvement fallings were to be done on a 12 years cycle. Marking was to be done in favour of Deodar.

6.7.1.1 RESULT OF WORKING:

In case of PB-I areas prescribed volume was not removed whereas large removals were done from PB-II against a nil annual yield and from PB un-allotted as well which exceeds even the allowed 10% deviation limit. As a result in PB.I areas the canopy could not be opened up sufficiently to obtain good regeneration. The fire burnt areas were generated with reasonable success. The removals in PB-II seems to be excessive because no yield was prescribed in PB-II. In case of PB un-allotted, over mature trees standing over and suppressing vigorous poles were to be marked and in mixed crop deodar was to be favored. The condition of the crop as a result improved reasonably and congestion was removed leading to healthy crop.

6.7.2 THE CHIL WORKING CIRCLE:

All demarcated and un-demarcated protected Chil forests were allotted to this working circle. Enumeration was carried out in all demarcated forests and a few undemarcated forests in 10 cm diameter classes down to 20 cm diameter. Three periodic blocks namely quartier bleu quartier jaune, and quartier blanc were constituted with a rotation of 120 years. Quartier bleu of 968.01 ha consisted of areas with mature chil, areas with poorly stocked chil and areas having chil only in pockets with preponderance of maturing trees were allotted to quartier jaune with 1248.46 ha of areas. No felling was prescribed and no yield was fixed with a view to preserve mature trees to prepare them for allotment to quartier bleu in the due course of time. Quartier blanc having an area of 5986.92 ha consisted of forests mainly with middle

aged and scattered mature trees. Seeding felling was to be carried out in well stocked patches of quartier bleu during the plan period. Where regeneration was established, final felling were to be carried out. No commercial felling were prescribed for Quartier Jaune. Light thinning and of course removal of dead, dying and diseased trees were prescribed. In quartier blank, thinning cum improvement felling were prescribed. The yield from quartier bleu and quartier blank was to be controlled separately.

6.7.2.1 RESULT OF WORKING:

There has been a deficit removal from quarterier bleu and excess removal from quartier jaune showing the marking were conservative. Regeneration was also hampered as a result of retaining all poles upto 20-30 cm. dia class. The allotment under quartier bleu was less than proportionate to the working plan period 6910 cum volume was removed from quartier jaune against no prescribed yield. The intention of the working plan officer subjecting the forests to light and non commercial felling had been mis-constructed by the implementing staff. This resulted in depleting the stock. Thinning carried out all over the areas allotted to Q. bleu resulted in providing benefitto the crop.

6.7.3 THE SELECTION WORKING CIRCLE:

Forests with a mixture of spruce and silver fir were allotted to this working circle. Total enumerations were carried out in demarcated protected forests and in 8 un-demarcated protected forest in 10 cm dia classes down to 20 cm diameter, trees of 60 cm and above in diameter were prescribed to be removed on selection principles from demarcated protected forest and thinning and improvement felling were prescribed in the un-demarcated forests. The approach less trees i.e. 50-60 cm dia were not marked.

6.7.3.1 RESULT OF WORKING:

There was deficit removal because a number of DPF's could not be marked and sold because of their location in the remote areas. Some of the forests were prescribed to meet the demand of the packing cases industry but the same were not marked because of less demand in these areas surrounding these forests.

6.7.4 THE SPRUCE WORKING CIRCLE:

All spruce forests where irregular crop having different age classes with middle ages to mature trees predominating, were allotted to this working circle. Total

enumerations were carried out in all the forests in 10 cm. dia classes. These forests were prescribed to be managed under Punjab Shelter Wood System with a rotation of 140 years fixing the regeneration period as 30 years. The area was divided into three quarters namely Quartier bleu, Quartier Jaune and blanc Quartier bleu (209.23 ha) consisted forests with the most mature crop. Seeding felling was prescribed for such areas leaving the spruce and fir trees 10-12 meters apart. All healthy poles occurring singly or in patches were to be retained as future crop. Q. Janue (701.72 ha) contained stands having preponderance of trees approaching maturity. No commercial felling was prescribed however thinning was prescribed. Q. Blanc (1708.59 ha) contained rest of the forests where crop was mostly middle aged with mature and over mature trees scattered in between. Thinnings and improvement felling was prescribed. All green trees 40 cm.d.b.h. and above in Q. bleu and Q. Jaune and above 50 cm. dia in Q. blanc felled for any purpose were to count towards yield. The yield for different PBs was to be controlled separately.

6.7.4.1 RESULT OF WORKING:

There was a deficit in removals in case of Q.bleu due to conservative markings and removals were in excess in case of Q.Jaune against nil prescription of yield because of marking of a large number of mature trees in the garb of improvement felling. On the whole, felling in this periodic block benefitted the crop. In case of quartier blanc, deficit in removals was observed despite the fact that all the forests were gone over. This shows that the markings were too much on the conservative side.

6.7.5 THE FUEL WORKING CIRCLE:

Ban forests which were easily accessible, were allotted to this working circle, for supply of fuelwood and charcoal. Coppice with standard system was prescribed with a rotation of 30 years for coppice and 90 years for standard. It has been seen that due to old age of stools there is not much coppice regeneration. Some areas were planted with Chil and some with Deodar. These forests should not be replaced with chil or deodar keeping in view the accessibility for supply of Ban.

6.7.6 PROTECTION WORKING CIRCLE:

6.7.6.1 RESULT OF WORKING:

No felling was carried out. At places deodar was introduced under ban oak which could not survive due to lack of overhead opening. Grazing and improper lopping continued, resulting in deterioration of the forests.

6.7.7 PLANTATION (OVER-LAPPING) WORKING CIRCLE:

This working circle covered areas suitable for planting with economically important species. Blank areas falling both in DPFs and UPFs were included. Certain areas were exclusive to this working circle, yet it partially overlapped other working circles. Economically important site suitable species were to be raised to rehabilitate the degraded treeless areas. Plantation programmes suggested the species to be raised in each areas.

6.7.7.1 RESULT OF WORKING:

All the areas listed could not be taken up for planting.

6.8 B.D.BHARTIYA'S DRAFT WORKING PLAN (1977-78 to 1991-92):

The plan under revision was prepared by B.D. Bhartiya. This plan covered Mandi felling series of Dr. R.V. Singh's plan and dealt with forests falling in Joginder Nagar Forest Division. This is only irony of fate that B.D. Bhartiya died in an accident and this plan remained unapproved. As per prevailing orders, this was followed only in respect of prescriptions and for the sake of yield control, Dr. Singh's plan remained operative. The objects of management of Bhartiya's plan were as under:-

- i) Preserving of adequate vegetative cover in order to protect the hill sides against denudation & erosion.
- ii) Meeting with bonafide requirement of the local people for timber, fuel, grazing& other forest produce.
- iii) Improving the stocking of the forest.
- iv) Gradually replacing the stock of diseased Kail with healthy mixture of Deodar& Kail.
- v) Obtaining progressively increasing yield.
- vi) Extending the areas under important timber species by raising plantation.

To achieve the above listed objects of management, the following working circles were constituted.

Deodar & Kail Working Circle (5550.25 ha).

The Chil Working Circle (8166.53 ha.).

The Fir Working Circle (6861.83 ha.).

The Oak Working Circle (4203.48ha.)

The Broad Leaved (over lapping)Working Circle (3808.54ha.).

The Protection Working Circle (13087.64 ha.).

The Plantation Working Circle (3297.00 ha.).

6.8.1 DEODAR & KAIL WORKING CIRCLE:

All pure or mixed deodar and Kail, demarcated protected forest including successful deodar plantation raised were allotted to this working circle. All the old demarcated protected forests of Singh's Working Plan were sub divided into compartments and sub compartments of areas varying between 20 to 40 ha for the purpose of intensive management. System of management to be followed to be followed was Irregular Shelter Wood System with special object of converting irregular crop into more regular forests gradually. Total enumerations were carried out in all the forests in 10 cm. dia classes down to 20 cm. dia on broken grounds, selection system was to be followed. Groupsof young even aged pole crops upto 30 cm dia and not less than 0.2 ha in extent were to be retained as advance growth. A period of 30 years was fixed as regeneration period with a rotation of 120 years. Thus the working circle was divided into four fixed as periodic blocks of 30 years each. Definite allotments were made to PB-I, II, III and IV. PBI carried comparatively mature crop fit for regeneration felling. Two types of areas were specified as type A areas. Type A area included freshly allotted areas of PBI. These were mostly PBII areas of working plan under revision. Only seedling felling could be carried out. In type B old PB.I areas were included which had already been gone over for seedling felling but the corrective markings were due. All forest which had preponderance of age classes approaching maturity were allotted to PB.II. In PB III comparatively younger crop was allotted and youngest of the crop available was allotted to PB.IV. The yield from each periodic block was to be controlled separately. The felling were immediately to be followed by planting where natural regeneration was found to be insufficient. Regeneration was suggested to be assessed by Divisional Forest Officer every third year and modification/reduction in yield could be suggested. A detailed planting programme for new PB.I areas was chalked out. Subsidiary cultural operations like unsalable thinning, climber cutting, cleaning, lopping of inferior broad leaved trees and removal of dead and damaged trees were prescribed wherever necessary. Slash disposal and debris burning was also prescribed. After slash disposal, effective closure of felled areas for a period of 30

years for a period of 30 years was also prescribed. To ensure its effectiveness, fencing was to be done with barbed wire. Right holders requirements were to be met from PB.III and PB.IV. From PB.II dry and fallen trees were to be marked to right holders. Adequate measures were also suggested for protection against fires.

6.8.1.1 RESULT OF WORKING:

The removal exceeded to the tune of (+) 27498.58 cum. As it stood on 31.3.1992 in case of Deodar, Kail and Chil and (-) 2064.32 cum in case of silver fir and spruce. The excess removal in this case is due to heavy demand of timber of local people at bartandari rates. Also since the yield followed was from R.V. Singh's working plan, this also led to excess removal because yield prescribed in Singh's plan was too conservative.

In majority forests, regeneration felling have not been carried out because of blanket ban on green felling in H.P. However, green trees have been allowed to be felled for exercising bartandari rights of local people. This practice of T.D. has resulted in irregular removals in forests thereby not creating right kind of opening for under coming regeneration. It is therefore very important that proper forest management should be followed as per prescriptions of the working plan and blanket ban on green felling be removed. This will not only lead to creation of healthy forests in perpetuity but also strengthen the state exchequer. In such areas where seedling felling has been carried out and opening created to the desired extent, regeneration has come up very well. Kalhog forest in Urla range is one of the best examples. Here natural regeneration has been supplemented with artificial regeneration. In some of the forests, the regeneration is deficient. This is mainly due to conservative markings and lack of protection. Corrective markings have been suggested in these areas in this plan. DPF Barot Cib and DPF Jamtehar C-I are a few examples. In Boaching DPF of Tikkan range, repeated fires and lack of protection has led to practically negligible regeneration and there is heavy invasion of bush growth. Repeated bush cutting has been suggested in such PB.I areas in the current working plan along with artificial plantation.

6.8.2 THE CHIL WORKING CIRCLE:

All Chil forests of Singh's chil working circle was allotted to this working circle. All the forests being easily accessible, the previous forest blocks and compartments were further sub divided into smaller units of 20-40 ha. Total enumerations were carried out in 10 cm dia classes down to 20 cm diameter in all the forests. The forests of this working circle were also to be worked under irregular shelter wood system of management. Advance growth in patches of not less than 0.2 ha was again to be

retained as future crop. The regeneration period was taken as 30 years with a rotation of 120 years. Four periodic blocks of 30 years each were recognized. Efforts were made to allot the most appropriate areas to different periodic blocks. The mature forests were allotted to PB.I with type A and type B, specified. Predominantly middle aged crop with a fair proportion of mature trees was allotted to PB.II. Rest of the forest containing large number of young aged crop constituted PB.III and PB IV. Yield was calculated in PB I on the basis of growing stock. No yield was prescribed for type B, PB.I areas. No commercial felling were prescribed in PB.II. From PB.III and PB.IV, scope of removal of yield was only by way thinning and improvement felling. The yield from each periodic block was to be controlled separately. Certain principles were to be observed while marking e.g. marking of dead, dying and diseased trees, marking of silviculturally available mature and over mature trees, retaining of 16 trees/ha as seed bearers etc. Subsidiary silvicultural operations were also prescribed. Slash disposal and debris burning in felled PB.I areas were to be carried out. Effective closure against grazing of PB.I areas felled, was to be taken up. Artificial regeneration was to be resorted immediately in case natural regeneration did not come up within five years after felling. Final felling were prescribed for PB.I areas where natural regeneration had fully established. All the regeneration areas were closed to grazing till the regeneration got fully established. Light tapping of trees for resin was prescribed for PB.II, PB.III and PB.IV areas. All chil trees 40 cm and above in diameter marked for felling in PB.I areas were to be tapped heavily for four years before felling. Strict measures for protection of chil forests against fire were suggested. Control burning was one of the measures suggested. The requirement of right holders was to be met from PB.III and PB.IV strictly in accordance with the silvicultural availability of trees.

6.8.2.1 RESULT OF WORKING:

There is excess removal to the tune of (+) 32647.42 cum as stood on 31.3.1992 in case of deodar, Kail and Chil. The position of spruce and silver fir yield is (+) 91.20 cum. The excess removal is because of two reasons of heavy pressure on account of demand of timber at bartandari rates and too conservative yield prescriptions in Singh's working plan. Areas allotted to PB.I in Bhartiya working plan have not been completely felled because of ban of green felling. This ban need to be removed and forests require proper regeneration felling to that these are regenerated fully. In some of the forests though regeneration felling have been carried out, these are on conservative side and corrective markings have been prescribed in the current plan. It has been found that regeneration in some of the areas of Joginder Nagar and Urla ranges are also deficit on account of heavy biotic interference and lack of protection. However, in general, chil regeneration, natural as well as by artificial means, has come up well where forests have been worked under PB.I felling. Siyuri DPF in Joginder Nagar range is one of the best examples.

6.8.3 THE FIR WORKING CIRCLE:

All spruce and silver fir forests situated on easier slopes were allotted to this working circle to be managed under irregular shelter wood system. Certain forests allotted to selection working circle in Singh's Working plan were also included in this working circle. Special objective of management remained conversion of irregular crops situated on easier terrain into more regular forest. Total enumerations in all the forests were carried out. Irregular shelter wood system with a provision of selection marking on difficult terrain was to be followed. These forests were to be regenerated with spruce and silver fir mainly 30 years period for regeneration and rotation of 120 years was adopted. Definite allotment was made for all the four PBs. PB.I constituted comparatively mature crop, PB.II having less mature crop and PB.III and PB.IV comprising the rest of the forests. Yield for PB.I was calculated on the basis of growing stock after deduction the volume of the seed bearers. No yield was to be taken out of PB.II as the forests were under stock. In case of PB.III and PB.IV, the yield would come in the form of thinning and improvement felling. The yield from each periodic block was to be controlled separately. Seeding felling were to be carried out in PB.I areas after observing the principles of Shelter Wood System. No secondary felling was prescribed. Final feelings were not due during the period of Bhartiya's plan and hence were not prescribed. Subsidiary silvicultural operations and slash burning etc. were provided accordingly to the requirement. Natural regeneration of spruce and silver fir being scarce and scanty, planting was prescribed soon after felling in PB.I areas. Two weeding, one before monsoon and one after monsoon was also suggested in the plantation areas till the seedlings overgrew the surrounding herbaceous growth. Closure was to be made effective till the regeneration was well established. Strict fire protection measures were to be taken. Regulation of logging was also suggested.

6.8.3.1 RESULT OF WORKING:

The deviation in case of Deodar, Kail and Chil as it stood on 31.3.1992 is (-)2134.99 m³ and that of spruce and silver fir is (+) 13372.64 m³ respectively. This is partly because of bartandari demands of local people, conservative yield prescriptions and partly due to demand for packing cases. The areas allotted to PB.I in Bhartiya's plan have not been completely felled because of ban on green felling. This ban needs to be removed and regeneration felling carried out to induce regeneration. The position of regeneration in the felled PB.I areas is deficient which is mainly due to dense bush growth and deep hums present in these areas. Kharoun DPF of Joginder Nagar range is one of the examples.

6.8.4 THE OAK WORKING CIRCLE:

This working circle comprised of ban oak areas which were easily accessible.

The inaccessible and commercially uneconomical oak forests located in for remote valleys were not included in this working circle. The oak trees were not enumerated but the conifers standing in these forests were enumerated in 10 cm dia classes down to 20 cms. Coppice with standard system was to be adopted. A rotation of 30 years for coppice and 90 years for the standard was adopted. Felling cycle was to be 30 years corresponding to the rotation of coppice. Extent of felling coupe was left to be decided by D.F.O. No yearly felling were prescribed. About 50 to 60 sound and well grown standards were to be retained per hectare, coppicing the rest of the crop. Blanks in the annual coupes were to be sown with ban oak. Clearing and thinning to be carried out in the coppice in the 8th year. Closures were prescribed at least for 10 years. Lopping of standards and coppice was prohibited. Strict fire control measures were to be taken at the time of working of the coupe. The requirement of local people for agricultural implements was to be met from unworked areas only after getting the trees duly marked by the forest staff.

6.8.4.1 RESULT OF WORKING:

The experience of regeneration oak forests by coppicing has not been encouraging. It is because the felling has been delayed much beyond a period of 90 years. N.D. Hyun in Joginder Nagar Range and Siriphat in Urla Range were ban tree have been felled, have not regenerated through coppicing. Artificial planting and regular cutting of ban trees after 90 years has been suggested in the current working plan. The complete ban on green felling of ban has therefore to maintain healthy ban forests in perpetuity.

6.8.5 THE BROAD LEAVED (OVER LAPPING) WORKING CIRCLE:

Temperate broad leaved species like walnut, maple, bird cherry, hornbeam, boxwood and poplars etc as are found in depressions and nalls earlier allotted to Deodar and Kail, Fir and Protection working circles, were allotted to broad leaved working circle extending to all the DPFs of the temperate zone. Total enumeration of the growing stock was carried out. These species were to be managed under selection felling, useless broad leaved species were to be removed and replaced by valuable species through sowing and planting. Felling cycle was fixed to be 15 years corresponding with the plan period. The yield was calculated by using Smythe's safe guarding formula. Removal of selection trees for whatever purpose would count towards yield. The markings were to be guided by the general principles of selection felling. Cleanings and unsellable thinning were to be carried out according to the requirement. Planting of broad leaved species, whose natural regeneration is a problem, was suggested in PB.I areas of fir working circle. In offer to make use of the closures, planting of broad leaved species was to be done alongwith planting of fir. No

separate planting programme was suggested. At least one weeding during monsoons was to be carried out.

6.8.5.1 RESULT OF WORKING:

No areas have separately been worked in this working circle in the expired working plan. In the working plan the above working circle has not been constituted as the areas under broad leaved forest in Mandi Distt. Because of repeated failure of broad leaved plantations due to heavy grazing.

6.8.6 THE PROTECTION WORKING CIRCLE:

All oak and coniferous forests located on precipitous and difficult terrain were allotted to this working circle. Old demarcated protected forests were divided/sub divided into units of areas ranging from 20 to 40 ha for intensive management except for a few very inaccessible forests situated far away. Total enumeration of all forests bearing conifers and important broad leaved species other than oak were carried out. No felling other than the markings for right holders were prescribed hence, no silvicultural management system was proposed. Since no commercial felling were proposed, no yield therefore was prescribed. Eroded areas were prescribed to be closed and soil conservation measures were to be taken up in such areas. It was also prescribed that the areas which were to be taken up for soil conservation and afforestation works, should be closed to grazing. Certain suggestions were made to control and regulate grazing in the forests allotted to this working circle which are (i) increase should not be allowed in the number of migratory grazers and their flocks visiting these areas (ii) a check be applied on the number of cattle of the local people by educating them to keep only good breed and they should be persuaded to go for stall feeding (iii) Areas exposed to serious over grazing should be immediately closed (iv) Rotational closures may also be demonstrated. Certain looping rules were also formulated in order to check the heavy lopping of ban oak, semal and siris etc. Fire protection measures were also to be taken for these forests as well as for ghasnis and rules.

6.8.6.1 RESULT OF WORKING:

No felling as prescribed in the plan, have been carried out. The forests have put in some increment and the serving the purpose as prescribed in plan especially that of improving soil and moisture conservation.

6.8.7 THE PLANTATION WORKING CIRCLE:

This working circle includes all young plantation of chil and eucalyptus raised in the past under various developmental schemes and blanks and scrub areas fit for

raising plantation of Chil and other economically important broad leaved species. Some forests were allotted exclusively to this working circle. It also overlapped some forests of protection working circle. Almost all forests allotted to this working circle were newly constituted demarcated protected forests. The plantation included this working circle were too young for enumerations. The plantations were to be raised artificially by planting or sowing after clearing the areas of scrub growth. In case of existing young plantation, mechanical thinning and cleanings were to be carried out as per the requirement. Species best suited to the site conditions and climate were to be planted. A detailed plantation programme was laid down. All plantation areas were prescribed to be fenced before planting with three strand barbed wire. Seeds used should have been collected from healthy, well growing, vigorous and genetically superior trees of middle age. Aftercare prescribed for the plantations included weeding, beating up of failures and bush cutting. All plantation areas were to be closed for a period of 20 years in the first instance. Strict fire protection measures were prescribed.

6.8.7.1 RESULT OF WORKING:

Despite all adverse climatic factors and heavy biotic interference, lot of good new plantations of various species especially Chil have come up throughout the tract dealt with. Recently there has been emphasis on raising exclusive plantation of useful broad leave species like Oak, Kachnar, Oie, Robinia etc. These plantations have contributed towards increased capital value of our forest lands. DPF Bindh in Joginder Nagar range is one of the best examples where a very good plantation of chil has been raised in rocky areas.

6.8.8 OTHER MISCELLANEOUS REGULATIONS:

Timber for right holder requirements should be sanctioned only after careful verification of their demand. Marking should be done according to silvicultural availability. Wasteful use of timber by right holders should be discouraged. The newly constituted demarcated protected forests should be surveyed and mapped on 4"=1 mile scale and their boundary registers be prepared. Intermediate boundary pillars be constructed at suitable places in existing DPFs and in case of newly constituted demarcated protected forests, boundary pillars be constructed.

6.9 AJAY KUMAR SHARMA'S WORKING PLAN (1999-2000 to 2013-2014):

The plan now under revision was prepared by Ajay Kumar Sharma. The objects of management in Ajay Kumar Sharma's plan the forests were divided into nine working circles as under: -

- i) Deodar and Kail Working Circle.
- ii) Chil Working Circle
- iii) Fir Working Circle.
- iv) Oak Working Circle.
- v) Protection cum Rehabilitation Working Circle.
- vi) Plantation Working Circle
- vii) Wild Life and its management.
- viii) Joint Forest Planning and Management.
- ix) Non-Timber Forest Produce.
- x) To continue the conversion of generally irregular deodar.

6.9.1 DEODAR & KAIL WORKING CIRCLE: The special objects of the management are: -

- i) To continue the conversion of generally irregular deodar and kail forests into more or less uniform forests.
- ii) To progress gradually in the direction of obtaining a normal forest with normal age class distributions and normal regeneration.
- iii) To obtain maximum progressive, increased sustained yield of timber after meeting the legitimate demand of local bartandars.
- iv) To fully restock the fire blanks and P.B.I areas as speedily as possible.
- v) To tend the regenerations already obtained in felled PB-I areas.

The silvicultural system adopted to manage and work the forests of this working circle is Punjab Irregular Shelter Wood System with provisions of adopting selection markings on uncertain and broken terrain and retention of a patch/group of immature growing stock as part of future crop meaning thereby that the young growing stock would not unnecessarily be felled for the sake of rigid uniformity of the future crop. Thus, in case of precipitous slopes and broken grounds, selection felling would be carried out and compact group of advance growth upto 30 cm d.b.h and not less than 0.2 ha in extent and above 0.7 in densities, will be retained as part of future crop. Natural regeneration through sowing and planting where ever necessary after closing the areas effectively. PB-II areas would not be gone over for felling as there is no scope for fellings. Silvicultural operations like thinning and improvement fellings are to be carried out in PB-III while cleanings, thinning and final fellings are prescribed for PB-IV areas. The most suitable size for extracting the most desired size of sawn timber is 60 cm dbh. This diameter will be obtained in a span of 116 years according to the growth data. Therefore, rotations of deodar crop of quality class II have been fixed as 120 years. For

quality class II under 'D' grade of thinning also the main annual increment for stem timber culminates at 120 years. Regeneration period of thirty years has been adopted since young deodar and kail attain a height of 5 meters, becoming safe from damage by grazing and fire. Thus, establishing itself in 28 years and 25 years respectively. With the rotation fixed at 120 years and regeneration period being 30 years, the total area of the working circle has now been divided into 4 periodic blocks viz. P.B.I, PB.II, PB.III and PB IV.

6.9.1.1 RESULT OF WORKING:

An Annual yield of 1455 cum was prescribed in the Working Plan which consisted of 206 cum from PB-I areas and, 0 cum from PB-II, 193 cum from PB-II and 1056 cum from PB-IV felling. The total removal of this working circle 1510.50 cum against prescribed yield of 21825 cum as on 31-03-2014. . Less removal of this working circle due to moratorium on green felling in the state no silvicultural felling was done during this period. Also, since the yield followed was from R.V. Singh's working plan, this also lead to excess removal because yield prescribed in Singh's plan was too conservative. In majority forests, regeneration fellings have not been carried out because of blanked ban on green fellings in H.P. However, green trees have been allowed to be felled for exercising bartandari rights of local people. This practice of T.D. has resulted in irregular removals in forests thereby not creating right kind of opening for under coming regeneration. It is therefore very important that proper forest management should be followed as per prescriptions of the working plan and blanket ban on green felling be removed. This will not only lead to creation of healthy forests in perpetuity but also strengthen the state exchequer. In such areas where seedling felling has been carried out and opening created to the desired extent, regeneration has come up very well. Jhantigri forest in Urla range is one of the best examples. Here natural regeneration has been supplemented with artificial regeneration. In some of the forests, the regeneration is deficient. This is mainly due to conservative markings and lack of protection. Corrective markings have been suggested in these areas in the plan under revision. DPF Tarswan and Barot are a few examples. In Phutakhal DPF of Urla range, repeated fires and lack of protection has led to practically negligible regeneration and there is heavy invasion of bush growth. Repeated bush cutting has been suggested in such PB.I areas in the current working plan along with artificial plantation.

6.9.2 THE CHIL WORKING CIRCLE:

All Chil forests of B.D.Bhartiya's Plan of chil working circle were allotted to this working circle. All the forests being easily accessible, the previous forest blocks and compartments were further sub divided into smaller units of 20-40 ha. Total enumerations were carried out in 10 cm dia classes down to 20 cm diameter in all the forests. The forests of this working circle were also to be worked under irregular shelter

wood system of management. Advance growth in patches of not less than 0.2 ha was again to be retained as future crop. The regeneration period was taken as 30 years with a rotation of 120 years. Four periodic blocks of 30 years each were recognized. Efforts were made to allot the most appropriate areas to different periodic blocks. The mature forests were allotted to PB.I with type A and type B, specified. Predominantly middle aged crop with a fair proportion of mature trees was allotted to PB.II. Rest of the forests containing large number of young aged crop constituted PB.III and PB.IV. Yield was calculated in PB.I on the basis of growing stock. No yield was prescribed for type B, PB.I areas. No commercial fellings were prescribed in PB.II. From PB.III and PB.IV, scope of removal of yield was only by way thinning and improvement fellings. The yield from each periodic block was to be controlled separately. Certain principles were to be observed while marking e.g. marking of dead, dying and diseased trees, marking of silviculturally available mature and over mature trees, retaining of 16 trees/ha as seed bearers etc. Subsidiary silvicultural operations were also prescribed. Slash disposal and debris burning in felled PB.I areas were to be carried out. Effective closure against grazing of PB.I areas felled, was to be taken up. Artificial regeneration was to be resorted immediately in case natural regeneration did not come up within five years after felling. Final fellings were prescribed for PB.I areas where natural regeneration had fully established. All the regeneration areas were closed to grazing till the regeneration got fully established. Light tapping of trees for resin was prescribed for PB.II, PB.III and PB.IV areas. All chil trees 35 cm and above in diameter marked for felling in PB.I areas were to be tapped heavily for four years before felling. Strict measures for protection of chil forests against fire were suggested. Control burning was one of the measures suggested. The requirement of right holders was to be met from PB.III and PB.IV strictly in accordance with the silvicultural availability of trees.

6.9.2.1 RESULT OF WORKING:

There is excess removal to the tune of (+) 6216.32 cum as stood on 1.4.2014. The excess removal is because of two reasons of heavy pressure on account of demand of timber at bartandari rates and too conservative yield prescriptions in Bhartiya's working plan. Areas allotted to PB.I in Bhartiya working plan have not been completely felled because of ban on green fellings. This ban needs to be removed and forests require proper regeneration fellings so that these are regenerated fully. In some of the forests though regeneration felling has been carried out, these are on conservative side and corrective markings have been prescribed in the current plan. OD Siyuri C-I(b) of Joginder Nagar range is the examples. It has been found that regeneration in some of the PB.I areas in Joginder Nagar and Urla ranges is also deficit on account of heavy biotic interference and lack of protection. However, in general, chil regeneration, natural as well as by artificial means, has come up well where forests have been worked under PBI fellings. Deodar DPF in Urla range is one of the best examples.

6.9.3 THE FIR WORKING CIRCLE:

All spruce and silver fir forests situated on easier slopes were allotted to this working circle to be managed under irregular shelter wood system. Certain forests allotted to selection working circle in Bhartiya's plan were also included in this working circle. Special objective of management remained conversion of irregular crops situated on easier terrain into more regular forest. Total enumerations in all the forests were carried out. Irregular shelter wood system with a provision of selection marking on difficult terrain was to be followed. These forests were to be regenerated with spruce and silver fir mainly 30 years period for regeneration and rotation of 120 years was adopted. Definite allotment was made for all the four PBs. PB. I constituted comparatively mature crop, PB. II having less mature crop and PB.III and PB.IV comprising the rest of the forests. Yield for PB. I was calculated on the basis of growing stock after deduction the volume of the seed bearers. No yield was to be taken out of PB. II as the forests were under stock. In case of PB.III and PB. IV, the yield would come in the form of thinning and improvement fellings. The yield from each periodic block was to be controlled separately. Seeding fellings were to be carried out in PB. I areas after observing the principles of Shelter Wood System. No secondary fellings was prescribed. Final fellings were not done during the period of Bhartiya's plan and hence were not prescribed. Subsidiary silvicultural operations and slash burning etc. were provided accordingly to the requirement. Natural regeneration of spruce and silver fir being scarce and scanty, planting was prescribed soon after fellings in PB. I areas. Two weeding, one before monsoon and one after monsoon was also suggested in the plantation areas till the seedlings overgrew the surrounding herbaceous growth. Closure was to be made effective till the regeneration was well established. Strict fire protection measures were to be taken. Regulation of lopping was also suggested.

6.9.3.1 RESULT OF WORKING:

An annual yield of 500 cum was prescribed in the working plan from area allotted to Quartier Bleu under floating periodic block system. No yield was prescribed from area allotted to Quartier Jauna. The total removal of this working circle 225 cum against prescribed yield of 7500 cum as on 31-03-2014. Less removal of this working circle due to moratorium on green felling in the state no silvicultural felling was done during this period. The areas allotted to PB. I in Ajay Sharma's plan have not been completely felled because of ban on green fellings. This ban needs to be removed and regeneration fellings carried out to induce regeneration. The position of regeneration in the felled PB. I areas is deficient which is mainly due to dense bush growth and deep humus present in these areas. OD Jharwar C-I of Urla range is one of the examples.

6.9.4 THE OAK WORKING CIRCLE:

This working circle comprised of banoak areas which were easily accessible. The inaccessible and commercially uneconomical oak forests located in for remote valleys were not included in this working circle. The oak trees were not enumerated but the conifers standing in these forests were enumerated in 10 cm dia classes down to 20 cms. Coppice with standard system was to be adopted. A rotation of 30 years for coppice and 90 years for the standard was adopted. Felling cycle was to be 30 years corresponding to the rotation of coppice. Extent of felling coupe was left to be decided by D.F.O. No yearly fellings were prescribed. About 50 to 60 sound and well grown standards were to be retained per hectare, coppicing the rest of the crop. Blanks in the annual coupes were to be sown with ban oak. Cleaning and thinning were to be carried out in the coppice in the 8th year. Closures were prescribed at least for 10 years. Lopping of standards and coppice was prohibited. Strict fire control measures were to be taken at the time of working of the coupe. The requirement of local people for agricultural implements was to be met from unworked areas only after getting the trees duly marked by the forest staff.

6.9.4.1 RESULT OF WORKING:

The experience of regeneration oak forests by coppicing has not been encouraging. It is because the felling has been delayed much beyond a period of 90 years. N.D. Marhola C-2 and O.D. Bhabhoridhar C4 in Joginder Nagar Range were ban tree have been felled, have not regenerated through coppicing. Artificial planting and regular cutting of ban trees after 90 years has been suggested in the current working plan. The complete ban on green felling of ban has therefore to maintain healthy ban forests in perpetuity. This ban on Green felling onBan should continue to encourage the ban Forests in the area.

6.9.5 THE PROTECTION WORKING CIRCLE:

All oak and coniferous forests located on precipitous and difficult terrain were allotted to this working circle. Old demarcated protected forests were divided/sub divided into units of areas ranging from 20 to 40 ha for intensive management except for a few very inaccessible forests situated far away. Total enumeration of all forests bearing conifers and important broad-leaved species other than oak were carried out. No fellings other than the markings for right holders were prescribed hence, no silvicultural management system was proposed. Since no commercial fellings were proposed, no yield therefore was prescribed. Eroded areas were prescribed to be closed and soil conservation measures were to be taken up in such areas. It was also prescribed that the areas which were to be taken up for soil conservation and afforestation works should be closed to grazing. Certain suggestions were made to control and regulate grazing in the forests allotted to this working circle which are (i) increase should not be allowed in the number

of migratory grazers and their flocks visiting these areas(ii) a check be applied on the number of cattle of the local people by educating them to keep only good breed and they should be persuaded to go for stall feeding (iii) Areas exposed to serious over grazing should be immediately closed (iv) Rotational closures may also be demonstrated. Certain lopping rules were also formulated in order to check the heavy lopping of ban oak, semal and siris etc. Fire protection measures were also to be taken for these forests as well as for ghasnis and rules.

6.9.5.1 RESULT OF WORKING:

No felling as prescribed in the plan have been carried out. The forests have put in some increment and the serving the purpose as prescribed in plan especially that of improving soil and moisture conservation.

6.9.6 THE PLANTATION WORKING CIRCLE:

This working circle includes all young plantations of chil and ban raised in the past under various developmental schemes and blanks and scrub areas fit for raising plantation of Chil and other economically important broad-leaved species. Some forests were allotted exclusively to this working circle. It also overlapped in some forests of protection working circle. Almost all forests allotted to this working circle were newly constituted demarcated protected forests. The plantation included in this working circle was too young for enumerations. The plantations were to be raised artificially by planting or sowing after clearing the areas of scrub growth. In case of existing young plantation, mechanical thinning and cleanings were to be carried out as per the requirement. Species best suited to the site conditions and climate was to be planted. A detailed plantation programme was laid down. All plantation areas were prescribed to be fenced before planting with three strand barbed wire. Seeds used should have been collected from healthy, well growing, vigorous and genetically superior trees of middle age. After care prescribed for the plantations included weeding, beating up of failures and bush cutting. All plantation areas were to be closed for a period of 20 years in the first instance. Strict fire protection measures were prescribed.

6.9.6.1 RESULT OF WORKING:

Despite all adverse climatic factors and heavy biotic interference, lot of good new plantations of various species especially Chil and ban have come up throughout the tract dealt with. Recently there has been emphasis on raising exclusive plantation of useful broad leaf species like Oak, Kachnar, Oie, Robinia etc. These plantations have contributed towards increased capital value of our forest lands. Chanehar, a new DPF in Joginder Nagar range is one of the best examples where a very good plantation of chil has been raised in rocky areas.

6.9.7 OTHER MISCELLANEOUS REGULATIONS:

Timber for right holder requirements should be sanctioned only after careful verification of their demand. Marking should be done according to silvicultural availability. Wasteful use of timber by right holders should be discouraged. The newly constituted demarcated protected forests should be surveyed and mapped on 4"=1 mile scale and their boundary registers be prepared.

Intermediate boundary pillars be constructed at suitable places in existing DPFs and in case of newly constituted demarcated protected forests, boundary pillars be constructed.

CHAPTER-VII

7. STATISTICS OF GROWTH AND YIELD

No fresh studies were carried out to determine local volume tables, diameter growth, mortality rate and relationship of volume and diameter with age in respect of different species while preparing this working plan. Instead, as per the guide lines in the approved preliminary working plan report, all the data regarding statistics of growth and yield has been adopted from Nachan working plan by D.C. Thakur (1977-78 to 1991-92). Since the climate and depict conditions are almost the same for different vegetative zones in both the divisions, it was decided to adopt the data for statistics of growth and yield of different species from Nachan working plan of D.C. Thakur for preparing the current working plan. Fresh studies hand been made to determine statistics of growth and yield during the preparation of Nachan Working Plan of D.C. Thakur. The same is reproduced here in detail incorporating a few changes in enumerations, stock mapping etc.

7.1 GENERAL:

The following records were consulted for statistics of growth and yield.

- a) *Cedrus deodara* (Deodar): Multiple yield tables for Deodar (*Cedurs deodara*) by H.G. Champion and I.D. Mahandru, Indian forest records volume XV part VIII (Silviculture series 1933).
- b) *Pinus wallichiana* (Kail): Yield table for blue pine by H.G. Champion, P.N.Suri and I.D. Mahanduru, Indian Forest Records Volume XIII part X (Silviculture Series 1929).
- c) *Abies pindrow* (Silver Fir): General volume table for *Abies pindrow* by S.K. Seth, S.N.Dabral and M.M. Singh, Indian Forest Records (New Series) silviculture 1957 volume X No.4.
- d) *Picea smithiana* (Spruce): Volume table for *Picea smithiana* (Spruce) by S.N.Dabral, M.M.Singh and D.S.Rawat, Indian Forest records, volume II No.3 (a) Growth and Yield Statistics of common Indian Timber species (Himalayan region) complied by the Directorate of Forest Education, F.R.I. 1967.
- e) The Silviculture Research Code Volume III.

7.2 VOLUME TABLES:

7.2.1 Coniferous species:

Local volume tables for all coniferous species were prepared after collecting local data of each species. For this purpose sufficient number of trees of all coniferous species were selected as representative of crop in different localities of the

division and volume were derived from the curves drawn as per procedures laid down in Silviculture research code volume-III. The volume factor thus derived and adopted in this working plan are as under:

Tabel 7.1 : Volume factor of coniferous species

Diameter classes(in cm)		Volume of standard stem timber					
		Deodar & Kail		Chil		Spruce & Silver Fir.	
		Cft.	Cubic meters	Cft.	Cubic meters	Cft.	Cubic meters
10-20	V	-	0.06	-	0.04	-	0.07
20-30	IV	8	0.23	5	0.14	10	0.28
30-40	III	25	0.70	15	0.42	30	0.85
40-50	IIA	50	1.41	45	1.27	60	1.70
50-60	IIB	87	2.46	75	2.12	105	2.97
60-70	IA	125	3.54	105	2.97	150	4.25
70-80	IB	175	4.95	150	4.25	210	5.94
80-90	IC	237	6.71	180	5.09	270	7.64
90 & over	ID	275	7.78	210	5.94	330	9.34

7.2.2 Broad leaved species:

The volume factors of *quercus incana* (Ban oak) and *Quercus dilatata* (Mohru oak) of Mandi Nachan working plan by Dr. R.V. Singh have been adopted in this plan also. Similarly the volume factors of other important broad leaved species have been adopted from Kullu working plan by Sh. J.C. Sharma. The volume factors of important broad leaved species are tabulated below:

Table 7.2 : The volume factors of important broad leaved species

Name of Species		Diameter class and volume in cubic meters.								
Botanical Name	Local Name	V	IV	III	IIA	IIB	IA	IB	IC	ID & over
		10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-above
<i>Quercus incana</i>	Ban Oak	0	0.28	0.84	1.70	2.54	3.11	3.40	3.40	3.40

Quercus dilatata & Quercus semicarp.	Mohru Oak & Kharsu.	0	0.3	1.0	1.8	3.0	4.6	6.30	8.0	9.6
Aesculus indica	Khanor	0	0.3	0.8	1.7	2.7	3.9	5.6	7.1	9.0
Juglans regia	Akhrot	0	0.2	0.8	1.5	2.5	3.8	5.1	7.2	8.9
Acer species	Maple	0	0.2	0.7	1.3	2.1	3.3	5.1	6.9	8.5
Prunus padus.	Bird cherry	0	0.1	0.7	1.4	2.2	3.2	4.3	5.6	6.9
Betula	BhojPatra	0	0.3	0.9	1.6	2.3	3.3	4.4	5.4	6.6
Carpinus	Chari/Khiri	0	0.3	0.9	1.5	2.4	4.0	6.0	7.8	9.7
Populus ciliate	Poplar	0	0.3	0.7	1.4	2.8	4.9	6.8	9.0	11.1
Cedraleserata	Darle	0	0.5	1.0	1.8	2.8	4.4	6.0	8.0	9.0
Bhus	-	0	0.3	0.7	1.4	2.6	2.9	4.0	5.1	7.0
Celtis australis	Khirkak	0	0.3	0.7	1.3	2.2	3.3	4.6	6.3	8.0
Alnus nitida	Kosh	0	0.3	0.8	1.5	2.2	3.2	4.3	5.7	7.8
Salix	Biuns	0	0.4	0.8	1.5	2.4	3.1	3.9	-	-
Bobina	-	0	0.3	0.6	1.0	1.4	1.7	2.0	-	-
Box sempervirens	Box	0	0.1	0.2	-	-	-	-	-	-

7.2.3 KHAIR

The diameter, total volume, heartwood, Katha as adopted in the Working plan of Hamirpur Forest division by Sh. Anil Joshi (which is adjoining to Joginder Nagar Forest Division) is also being relied upon in the current working plan and relation is reproduce as under: -

Table 7.3 : The diameter, total volume, heartwood, Katha.

Diameter(cm)	Height (m)	Volume (cum)	Heartwood vol (cum)	Wt. of heartwood forKatha(kg)	Wt. of Katha (kg)
10-15	8.30	0.02570	0.011220	11.2	--
15-20	10.10	0.06860	0.03100	31.6	2.5
20-25	11.80	0.11810	0.05760	50.6	5.0
25-30	12.90	0.216970	0.10960	78.7	8.0
30-35	13.40	0.25280	0.17570	128.3	14.0
35-40	13.40	0.25280	0.17570	128.3	14.0
40-45	13.40	0.33310	0.24060	197.4	23.0
45-50	13.40	0.5680	0.38980	280.1	29.0

7.3 DIAMETER GROWTH:

To determine the rate of diameter growth of different coniferous species, stump analysis was done and necessary seedling and taper data was collected for each species. This work was spread over the entire area to cover the forests of all classes met within the tract and the stumps with only normal growth were selected for analysis. For collection and compilation of data, the procedure of stump analysis as laid down in the Silviculture Research Code Volume III was followed. The rate of growth for different species, is given in the table below:

Table 7.4: Diameter growth of different coniferous species

D.B.H (O.B)	No. of years to reach D.B.H.(O.B.) given in column.				
	Deodar	Kail	Chil	Spruce	Silver Fir
10	28	22	19	29	34
15	36	26	24	36	41
20	44	30	29	44	49
25	53	35	36	53	57
30	62	41	42	61	66
35	70	47	48	71	76
40	80	54	55	80	85
45	88	61	62	90	95
50	98	69	70	101	106
55	107	76	78	109	117
60	116	84	87	119	128
65	126	93	95	128	140
70	136	102	104	138	152
75	146	112	112	148	165
80	155	121	121	157	178
85	165	131	130	168	190
90	174	142	139	179	204
95	185	151	150	190	220

7.4 RECRUITMENT PERIOD:-

From the rate of growth summarized in the above table, the recruitment period from lower to higher diameter class for different species works out as under:

Table 7.5 : The recruitment period diameter class for different species.

Species	Recruitment period in years.				
	IV to III (20-30 cms to 30-40 cms	III to IIA (30-40 cms to 40-50 cms	IIA to IIB (40-50 cms to 50-60 cms	IIB to IA (50-60 cms to 60-70 cms	IA to IB (60- 70 cms to 70-80 cms
Deodar	17	18	19	19	20
Kail	12	14	15	17	19
Chil	12	14	16	17	17
Spruce	18	19	19	19	20
Silver Fir	19	19	22	23	25

7.5 MORTALITY RATE (VALUE OF Z):

The figure regarding the time taken “t” by approach class to grow to exploitable size and mortality percent “Z” i.e. percentage of approach class trees which disappear in “t” years, as available in the expired working plan under revision and also in Kinnaur Working Plan have been adopted in this plan as under:

Species	‘t’ in years	Z
Walnut, Horse chest nut, Bird Cherry, Hazel nut, Carpinus, Betula, Alnus, Populus.	25	25%
Maple, Box wood	40	40%

7.6 QUALITY CLASS ASSESSMENT:

To determine the quality class of a compartment or sub compartment, heights of two dominant trees of the species of a particular forest were measured. In case of Deodar, Kail, Chil, Fir and Spruce forests, the quality class of each compartment was determined by comparing the heights of dominant trees with those given for a standard quality class in the yield tables of these species. Quality classes of various coniferous species relating to heights are tabulated as below:

Quality classes in Ft.					
Species	I	II	III	IV	Remarks
Deodar	120-140	100-120	80-100	60-80	From F.R.I. tables from Howard’s pocket book.
Kail	120-140	100-120	80-100	-	
Kail	120-140	100-120	80-100	-	As adopted by Trevor in his Kullu W. Plan.

The average quality class of the forests of the division has been taken to be II

7.7 Density:

As the crops are uneven aged, no mathematical calculations of density, based on the comparison of actual basal area with that given in the yield tables for normal crops, is possible. The density of crop in each compartment or sub-compartment has, therefore, been based on ocular estimates and is given in the compartment history files.

7.8 ENUMERATIONS:

Total enumeration of all the compartments is basically too capital and time intensive. Therefore for better and good results as same to total enumeration, many of the forests/compartments have been fully enumerated, some of the larger compartments of big forests have also been fully enumerated and for rest, a list of all compartments of Working Circle was prepared and one sample plot was selected for enumeration on the basis of sample plot enumeration as suggested by FSI, which is more than 10% of the total compartments. . Only 5% enumeration has been carried out in the forests allotted to plantation and protection working circle to have an idea of capital value of the stock in these forests. All coniferous and important broad leaved species were enumerated in 10 cm diameter classes down to 10 cm diameter. The enumeration result of each enumerated forest has been given in the compartment history file and also summarized in appendix in Vol.II.

7.9 STOCK MAPS:

All the demarcated protected forests were stock mapped on relevant scale maps and stock map of the all the new/old demarcated protected forests have been attached with C.H Files. In case of un-demarcated protected forests, the minimum area shown on stock maps was taken to be 2 ha. and all the un- demarcated protected forests below 2 ha. have simply been listed. The area under different species and under mixed crop was calculated from the stock maps for each forest, compartment separately and is given in appendix.

7.10 INCREMENT:

In order to determine growth and yield statistics, sufficient number of trees representing wide range of forests of the division was felled for stem analysis while preparing the plan under revision. The trees putting on exceptionally rapid diameter growth were rejected. Curves showing the relationship of volume and diameter of species with age were drawn by giving allowance for correction of breast height age of total age. The statement of growth and yield as read out from these curves were

compiled and are given in the tables below:-The volume increment percentage was worked out multiplying the basal area increment percentage by 1.3, a constant derived by averaging the constants 1.2 and 1.4 given for this purpose in the book “**Planning and Control in Management Forest**” by H. Knuchel. The volume increment percentage so worked out for different species is given below:-

Table 7.6: The volume increment percentage worked out for different species.

Diameter Classes inCms.	Volume increment percentage				
	Deodar	Kail	Chil	Spruce	Silver Fir
20-30	3.52	3.81	4.35	3.08	2.34
30-40	2.82	2.29	3.28	2.56	2.08
40-50	2.27	2.47	2.49	1.97	1.69
50-60	1.82	1.80	2.08	1.54	1.30
60-70	1.56	1.67	1.41	1.21	1.13
70-80	1.27	1.24	1.01	0.95	0.91
80-90	1.14	1.20	0.97	0.83	0.73
90 & over.	0.86	0.88	0.78	0.65	0.49
KAIL					
D.B.H (O.B.) c.m.	Age in years	Vol. in m3	Vol. table adopted for this plan m3	C-A-I in m3	C-A-I %
10	13	-	0.07	-	-
20	24	0.18	0.27	0.02	7.41
30	32	0.43	0.67	0.04	5.97
40	42	1.02	1.50	0.06	4.00
50	57	2.02	2.85	0.07	2.46
60	81	3.60	4.37	0.07	2.46
70	-	5.05	5.76	-	-
80	-	6.33	6.92	-	-
90 & over	-	7.38	7.80	-	-
SPRUCE					
D.B.H (O.B.) c.m.	Age in years	Vol. in m3	Vol. table adopted for this plan m3	C-A-I in m3	C-A-I %
10	35	0.05	0.07	-	-
20	50	0.18	0.27	0.01	3.70
30	68	0.53	0.80	0.02	2.50

40	92	1.20	1.80	0.03	1.67
50	136	2.50	3.25	0.03	0.92
60	-	4.05	4.77	-	-
70	-	5.60	6.30	-	-
80	-	7.05	7.82	-	-
90 & over	-	7.38	7.80	-	-
SPRUCE					
D.B.H (O.B.) c.m.	Age in years	Vol. in m3	Vol. table adopted for this plan m3	C-A-I in m3	C-A-I %
10	26	-	0.075	-	-
20	37	0.18	0.285	0.02	7.02
30	49	0.48	0.750	0.03	4.00
40	63	1.10	1.525	0.04	2.62
50	82	2.13	2.750	0.05	1.82
60	114	3.68	4.600	0.05	1.09
70	-	5.50	6.400	-	-
80	-	7.38	8.350	-	-
90 & over	-	9.26	10.175	-	-
SILVER FIR					
D.B.H (O.B.) c.m.	Age in years	Vol. in m3	Vol. table adopted for this plan m3	C-A-I in m3	C-A-I %
10	35	0.05	0.07	-	-
20	50	0.18	0.27	0.01	3.70
30	68	0.53	0.80	0.02	2.50
40	92	1.20	1.80	0.03	1.67
50	136	2.50	3.25	0.03	0.92
60	-	4.05	4.77	-	-
70	-	5.60	6.30	-	-
80	-	7.05	7.82	-	-

7.11 Out turn of firewood and charcoal from Ban Oak: -

The figure arrived at in the expired working plan have been adopted in this plan also, which are as under: -

Diameter Class in cm.	Yield in quintals from each tree of the diameter class given in column-I.	
	Fire wood	Charcoal
10-20	1.90	0.32
20-30	3.00	0.50
30-40	8.20	1.20
40-50	12.30	2.05
50-60	18.60	3.10
60-70	22.40	3.73
70 & over	30.00	5.00

7.12 COMPARISION OF GROWING STOCK:

In the working plan under revision enumerations have been carried out down to 20 cm d.b.h. in different working circles. In the revised working plan enumerations have been carried out down to 10 cm. d.b.h. in all the working circles except plantation working circle. On the basis of enumeration results, per hectare growing stock has been worked out for different working circles in respect of different species. The figures at “A” represent per ha. Growing stock in the beginning of the present working plan. The figures “B” represents similar growing stock at the beginning of last working plan. The comparison of growing stock at the beginning of last working plan and that in the beginning of the present working plan is given for different working circles in part-II.

PART-II

CHAPTER-I

1. BASIS OF PROPOSALS

1.1 NATIONAL FOREST POLICY:

The first National Forest Policy was enunciated by the Govt. of India in 1894, which formed the basis of the future management strategies of the forest in India in 1904, special rules known as Shimla Forest conservancy rules were introduced by the Govt. of Punjab under the policy laid down in 1894. After independence the Govt. of India felt the need for reorientation of this policy in the light of revolutionary changes. Consequently National Forest Policy of India was formulated and notified vide Govt. of India No. 13-1/52-p dated 12th May 1952. Broadly, it prescribed the maintenance of forest cover over 60% of geographical area in order to prevent soil erosion and land degradation and to ensure the stability of fragile ecosystem of hilly States beside realization of maximum annual revenue in perpetuity consistent with the fulfillment of various needs.

As the forests in the country have suffered serious depletion because of relentless pressure arising from ever increasing demand for fuelwood, fodder and timber, inadequacy of protection measures, division of forest lands to non-forest uses without ensuring compensatory afforestation and essential environmental safeguards, and tendency to look upon forests as revenue earning resources, therefore, it was felt necessary to review the situation. Thus a new strategy of forest conservation became imperative and accordingly National Forest Policy was again revised and notified by Govt. of India No. 3-1/86 FP dated 7th December, 1988. The salient features of this policy are given below:

1. Two third of the area under forest cover in hilly States.
2. Environmental stability and maintenance of ecological balance.
3. Creation massive people's movement and involvement of women.
4. Modification of land laws.
5. Alternative avenues of income, suitably harmonized with the right land laws.
6. Strengthening of scientific forestry research and education.

7. Relation of rights and concessions to the carrying capacity of forests.
8. Protection, improvement and enhanced production of minor forest produce.
9. Forest management through approved working plans.
10. Wildlife and biological diversity conservation.
11. Establishing a strong forest data base.
12. Use of modern method to control forest fires.
13. Substitution of wood needs.
14. Public awareness.
15. Strict control of diversion of forest lands for country.
16. Increasing substantially forest tree cover in the country.
17. Covering the natural heritage of the country by preserving remaining natural forests.

1.2 HIMACHAL FOREST POLICY:

Though, National Forest Policy of 1988 is also applicable to Himachal Pradesh but to meet the peculiar forestry situation within the state, the Govt. of Himachal Pradesh has also formulated Forest Policy for the Pradesh notified vide No. Fts. (8) 17-5/10 dated 3rd September, 1980. Important Salient features of this policy areas under:

1. To bring 50% of the total geographical area of the state under forest by 2000 A.D and to raise this percentage to 60% ultimately.
2. Felling to be carried out strictly in accordance with prescriptions of sanctioned working plan.
3. No felling upto 30 meters on either side of roads.
4. Settlement of two third of Undemarcated and un-classed forests by proper demarcation and settlement in 10 years.
5. Forest and Revenue settlement should be taken up simultaneously so that there is no conflict in the rights to be admitted under two settlements.
6. The requirement of local right holders to be met with judiciously keeping in view the conditions of forests and rationalization of provisions of rights and concessions.

7. The requirement of local right holders to be met with judiciously keeping in view the conditions of forests and rationalization of provisions of rights and concessions.
8. There being hardly any scope for further extension of agriculture, the people should be encouraged to adopt some alternative professions.
9. Transfer of areas under reserved, demarcated protected forest and plantations for non forestry purposes to be totally banned.
10. Management of watersheds to be given due importance.
11. Game development and preservation to be accorded high priority.
12. Peoples participation in afforestation programmes.
13. Planting of fast growing fuel and fodder species to be preferred near habitations to meet the requirements of the local people.
14. Steps to be taken to reduce cattle population rationally.
15. To promote tourism along with improvement of forest vegetation.
16. No lease for the extraction of minerals to be granted without the prior consent of Forest Department.
17. Research facilities to be created to solve problems of applied nature.

Consistent with the objectives as laid down in the National Forest Policy, 1988 and Himachal Pradesh Forest Sector Policy & Strategy, 2005, the following general objectives of management of forests shall be as under: -

- i)** To conserve & improve the quality and density of the existing forests for the protection, preservation, improvement, prevention of erosion and maintenance of an equitable flow of water in the streams and rivers.
- ii)** To develop the sustainable management of forests, watershed, wild life & biodiversity and to rehabilitate the degraded forests & habitat through plantation of native species, habitat improvement, assisting of natural regeneration and taking up soil & water conservation measures.
- iii)** To develop the sustainable management of forests, watershed, wild life & biodiversity and to rehabilitate the degraded forests & habitat through plantation of native species, habitat improvement, assisting of natural regeneration and taking up soil & water conservation

measures.

- iv) To protect and conserve the forest biodiversity including total protection of endangered species of flora and fauna consistent with environmental considerations, to increase the proportion of more valuable species while conserving biodiversity etc.
- v) To bring the growing stock to a condition nearer the normal forest, as far as possible.
- vi) To meet the bonafide requirements of the local population for timber, fuel, agricultural implements, grazing & other forest produce for enhanced livelihood of the local people.
- vii) To aware and educate local people through participatory forest management about importance of biological diversity & their role to human ecology and environment and also seek their co- operation and participation in its management.

1.3 GENERAL OBJECTIVES OF MANAGEMENT:

The total geographical area of H.P. is 55673 Km², out of which 37033 Km² has been recorded as forest area with forms 66.52% of total geographical area of the State. Only 14467Km² out of 37033 Km², is under forest cover which forms 25.79%. In a hilly state like Himachal Pradesh, forests are very intimately connected with human life. They not only meet the day-to-day requirement of timber, fuelwood, fodder etc. of the local population and their livestock, but also play a key role in the maintenance of pure and invigorating environment, protection of hill slopes and regulation of water supply in the rivers and streams.

The existing forests of Joginder Nagar forest division are under heavy pressure due to diversion of forest land for various developmental activities like construction of new roads, winding to State highway to National High way and other development activities etc. In addition the forest land has been encroached especially in UPFs for agriculture and other purposes. Pressure is also mounted on the forest to meet the timber and fodder requirement of the local people. Thus, keeping in view of the objectives of National and State forest policy, present status of the forests of the tract and legitimate demands of the people the following general object of the management are enumerated herein under:-

i) To conserve & improve the quality and density of the existing forests for the protection preservation, improvement, prevention of erosion and maintenance of an equitable flow of water in the streams and rivers.

ii) Yield regulation is one of the tasks of forest management and therefore to manage the forest in such a way as to produce normal forest as early as possible.

iii) To protect and conserve the bio-diversity including total protection of endangered species of flora and fauna consistent with environmental considerations.

iv) To create and manage normal forest by ideally constituting appropriate growing stock, age, class distribution and increment from which the annual and periodic removal or produce can be continued indefinitely without endangering environment and future yields. To ensure these objective trees of all sizes, classes or crops of all age classes are to be ensured to be present in correct proportion.

v) To convert the abnormal forest to normal forest by removing the over mature trees and trees of older age gradation or age classes and to restocked the under stocked forest be preponderance of younger age classes. To maintained the environmental stability and restoration of the ecological balance through preservation of the forests.

vi) To maintain the forest on scientific technical and economic principle of forestry.

vii) To meet the bonafide requirements of the local population for timber, fuel, agricultural implements, grazing and other forest produce for enhanced livelihood of the people.

viii) To create awareness and educate local people through participatory forest management and seek their co-operation and participation in its management.

ix) To develop recreational forestry to encourage nature based Eco-tourism and to regulate and control growing tourist influx in forests areas inconsonance with Eco- Tourism principles keeping in view the Forest Conservation Act, 1980.

1.4 Methods of Treatment to be adopted

To achieve the above objectives of management, the following treatment and methodology will be followed.

1. All the coniferous forests which are on comparatively moderate slops will be managed under shelterwood system.

2. All the forests which are on steeper slopes along the nalas or streams, along the National high ways or Railway line and around the Tourist places will be preserved and improved from Tourist, aesthetic, soil and water conservation point of view.

3. Poorly stocked and blank forests will be re-afforested by

planting suitable species to meet local demand of fodder, fuel, timber and forest based industries.

1.5 Constitution of working circles & method of treatment

Ajay Kumar Sharma,s Plan	Area (in ha.)	Plan under Revision	Area (in ha)
▶ Deodar and Kail Working Circle	628.02	▶ Deodar and Kail Working Circle	1376.34
▶ Chil Working Circle	4055.58	▶ The chil Working Circle.	4095.32
▶ Fir Working Circle.	246.10	▶ The Fir / Spruce Working Circle.	1057.77
▶ Oak Working Circle.	1591.90	▶ The Protection Working Circle	14500.58
▶ Protection cum Rehabilitation Working Circle.	5473.56	▶ The Plantation Working Circle	4513.8
▶ Plantation Working Circle	3765.58	▶ JFM (overlapping) Working Circle	
▶ Wild Life and its management.		▶ Wild Life Management-cum- Eco tourism (overlapping)Working Circle	
▶ Joint Forest Planning and Management.		▶ NTFP (overlapping) Working Circle	
▶ Non-Timber Forest Produce.			
Total	15760.74	Total	25543.81

To achieve the above objective of management, the following working circles will be constituted, which had been approved in PWPR: -

- i) The Deodar and Kail Working Circle.
- ii) The chil Working Circle.
- iii) The Fir / Spruce Working Circle.
- iv) The Protection Working Circle
- v) The Plantation Working Circle
- vi) JFM (overlapping) Working Circle
- vii) Wild Life Management cum Ecotourism (overlapping) Working Circle.
- viii) NTFP (overlapping) Working Circle

1.6 Deodar and Kail Working Circle (Area 1376.34 hac.):

All the forests having more than 60% deodar and kail on easy slopes have

been allotted to this working circle. The forests are not even aged. Definite allotment to different periodic blocks has been made and yield is calculated for each PB. Punjab Shelter wood system has been adopted for the management of these forests to get intensive regeneration and maximum yield. The emphasis will be laid on natural regeneration supplemented with artificial regeneration. The total area under this Working Circle is 1376.34ha.

1.7 The Chil Working Circle (Area 4095.32ha.):

This includes all D.P.Fs and U.P.Fs containing chil as pure crop. These forests shall be worked under Punjab Irregular shelterwood System. All Demarcated Protected and Un-demarcated Protected Forests lying in easy slopes where Chil is the main species occurring either pure or in mixture and established Chil plantations, have been allotted to this Working Circle.. Definite allotment to different PBs has been made and yield has been calculated separately for each PB. Silviculture system adopted for managing these forests is Punjab shelterwood system with natural method of regeneration supplemented with artificial. The total area allotted to this Working Circle is 4095.32ha.

1.8 The Fir and Spruce Working Circle (Area 1057.77 hac.):

Those Forests which are on easy slopes and have 60% or more pure or mix crop of Fir and Spruce, have been allotted to this Working Circle. Both fir and Spruce has a peculiar problem of regeneration, which cannot be solved by grouping them with Deodar and Kail forests. Therefore, a separate Working Circle for Fir and Spruce forests has been constituted to bring these forests under proper management. In order to ensure regeneration, these forests will now be managed under Punjab Shelter wood system with floating method of allotting PBs will be followed, in which only PB I will be definitely allotted and rest of the forests will be unallotted 1057.77ha area has been allotted in this Working Circle. The artificial source of regeneration will be resorted to.

1.9 Protection Working Circle (Area 14500.58 hac.) :

This Working Circle comprised Forests which are situated on steep and precipitous slopes, along major roads/streams/nalas, near habitations around places of tourist importance and also those forests which have not been covered under other Working Circles and also those forests which were allotted to oak working circle in the previous working plan. In this Working Circle, no silviculture system is adopted. Moreover, green felling will not be allowed from these forests except salvage removal for meeting the bonafide demand of right holders due to environmental hazards and regeneration problems. These forests will be protected from soil and water conservation, aesthetic and tourist point of view besides maintaining the ecological balances. The

density of these forests will be improved by raising plantation of suitable species through artificial means. The total area of this Working Circle is 14500.58ha.

1.10 Plantation Working Circle (Area 4513.80 hac.): -

All blanks and poorly stocked undemarcated protected forests, Demarcated Protected, areas of failed old plantations which require restocking of suitable species have been allotted to this Working Circle. The total area of this Circle is 4513.8ha. No silviculture system is adopted. However, areas to be planted year- wise, method of planting, planting techniques of various suitable species is clearly mentioned.

1.11 Joint Forest Management (Overlapping) Working Circle:

The degraded U.P.Fs near to the habitations, D.P.Fs close to habitations which are facing fast natural resource depletion are prime areas to be taken up for JFM. Demonstration areas will be created where field visits can be made by the farmers and other NGOs. This will create environmental awareness and value of forests among the masses.

1.12 The Wild Life-cum- Eco Tourism (Over-Lapping) Working Circle:

This working circle includes areas which are important for recreational forestry to encourage nature based eco-tourism as well as wild life comprising by demarcated and un-demarcated protected forests of all other working circles except chil and plantation working circles. It includes all forest areas situated in and around the National Highways, aesthetic point of view and those forests constituted the importance of wild life conservation and protection of development of Eco-tourism and all high lying forests habitat for wild life conservation and protection etc. This Working Circle is constituted for emphasizing the necessity of conservation of wildlife and collection of information for better management of wild life.

1.13 Non-Timber Forest Produce (Over-Lapping) Working Circle.

This would be an overlapping working circle covering all the working circle and is constituted to ensure systematic development and exploitation of non timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, grasses. Programme of planting and establishment of nurseries for NTFP along with extraction cycle will be done.

1.14 BLOCK AND COMPARTMENTS:

By and large the old compartments/sub-compartments will be retained as such but a few sub division of compartment may be required to facilitate better management. The compartments/sub-compartments in the forests being managed under shelter wood system should not be more than 20-30 ha. as this will facilitate better management.

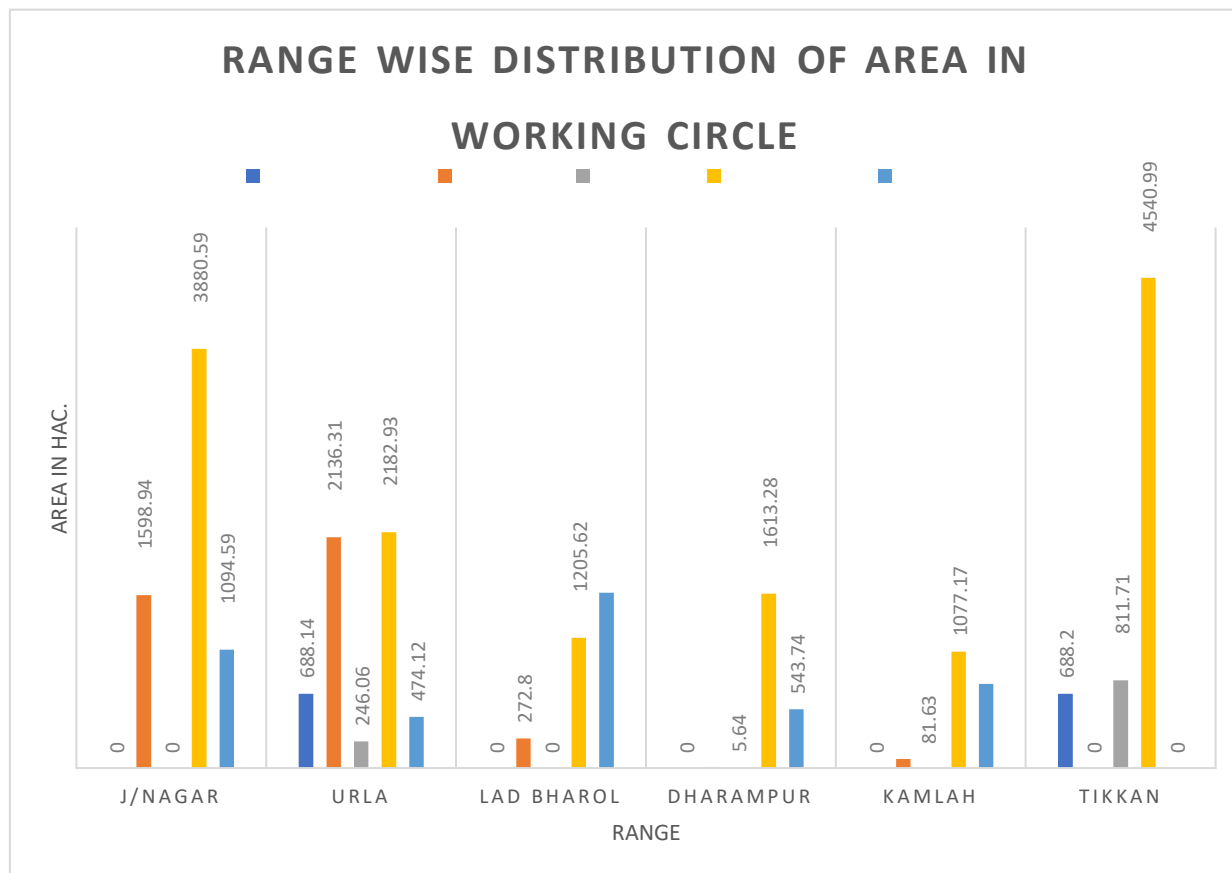
1.15 FELLING SERIES

Taking the whole division as one unit of control, there will be only one felling series.

The area under each working circle and its range wise distribution is tabulated below:-

Table 1.1 : Working circle and its range wise distribution. (ha.)

Name of Range	DEO KAIL W.C.	CHIL W.C	FIR W.C.	Protec. W.C.	Plantn. W.C.	Total
J/Nagar	0	1598.94	0	3880.59	1094.59	6574.12
Urla	688.14	2136.31	246.06	2182.93	474.12	5727.56
Lad Bharol	0	272.8	0	1205.62	1623.4	3101.82
Dharampur	0	5.64	0	1613.28	543.74	2162.66
Kamlah	0	81.63	0	1077.17	777.95	1936.75
Tikkan	688.2	0	811.71	4540.99	0	6040.9
Total	1376.34	4095.32	1057.77	14500.58	4513.8	25543.81



1.16 Period of Working Plan:

The plan of Mr. Ajay Sharma IFS, expired on March 2014, whereas revision of same could not be carried out. Complete ban on green fellings and grant of T.D were banned during the period, only salvage removals were made from the forests for which control forms have been updated and approved from the competent authority. Therefore, implementation of Working plan is proposed prospectively from 1st April 2022 for further 10 years i.e. 2022-2032 to 2031-2032.

CHAPTER-II

2. THE DEODAR AND KAIL WORKING CIRCLE

2.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the forests with Kail and deodar either occurring pure or in mixture with other Species, containing deodar and Kail as 60% or more, keeping the consideration of slope, accessibility and suitability for regeneration, will be included in this working circle. The basic constitution of this working circle will remain the same as in the earlier plan. This working circle will be managed under the Punjab Irregular Shelterwood system in a compartment of all Demarcated protected forests.

The emphasis will be laid on natural regeneration supplemented by artificial regeneration. The overall condition of the crop is young to middle age with a few mature age groups, besides above, the suitable forests as have promising deodar regeneration coming up naturally in compartments of Chil Working Circle will be included in this circle. In addition, all Deodar and Kail established plantation which have attained the height of poles have also been allotted to this working circle. Besides, some spruce forests of Ajay Kumar Sharma's Working Plan having predominance of deodar and kail have been allotted to this working circle.

2.2 GENERAL CHARACTER OF VEGETATION

The crop is mainly Deodar and Kail occurring either gregariously in pure patches or in mixture with Spruce, Fir, Oaks, Broad Leaved and Chil species in descending proportions. In the upper reaches Fir and Spruce is found mixed with deodar and Kail with some proportion of *Taxus baccata*. Along the nallas and depressions and at places dense crops of Ban oak pure or mixed with Mohru also found. Along the lower limits deodar is confined to sheltered places only. Chil is met within the lower altitudinal zone and is mainly confined to spurs and warmer aspects.

SPECIAL OBJECTS OF THE MANAGEMENT: -

The special objects of management will be: -

- i) To continue the process of conversion of irregular/un-even aged Crop into regular/ even age crop.
- ii) To improve health of the plant by reducing congestion and by removing overhead

shade.

- iii) To restock PB-I areas as soon as possible by artificial regeneration removing overhead shade.
- iv) To restock the area deficient in natural regeneration by artificial means.
- v) To provide bonafide requirements of timber, firewood and fodder to the Right holders on the more systematic lines for bonafide domestic purpose as per settlement report through participatory forest management.
- vi) To obtain maximum sustained yield of timber and eco-service.

FELLING SERIES AND CUTTING SECTIONS

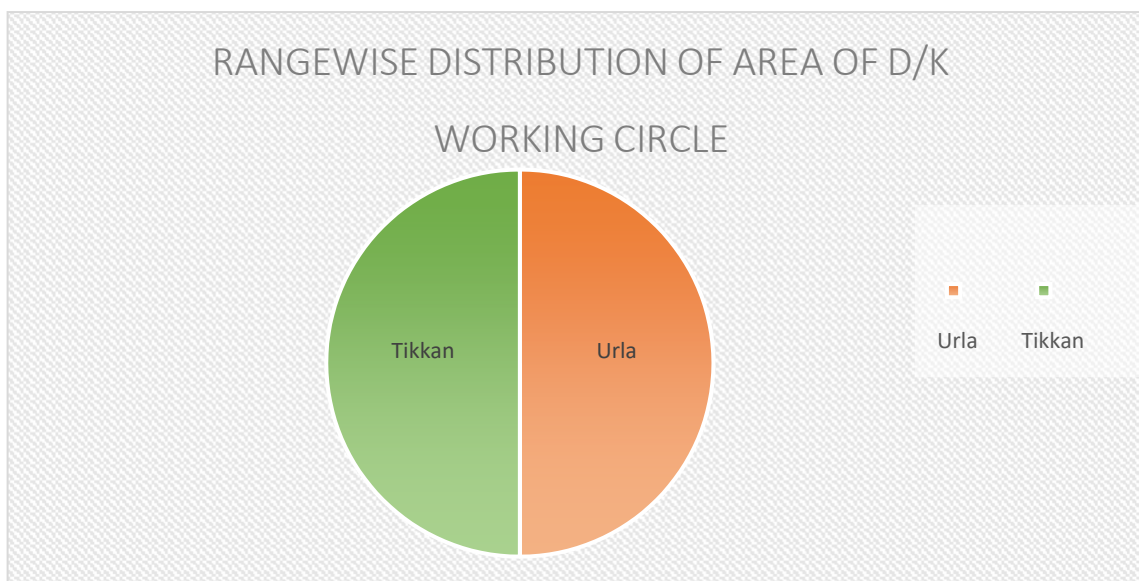
There will be one felling series

2.3 AREA STATEMENT:

This working circle covers an area of 1376.34ha. The range wise distribution is as under:

Table: 2.1 : Area statement of Deodar and Kail Working Circle

Felling series	Name of Range	Area in ha.
Joginder Nagar	Joginder Nagar	-
	Urla	688.14
	Lad Bharol	-
	Dharampur	-
	Kamlah	-
	Tikkan	688.2
Total		1376.34

FIGURE- 5. DIAGRAMATIC REPRESENTATION OF AREA:

Range wise and species wise distribution of area is given in the following table.

Table 2.2: Range wise and species wise distribution of area

Range	Deodar	Kail	Chil	Fir/ Spruce	Oak	Mixed Conifer	Misc. B/L	Conifer mixed with B/L/	Blank	Total
1.	2	3.	4.	5.	6.	7.	8.	9.	10.	11.
J/Nagar	-	-	-	-	-	-	-	-	-	-
Urla	203.4	88	-	3.74	46	189	46	74	38	688.14
L/Bharol	-	-	-	-	-	-	-	-	-	-
D/Pur	-	-	-	-	-	-	-	-	-	-
Kamlah	-	-	-	-	-	-	-	-	-	-
Tikkan	149.2	159	2	41	56	144	53	61	23	814.87
Total	352.6	247	2	44.74	102	333	99	135	61	1376.34

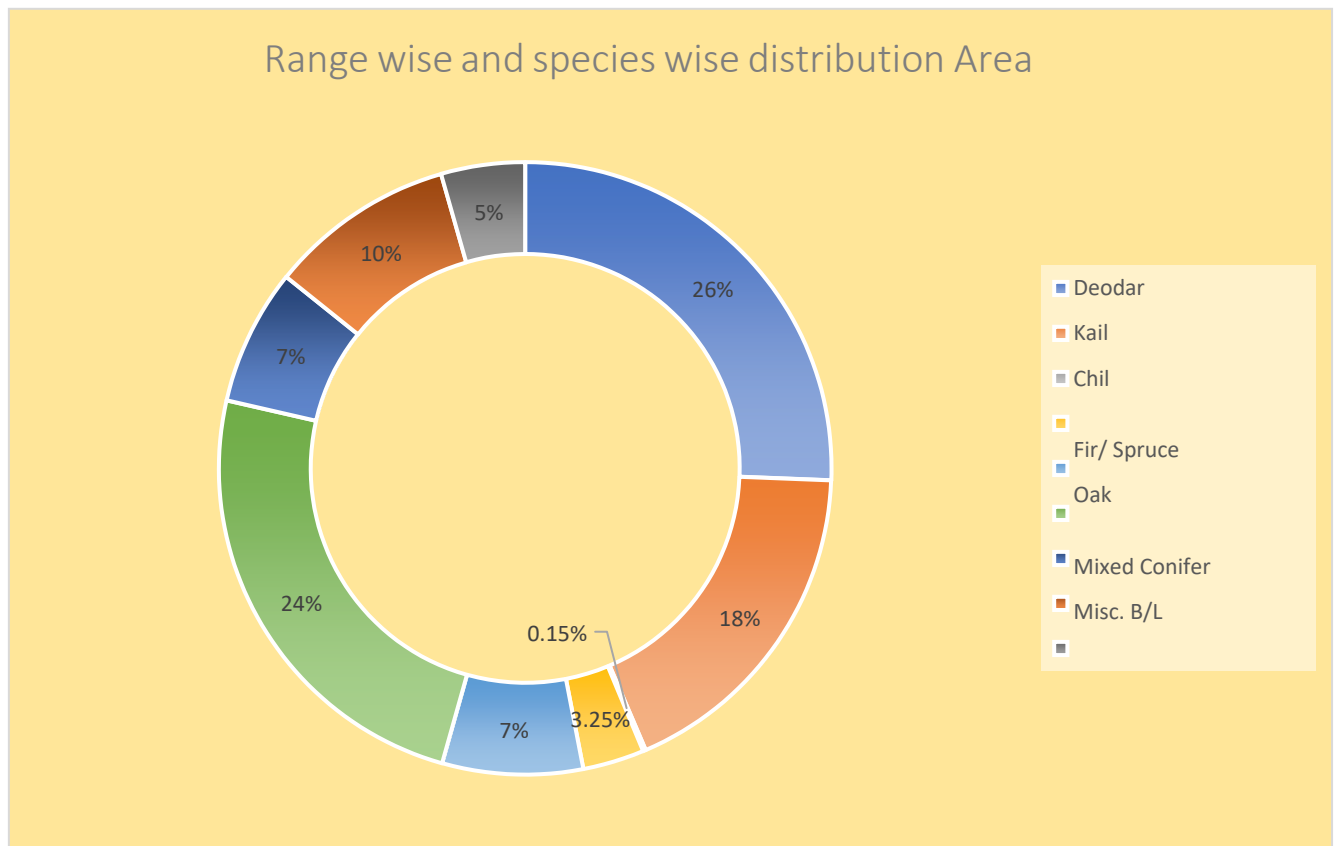


Figure-6- Range Wise and Species wise distribution

2.4 ANALYSIS AND VALUATION OF THE CROP:

2.4.1 STOCK MAPS:

Stock maps have been prepared and have been attached in the compartment history files.

2.4.2 SITE QUALITY:

Quality classes have been estimated ocularly in each compartment and sub compartment. At places actual measurements of height and diameter of dominant trees was also carried out. The average quality in these forests of Jogindernagar Forest Division for deodar and kail is quality class II (FRI).

2.4.3 AGE CLASSES:

Crops generally are uneven aged meaning there by all the age classes are present. Middle class is dominating in P.B.IV areas and in very few old plantations, the crop is even aged.

2.4.4 DENSITY:

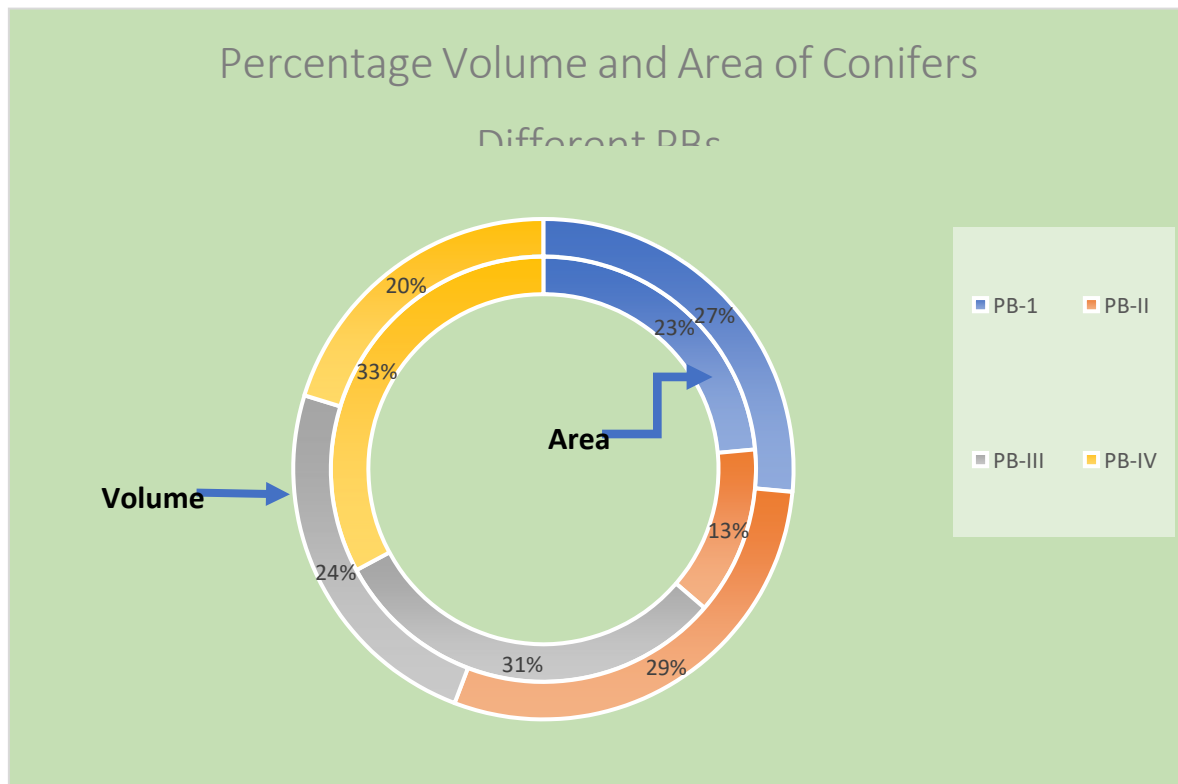
By and large these forests are well stocked. For each compartments/sub compartment ocular estimation for density was done, which is recorded in the respective compartment history file. The density varies between 0.1 to 0.8, the average being 0.45 for the whole working circle.

2.4.5 ENUMERATIONS:

Total enumeration of all the compartments is basically too capital and time intensive. Therefore for better and good results as same to total enumeration, many of the forests/compartments have been fully enumerated, some of the larger compartments of big forests have also been fully enumerated and for rest, a list of all compartments of Working Circle was prepared and one sample plot was selected for enumeration on the basis of sample plot enumeration as suggested by FSI, which is more than 10% of the total compartments. Enumerations were carried out in 10 cm diameter classes down to 10 cm diameter. The forest wise detail of enumerations is given in the respective compartment history files as well as in Appendix in Vol. II. A summary of enumeration results is shown in the tabular as below: -

Table 2.3 : Summary of enumeration results

Periodic block	Area in ha.	Total % of area	Total % volume of Coniferous spp. In m3	Volume of Coniferous spp. In m3 per ha.
PB-1	319.24	23.19	26.79	72818.88
PB-II	192.8	14.00	18.97	51623.5
PB-III	418.06	30.37	29.21	79455.4
PB-IV	446.22	32.44	25.03	68101.4
Total	1376.34	100	100	271999.98

Table 2.4 : Number of trees of different Dia classes PB-I

Number of Trees and Volume of Different Dia. Classes In PB-I							
Class & Volume	Species						Total
	Ban	BL	Chil	Deodar	Kail	Rai Tosh	
Class-V	14946	13363	5	12667	4104	2029	47114
Vol-V	0	0	0.2	760.02	246.24	1420.3	2426.76
Class-IV	7383	6516	3	12997	2328	950	30177
Vol-IV	2067.24	1954.8	0.42	2989.31	535.44	266	7813.21
Class-III	4244	2584	2	16059	2306	747	25942
Vol-III	3564.96	1808.8	0.84	11241.3	1614.2	634.95	18865.05
Class-IIA	2050	429	0	8622	1602	313	13016
Vol-IIA	3485	557.7	0	12157.02	2258.82	532.1	18990.64
Class-IIB	1156	147	0	3441	1747	312	6803

Vol-IIB	2936.24	323.4	0	8464.86	4297.62	926.64	16948.76
Class-IA	795	56	0	674	1012	113	2650
Vol-IA	2472.45	184.8	0	2385.96	3582.48	480.25	9105.94
Class-IB	380	5	0	373	1270	37	2065
Vol-IB	1292	23	0	1846.35	6286.5	219.78	9667.63
Class-IC	170	5	0	174	718	13	1080
Vol-IC	578	31.5	0	1167.54	4817.78	99.32	6694.14
Class-ID	48	2	0	72	371	15	508
Vol-ID	163.2	16	0	560.16	2886.38	140.1	3765.84
Total-Class	31172	23107	10	55079	15458	4529	129355
Total Volume	16559.09	4900	1.46	41572.52	26525.46	4719.44	94277.97

Table 2.5: Number of trees of different Dia classes PB-II

Number of Trees and Volume of Different Dia. Classes In PB-II							
Class & Volume	Species						Total
	Ban	BL	Chil	Deodar	Kail	Rai Tosh	Total
Class-V	3385	13865	0	14248	2702	762	34962
Vol-V	0	0	0	854.88	162.12	533.4	1550.4
Class-IV	4211	5959	76	8037	900	1311	20494
Vol-IV	1179.08	1787.7	4	1848.51	207	367.08	5400.01
Class-III	880	1672	153	7594	365	487	11151
Vol-III	739.2	1170.4	64.26	5315.8	255.5	413.95	7959.11
Class-IIA	686	97	0	4944	147	404	6278
Vol-IIA	1166.2	126.1	0	6971.04	207.27	686.8	9157.41
Class-IIB	0	57	0	4233	650	190	5130
Vol-IIB	0	125.4	0	10413.18	1599	564.3	12701.88
Class-IA	0	98	0	1165	114	1271	2648

Vol-IA	0	323.4	0	4124.1	403.56	5401.75	10252.81
Class-IB	118	158	0	0	308	289	873
Vol-IB	401.2	726.8	0	0	1524.6	1716.66	4369.26
Class-IC	0	57	0	324	171	247	799
Vol-IC	0	359.1	0	2174.04	1147.41	1887.08	5567.63
Class-ID	0	0	0	356	0	0	356
Vol-ID	0	0	0	2769.68	0	0	2769.68
Total-Class	9280	21963	229	40901	5357	4961	82691
Total Volume	3485.68	4618.9	74.9	34471.23	5506.46	11571.02	59728.19

Table 2.6: Number of trees of different classes PB-III

Number of Trees and Volume of Different Dia. Classes In PB-III							
Class & Volume	Species						Total
	Ban	BL	Chil	Deodar	Kail	Rai Tosh	
Class-V	9877	13734	15	24673	12071	1745	62115
Vol-V	0	0	0.6	1480.38	724.26	1221.5	3426.74
Class-IV	9075	10601	37	19747	11422	1754	52636
Vol-IV	2541	3180.3	5.18	4541.81	2627.06	491.12	13386.47
Class-III	7070	3086	18	23556	11176	1049	45955
Vol-III	5938.8	2160.2	7.56	16489.2	7823.2	891.65	33310.61
Class-IIA	5168	1139	5	5401	5212	451	17376
Vol-IIA	8785.6	1480.7	6.35	7615.41	7348.92	766.7	26003.68
Class-IIB	1350	687	8	1196	1628	618	5487
Vol-IIB	3429	1511.4	16.96	2942.16	4004.88	1835.46	13739.86
Class-IA	648	78	3	155	413	1561	2858

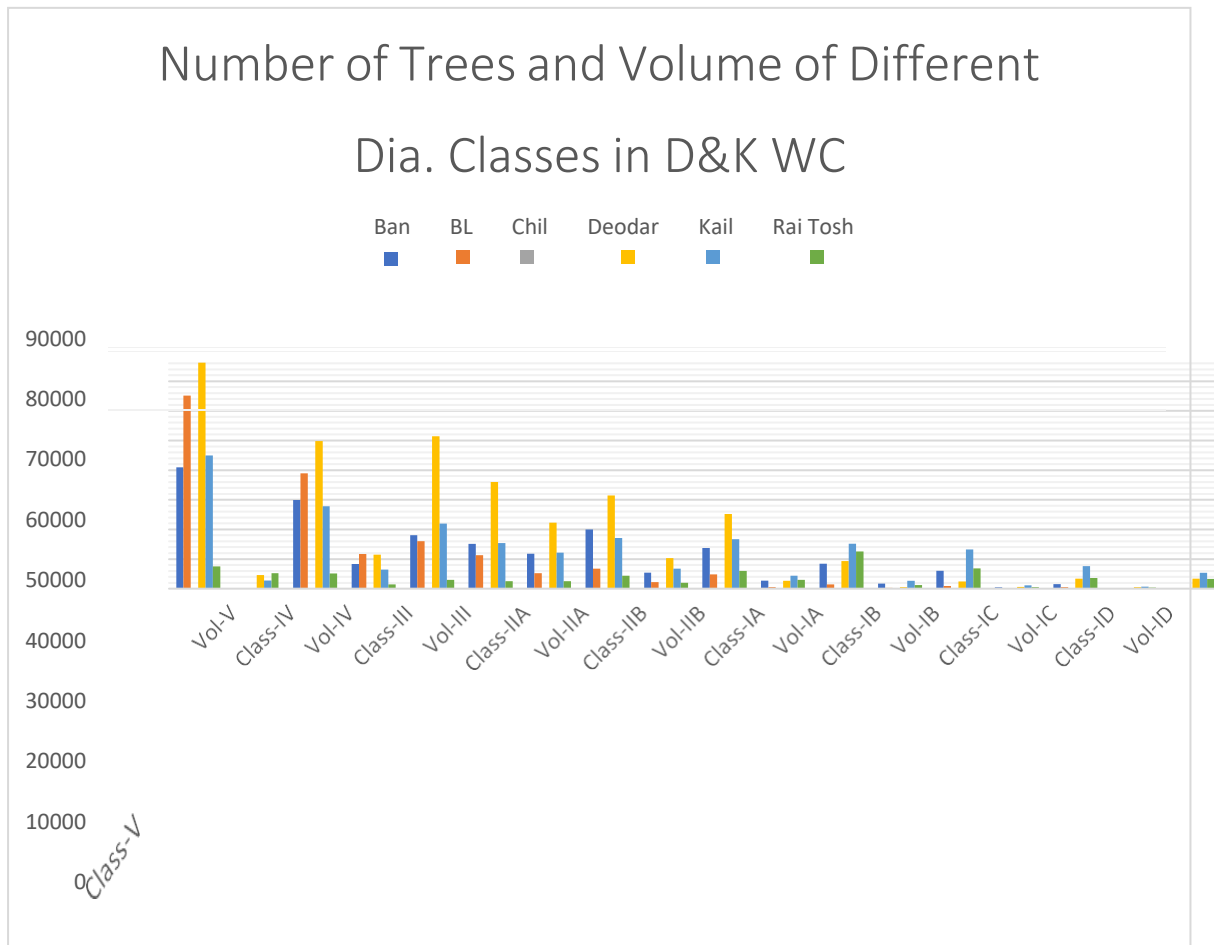
Vol-IA	2015.28	257.4	8.91	548.7	1462.02	6634.25	10926.56
Class-IB	462	13	0	44	374	347	1240
Vol-IB	1570.8	59.8	0	0	1851.3	2061.18	5760.88
Class-IC	236	15	0	9	51	176	487
Vol-IC	802.4	94.5	0	60.39	342.21	1344.64	2644.14
Class-ID	36	1	0	1	315	174	527
Vol-ID	122.4	8	0	7.78	2450.7	1625.16	4214.04
Total-Class	33922	29354	86	74782	42662	7875	188681
Total Volume	25205.28	8752.3	45.56	33903.63	28634.55	16871.66	113412.98

Table 2.7:- Number of trees of different Dia classes PB-IV

Number of Trees and Volume of Different Dia. Classes in PB-IV						
Class & Volume	Species					Total
	Ban	BL	Deodar	Kail	Rai Tosh	
Class-V	12677	24152	24650	26057	2892	90428
Vol-V	0	0	1479	1563.42	2024.4	5066.82
Class-IV	9223	15777	9036	13155	1075	48266
Vol-IV	2582.44	4733.1	2078.28	3025.65	301	12720.47
Class-III	5862	8653	4177	8136	649	27477
Vol-III	4924.08	6057.1	2923.9	5695.2	551.65	20151.93
Class-IIA	3857	3512	3308	5150	1358	17185
Vol-IIA	6556.9	4565.6	4664.28	7261.5	2308.6	25356.88
Class-IIB	2879	1256	1353	2719	877	9084
Vol-IIB	7312.66	2763.2	3328.38	6688.74	2604.69	22697.67
Class-IA	1258	211	625	2747	5	4846
Vol-IA	3912.38	696.3	2212.5	9724.38	21.25	16566.81
Class-IB	825	9	61	705	483	2083
Vol-IB	2805	41.4	301.95	3489.75	2869.02	9507.12
Class-IC	59	0	2	181	33	275
Vol-IC	200.6	0	13.42	1214.51	252.12	1680.65
Class-ID	0	0	0	0	161	161
Vol-ID	0	0	0	0	1503.74	1503.74
Total-Class	36640	53570	43212	58850	7533	199805
Total Volume	28294.06	18857	17001.7	38663.2	12436.5	115252.1

Table 2.8:- Number of Trees and Volume of Different Dia. Classes in D&K WC

Number of Trees and Volume of Different Dia. Classes in D&K WC							
Class & Volume	Species						Total
	Ban	BL	Chil	Deodar	Kail	Rai Tosh	
Class-V	40885	65114	20	76238	44934	7428	234619
Vol-V	0	0	0.8	4574.28	2696.04	5199.6	12470.72
Class-IV	29892	38853	116	49817	27805	5090	151573
Vol-IV	8369.76	11655.9	16.24	11457.1	6395.15	1425.2	39320.16
Class-III	18056	15995	173	51386	21983	2932	110525
Vol-II	15167.04	11196.5	72.66	35970.2	15388.1	2492.2	80286.7
Class-IIA	11761	5177	5	22275	12111	2526	53855
Vol-IIA	19993.7	6730.1	6.35	31407.75	17076.51	4294.2	79508.61
Class-IIB	5385	2147	8	10223	6744	1997	26504
Vol-IIB	13677.9	4723.4	16.96	25148.58	16590.24	5931.09	66088.17
Class-IA	2701	443	3	2619	4286	2950	13002
Vol-IA	8400.11	1461.9	8.91	9271.26	15172.44	12537.5	46852.12
Class-IB	1785	185	0	478	2657	1156	6261
Vol-IB	6069	851	0	2366.1	13152.15	6866.64	29304.89
Class-IC	465	77	0	509	1121	469	2641
Vol-IC	1581	485.1	0	3415.39	7521.91	3583.16	16586.56
Class-ID	84	3	0	429	686	350	1552
Vol-ID	285.6	24	0	3337.62	5337.08	3269	12253.3
Total-Class	111014	127994	325	213974	122327	24898	600532
Total Volume	73544. 11	37127. 9	121.92	126949. 09	99329. 62	45598.59	382671.23



2.5 SILVICULTURAL SYSTEM:

The forest of this working circle will be managed under Punjab Irregular Shelter Wood system. Compact groups of advance growth upto 30 cm dbh and 0.2 ha. or more in extent will be retained as advance growth. Individual poles or middle aged trees will not be retained while carrying out seeding fellings. Efforts will be made to get PB I areas regenerated naturally and regeneration will be supplemented by artificial regeneration operations. No felling will be carried out in PB II areas except salvage removal. Thinning will be carried out in PB III wherever required. Final fellings along with thinning and cleanings as per requirement of the crop will be carried out in PB IV areas. The Punjab irregular Shelterwood Silvicultural System have been prescribed to be adopted *to form normal and even aged forests* for the time to come. This system allows felling according to the nature of the ground and also permits certain amount of irregularity so as to avoid sacrifice of immature pole crop that are unavoidably included in PB-I. Protection of steep and precipitious slopes is done by carrying out markings on selection principles.

2.6 CHOICE OF SPECIES:

The best suited species from all aspects of the site will be preferred. Deodar of

course will be favoured as it is the most valuable species. Deodar also is to be preferred over kail in case of mixed forests while carrying out unsalable thinning and planting. On hot southern aspect or along dry spurs unsuited for deodar, attempts should not be made to indiscriminately introduce deodar in kail areas. In sprurs areas and nallas too damp for deodar, introduction of deodar should be confined to better drained sites only. Introduction of Ban, Walnut should be introduced in nallas and damp localities, wherever possible.

2.7 ROTATION AND CONVERSION PERIOD

A diameter of 60 cm dbh is suited for conversion into standard size sleepers and other large size scantling which are mostly in demand. According to the growth data given in previous plan, this diameter is attained during 100 years. Giving an allowance for regeneration failures and other risks, the rotation of 120 years has been fixed for all the species in this working circle. As the forests of this circle are in the process of conversion from irregular to regular and have been achieved partly. Taking field position into consideration and by carrying out tending operations like cleaning, climber cutting, thinning and improvement felling in PB-II & PB-III and concentrated felling in PB-I and final felling in PB-IV as per prescription of Working Plan this objective of conversion of irregular to regular forest can be achieved during next 45 years. Hence now the conversion period is fixed as 60 years.

2.8 EXPLOITABLE DIAMETERS

The exploitable diameter of the Kail and deodar is fixed 60 cm dbh.

2.9 REGENERATION PERIOD:

Regeneration period of 30 years is sufficient to regenerate PB I area, therefore, it shall continue. Efforts will be made to regenerate the area naturally supplemented with artificial planting.

2.10 DIVISION INTO PERIODIC BLOCKS:

With the rotation fixed at 120 years and regeneration period being 30 years, the total area of the working circle has now been divided into 4 periodic blocks viz. P.B.I, P.B.II, PB-III and PB-IV. The basis of allotment of forest to various periodic blocks is as under:

2.10.1 P.B.I: This periodic block includes the following types of areas:

This periodic block includes all those forests of this working circle where mature

age classes are pre dominant and are unfelled. This type includes unfelled PB-I areas of previous working plan , some of the PB-II areas of previous working plan under revision crossing over to PB-I and areas which have been felled but are deficient in regeneration due to inadequate openings. PB-I areas of the working plan under revision, which have not been fully regenerated are also allotted to PB-I. In these areas regeneration is either found in patches or not established as yet. A list of forests falling in PB-1 is given as under:

Table 2.9: PB-I JOGINDER NAGAR FELLING SERIES

PB-I JOGINDER NAGAR FELLING SERIES				
S. No.	Kind of Forest	Forest Name	Name of Compt.	Area (in Ha.)
1	DPF	ND 127 Barot	C-Ia	18.4
2			C-Ib	25.71
3		ND 137 Sarchnala	C-II	67.2
4		OD 131 Kalhog	C-II	35.19
5			C-III	21.07
6		OD 132 Jamtehar	C-I	20
7		OD 141 Phutakhal	C-I	81.56
8			C-II	19.76
9		OD 160 Silhswar	C-III	30.35
Grand Total				319.24

Table 2.10 : PB-IV JOGINDER NAGAR FELLING SERIES.

PB-IV JOGINDER NAGAR FELLING SERIES				
S. No.	Kind of Forest	Forest Name	Copartment	Area (Ha.)
1	DPF	ND 126 Kathyaru	C-I	25.2
2		ND 183 Boaching	C-I	26.14
3		ND 189 Galu	Whole	10.12
4		ND 192 Thuji	Whole	27.11
5		ND 199 Lachkandhi	C-I	30.84
6			C-II	31.28
7			C-III	35.9
8			C-IV	35.02
9			C-V	36.12
10		ND 201 Bhamchawan	C-II	32.2
11		ND 202 Dhamchyan	C-II	47.46
12		ND 203 Cheling	Whole	45.33
13		ND 207 Badi Bajgan	Whole	38.45
14		ND 238 Kopaldhar	C-II	25.05
Grand Total				446.22

PB-II:-All forests which have preponderance of age classes approaching maturity have been allotted to P.B.II. Some of the PB-II areas of working plan under revision have been retained in this periodic block as these were not mature enough to be allotted to PB-I.

PB-III: All forests having pole to middle aged crop with a few scattered mature and maturing trees have been allotted to this periodic block.

PB-IV: Forests carrying partly young crop in sapling and pole stage with scattered middle aged to maturing class trees, including PB- IV areas of previous working plan have been allotted to this periodic block. Besides some of the forests of PB-I and plantation working circle of the expired working plan where the regeneration has been established have been kept in PB-IV.

2.11 FELLING CYCLE:

A felling cycle of 10 years corresponding to the period of the plan has been adopted.

2.12 CALCULATION OF YIELD:

The yield has been calculated by volume separately for all the PB's. Increments have been ignored as a safety factor against fire and other natural calamities and to serve as emergency reserve. For PB-I the yield has been calculated keeping in view the growing stock available for felling as per the marking rules and silvicultural system followed. The total annual yield prescribed from this working circle is 3950 cum, which has been calculated as under:

YIELD FROM PB-1:

The Annual yield has been calculated by the following formula:

(a) Von Mantel, s formula:

$$Y = \frac{2 \times GS}{R} \quad \text{Where: Y is annual yield, GS is growing stock, R is rotation period of 120 Years}$$

$$Y = \frac{2 \times 271999.18}{120} = 4533.32 \text{ m}^3$$

(b) Yield calculated by the Hufunagel, s formula:

In view of the fact that only seeding felling will be carried out in PB1 areas during the period of the working plan, the yield has been calculated as under on the basis of the silvicultural availability assessed on the basis of past experience based on markings done in PB 1 areas by using Hufunagels as under:

$$Y = \frac{C1V1 + C2V2 + C3V3}{P}$$

Where; Y= Annual yield
P= Period of the Plan i.e 10 years
V1=Volume of I and over trees in PB1
V2= Volume of II and over trees in PB1
V3= Volume of III class tree in PB1

C1, C2 , C3 are constants to represent the proportion of I ,II, III classes which are estimated to be available for felling during the regeneration period for different species. The values of constants C1, C2 ,C3 for different species is as under;

Species	C1	C2	C3
Deodar	0.5	0.5	0.5
Kail	0.7	0.6	0.5
Fir/ Spruce	0.6	0.5	0.5
Chil	0.6	0.6	0.5

For Deodar:-

V-I Total Volume of I class trees = 5960.01 m³
V-II Total Volume of II Class trees = 20621.88 m³
V-III Total Volume of III trees = 14990.63 m³

$$AY = \frac{0.5 \times 5960.01 + 0.5 \times 20621.88 + 0.5 \times 14990.63}{10}$$

10

$$AY = 2078.61 \text{ m}^3 \text{ or say } \mathbf{2050 \text{ m}^3}$$

For Kail:

V-I Total Volume of I class trees = 17573.14 m³
V-II Total Volume of II Class trees = 6556.44 m³
V-III Total Volume of III trees = 2395.88 m³

$$Ay = \frac{0.7 \times 17573.14 + 0.6 \times 6556.44 + 0.5 \times 2395.88}{10}$$

$$Ay = 1743.20 \text{ m}^3 \text{ or say } 1700 \text{ m}^3$$

For Chil

Small volume as such no felling prescribed

For Fir/ Spruce:

Total Volume of I class trees = 939.45 m³
Total Volume of II Class trees = 1458.74 m³
Total Volume of III trees = 2321.25

$$AY = \frac{0.5 \times 939.45 + 0.5 \times 1438.74 + 0.5 \times 2321.2}{10}$$

$$= 245.35 \text{ cum or say } = 200 \text{ cum}$$

The annual yield from PB I is therefore, prescribed as under:-

Species	Cubic meter
Deodar	2050
Kail	1700
Chil	0
Spruce	200
Total	3950

(c) Yield calculation by the formula as per the code of Working Plan procedures for HP is as under:-

$$AY = \frac{GS - (V_1 + V_2 + V_3)}{P}$$

P

Whereas AY= Annual Yield.

GS= Total Growing stock of PB-1

V1= Total volume of mother trees retained at the rate of 30 trees/ha.

V2= 20% of total growing stock of PB1 to be retained on precipitous slopes.

V3= 50% of total volume of V to III class trees to be retained as future crop.

P= Plan period i.e. 10 years.

$$\text{Thus, } AY = \frac{72818.88 - (60783.30 + 54399.34 + 9854.62)}{10}$$

10

$$\frac{52218.38}{10} = 5221.83 \text{ m}^3$$

10

The annual yield calculated by Von Mantel's Formula, Hufunagel's formula and formula as per code of Working Plan procedures of HP works out to be 4533.32 cum, 3950 cum and 5221.83 cum cum respectively. The yield calculated by Hufunagel formula is on the conservative side, hence adopted for PB-1.

The annual yield from PB1 is therefore, prescribed as under:

Species	Cubic meter
Deodar	2050
Kail	1700
Chil	-
Spruce	200
Total	3950

YIELD FROM PB II:

No felling has been prescribed in the forests allotted to PB II and hence no yield is to be calculated and prescribed for PB II. Only, dead, fallen and seriously damaged trees are to be removed. Thinning will however to be carried out according to strict silviculture principles.

YIELD FROM PB III:

In this periodic Block, thinning would count against yield. Removal of dead, dying, dry and uprooted trees would also be counted against yield. The growing stock for PB-III is tabulated above. No felling has been prescribed in the forests allotted to PB-III. Only, dead, fallen and seriously damaged trees are to be removed. Thinning will however to be carried out according to strict silviculture principles.

YIELD FROM PB-IV:

In this periodic block, enumeration in 10 cm diameter classes down to 10 cm dbh have been carried out as already cited in enmurations. An abstract of growing stock is given above. Calculation of yield has been based on total volume of trees in PB IV areas. Increment has not been taken in to account. All I & II class trees could be removed during the plan period, but it is not advisable silviculturally. Trees on precipitous slopes are to be retained. Besides some I and II class will have to be retained as emergency reserves. It has been estimated that only 80 % volume of I and II class trees and 10 % volume of V to III classes will be available towards yield in PB IV.

YIELD CALCULATION:-**For Deodar:**

V-I- Total Volume of I class trees = 2527.87 m³

V-II Total Volume of II Class trees = 7992.66 m³

V-III Total Volume of III trees = 2923.9 m³

$$AY = \frac{0.5 \times 2527.89 + 0.5 \times 7992.66 + 0.5 \times 2923.9}{10}$$

10

AY = 672.21 m³ or say 650 m³

For Kail:

V-I Total Volume of I class trees = 14428.63 m³

V-II Total Volume of II Class trees = 13950.24 m³

V-III Total Volume of III trees = 5695.2 m³

$$Ay = \frac{0.7 \times 14428.63 + 0.6 \times 13950.24 + 0.5 \times 5695.2}{10}$$

Ay = 1875.4785 m³ or say 1800 m³

For Fir/ Spruce:

V-I Total Volume of I class trees = 4646.13 m³

V-II Total Volume of II Class trees = 4913.29 m³

Total Volume of III trees = 551.65 m³

$$Ay = \frac{0.6 \times 4646.13 + 0.5 \times 4913.29 + 0.5 \times 551.65}{10}$$

= 552.0148 m³ or say 550 m³

The annual yield from PBIV is therefore, prescribed as under:

Species	Cubic meter
Deodar	650
Kail	1800
Chil	-
Spruce	550
Total	3000

TOTAL PRESCRIBED YIELD:

PB	ANNUAL YIELD PRESCRIBED IN CUM
PB-1	3950
PB-II	Nil
PB-III	Nil
PB-IV	3000
TOTAL	6950

2.13 CONTROL OF YIELD:

The yield will be controlled by volume. All dia. Classes conifers felled for whatsoever purpose will count towards the yield. The combined yield of Deodar, Fir, Spruce and Chil in year should not be exceed 20 % and in a slab of 5 years should not exceed 10 %. The annual excess and deficient in case of each species will be carried forward in the control forms and deviation statement. This will be adjusted at the end of every five years when it should be within + 10 % for each species. The volume of trees in salvage removals or for any purpose will count the yield of the working circle. The yield will be PB wise.

2.14 METHOD FOR EXECUTING FELLING IN PB-1:

The markings in PB1 areas shall be carried out by the Divisional Forest Officer / Assistant Conservator of Forests. Two types of markings viz; Seeding Felling and final felling shall be carried out. The secondary or corrective felling will be carried out as per requirement of crop. The complete removals of overwood would be done in areas where the regeneration has fully established. While carrying out markings of seeding felling, certain guiding principles are to be followed: -

Marking Rules:-

- 1) Marking will be done under Indian irregular Shelterwood System.
- 2) The objective of felling in this block is to replace the existing crop by young and more uniform crop. The marking in these areas shall be carried out by senior officers.
- 3) There will be only one felling i.e. seeding felling in P.B. I. Final felling will be done in PB IV.
- 4) Well grown, healthy, tall, clean bole trees with well-developed crown, preferably of IIB to IIA class, uniformly spaced will be retained as seed bearers.

The number will be 35-45 trees in case of Deodar and Spruce, 25 to 35 trees of Kail and 70 to 80 in case of Fir and 20-25 trees of Chil per hectare. The spacing comes to 16-18 m, 18-21 m, 12-13 m, and 21-24 m in case of Deodar, Spruce, Kail, Fir and Chil respectively. The spacing of seed bearers should be less on hot dry aspect/steep slopes as compared to cold aspect, gentle moderate slopes. The spacing between seed bearers should be of about one crown width so as to allow sufficient light to reach the ground but the same time discourages unnecessary seed growth.

- 5) Spacing may be over looked to some extent to favour better seed bearers and the more valuable species. The order to preference of retention of seed bearer will be Deodar, Kail, Spruce and for depending of course on the fitness of site to suit these species.
- 6) In case of mixed forests of Kail and Deodar, opening of the canopy should be light so that Deodar regeneration gets a start over that of Kail. In a predominately Kail crop, retention of Deodar as seed bearer should be preferred.
- 7) Compact groups of vigorous growing pole crop upto 40 cm dbh & density not less than 0.6 and at least 0.2 ha in extent shall be retained as part of the future crop.
- 8) All dead, dying, diseased, malformed and fallen trees will be marked for removal.
- 9) A strip of 50 meters wide on either side along main roads and 25 meters wide on either side of Nallas and streams shall be left untouched.
- 10) On steep to precipitous (between 40°-45°) and broken ground, the marking be done on selection principles.
- 11) Broad leaved trees not interfering with the conifer species or their regeneration should not be cut unnecessarily as they provide fuel / fodder to local people and also improve soil of this belt particularly in nallas/depressions which acts as barrier against fire.
- 12) Wolf trees, isolated young trees will be marked for felling.
- 13) All trees standing over established regeneration should be lopped before felling.
- 14) Broad-leaved species should also be marked on selection-on-selection principal

along with principal spp.

- 15) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.
- 16) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.
- 17) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.

2.15 SEQUENCE OF FELLING IN PB-I AND PB-IV: -

1. The average area going to be felled per year comes to be = 76.50 Ha.
2. The sequence of felling may be changed with the approval of CF concerned if it is required due to excessive fire or other natural calamities.
3. The entire area or most of PB1 areas shall be gone over during the regeneration period i.e 30 years.
4. This felling program has been formulated according to the annual yield worked out for the entire PB.

Table 2.11 :- SEQUENCE OF FELLING IN PB I and PB IV

2.16 SEQUENCE OF FELLING IN PB I and PB IV:

Year	Range	Forest Name	Compt.	PB	Area (in Ha.)	Felling
2022-23	TIKKAN	ND 183 Boaching	C-I	PB-IV	26.14	FF
2022-23	URLA	OD 132 Jamtehar	C-I	PB-I	20	SF
2023-24	TIKKAN	ND 189 Galu	Whole	PB-IV	10.12	FF
2023-24	URLA	OD 141 Phutakhal	C-II	PB-I	19.76	SF
2024-25	TIKKAN	ND 192 Thuji	Whole	PB-IV	27.11	FF
2024-25	URLA	OD 160 Silhswar	C-III	PB-I	30.35	SF
2025-26	TIKKAN	ND 199 Lachkandhi	C-III	PB-IV	35.9	FF
2025-26	TIKKAN	ND 199 Lachkandhi	C-V	PB-IV	36.12	FF
2025-26	URLA	ND 126 Kathyaru	C-I	PB-IV	25.2	FF
2026-27	TIKKAN	ND 199 Lachkandhi	C-IV	PB-IV	35.02	FF
2026-27	TIKKAN	ND 238 Kopaldhar	C-II	PB-IV	25.05	FF
2026-27	URLA	OD 141 Phutakhal	C-I	PB-I	81.56	SF
2027-28	TIKKAN	ND 199 Lachkandhi	C-I	PB-IV	30.84	FF

2027-28	TIKKAN	ND 207 Badi Bajgan	Whole	PB-IV	38.45	FF
2027-28	URLA	ND 127 Barot	C-Ia	PB-I	18.4	SF
2027-28	URLA	ND 127 Barot	C-Ib	PB-I	25.71	SF
2028-29	TIKKAN	ND 201Bhamchawan	C-II	PB-IV	32.2	FF
2029-30	TIKKAN	ND 202 Dhamchyan	C-II	PB-IV	47.46	FF
2029-30	URLA	ND 137 Sarchnala	C-II	PB-I	67.2	SF
2030-31	TIKKAN	ND 203 Cheling	Whole	PB-IV	45.33	FF
2030-31	URLA	OD 131 Kalhog	C-II	PB-I	35.19	SF
2031-32	TIKKAN	ND 199 Lachkandhi	C-II	PB-IV	31.28	FF
2031-32	URLA	OD 131 Kalhog	C-III	PB-I	21.07	SF

2.17 SEQUENCE OF THINNING IN PB III:

The demand of right holders for TD, is higher than the yield available for removal, hence, there is no need to prepare thinning sequence in PB-III areas.

2.18 TREATMENT OF PB III AREAS:

This periodic block generally constitutes irregular crop with different age classes mixed together. Certain principles are always to be kept in view while carrying out markings.

- i.) The dead, dying, diseased and uprooted trees are always to be marked first.
- ii.) Crooked, stunted, malformed, ill grown, lanky trees will also be marked if their removal is not creating a permanent gap in the canopy.
- iii.) Over mature trees may also be marked if these are available silviculturally.
- iv.) No broad leaved trees are to be marked on any pretext.

2.19 TREATMENT OF PB-IV AREAS:

Final fellings shall be carried out in this PB where majority of the trees shall be of class V and IV i.e. upto 30 cm dbh. The felling of mother trees shall be done on the following principles.

- i) Over wood standing over young crop will be removed. Such over wood will be mainly of IIB and above classes.
- ii) If the young crop is very dense. D/C or C grade thinning among the coniferous plants should also be carried out at the time of final fellings.
- iii) Isolated tree of II and III class which will not merged with future crop and are likely to be potential wolf trees shall be removed. Broad leaved

species should not be felled but lopped if interfering in the growth of young plants.

- iv) Mother trees will be lopped before felling so as to minimize the damage during fellings. Detailed marking note will be prepared by the marking officer. All I and II class trees not required silviculturally shall be drastically removed and while doing so, blanks to the extent of 0.01 ha. will be ignored.
- v) Marking shall aim at freeing the existing established regeneration from suppression rather than inducing fresh regeneration.

2.20 SEQUENCE OF FELLING IN PB-III:

No thinning sequence is proposed as the forests are under stocked. However, sequence of final felling has already been proposed.

2.21 PLANTING PROGRAMME

Table 2.12: PLANTING PROGRAMME PB1 Areas of D&K WC Joginder Nagar Felling Series:

Year	Range	Forest Name	Name of Compt.	Periodic Block	Area (in Ha.)	Area Proposed for Planting
2028-29	URLA	ND 127Barot	C-Ia	PB-I	18.4	9
2029-30		ND 127Barot	C-Ib	PB-I	25.71	13
2029-30		ND 137 Sarchnala	C-II	PB-I	67.2	33
2030-31		OD 131Kalhog	C-II	PB-I	35.19	17
2031-32		OD 131Kalhog	C-III	PB-I	21.07	10
2024-25		OD 132Jamtehar	C-I	PB-I	20	10
2027-28		OD 141Phutakhal	C-I	PB-I	81.56	40
2025-26		OD 141Phutakhal	C-II	PB-I	19.76	10
2026-27		OD 160Silhswar	C-III	PB-I	30.35	15
		Grand Total			319.24	157

*****Note:-** it is expected that natural regeneration will cover atleast 50% area and accordingly planating has been proposed for only half of their area felled.

2.22 SILVICULTURAL OPERATIONS:

The role of subsidiary operation to helping seedling to establish them cannot be over-emphasized and successful natural regeneration greatly depends upon that. It is, therefore, prescribed that the following subsidiary silvicultural operations will be carried out as soon as possible after the felling:

Subsidiary silvicultural Operations

The following subsidiary Operations will be carried out soon after the seeding felling in this period block:

- i) Removal of dead, damage and un-felled marked trees if any.
- ii) Cleaning and un-commercial thinning in young crop.
- iii) Climber cutting wherever necessary.

2.22.1 SLASH DISPOSAL:

- i) For providing clean seed bed for the germination of seed, disposal of felling refuse is quite essential. Soon after, fellings are over bush cutting should be carried out and debris removed by way of burning it. In this era of Joint Forest Management, villagers should be encouraged to remove as much of felling refuse as possible.
- ii) Climber and shrub cutting should be carried out wherever needed.
- iii) In order to remove competition for the young regeneration, it is absolutely essential, that the proper weeding of the area is done depending upon the need of the area. For the first few years, two weeding every year, one before monsoon and one after monsoon are prescribed.

2.22.2 CLEANING/ THINNING:

Cleaning is necessary to remove less valuable stems to provide optimum growing space the cleanings will be done with the general principles of cleanings. Thinning would be carried out in pole crop retained as part of future crop.

2.22.3 SOWING AND PLANTING:

Good seed year does not always coincide with the year of fellings. In case the interval between felling year and good seed year is too much, then there is little hope for natural regeneration as by that time, the area becomes invaded by weeds and soil gets compact, so it is laid down that artificial sowing / planting will be done in unregenerate portions after about 5-6 years of felling. The sowing and planting will be done in the following manner:-

i) For sowing, patches of 45x45x15cm should be made, 2.5 meter apart. The soil should be well pulverized and seed of Deodar should be sown in the soil before the onset of winter rains. Deodar should be preferred, however, Kail should be sown as per suitability of the site.

ii) For planting Deodar seedling of one and half years to two and half years old with about 25cm in height should be planted before the onset of monsoons in pits of 30x30x30cm size. Nursery for this purpose should be laid out near to the area to be planted and also well in advance of the year when planting stock is required. The technique of planting will be as laid down in Technical order No. 3 and 4 in the Punjab Forest Manual vol. III.

iii) In refectory areas, planting be preferred to sowings, raw humus, if any, should be scrapped before sowing/planting.

2.22.4 Weeding and Bush Cutting

All the plantations areas should be weeded in the early stages. Normally two weeding one in June/July and another in Aug./Sept. are considered sufficient for young plantations. It should be done judiciously and carefully so as not to disturb their roots. Removal of weaker plants from the patches where patch sowing is done, should be done alongwith the weeding operations. The weeding should be done at least for 4 years after closure or till such time as the seedlings are no longer in danger of being suppressed by shrubs. On warmer aspects and exposed sites, however, light shrub growth is essential to provide side shade to the young plants.

2.22.5 Cleaning

This operation should be carried out in the early stages both in congested natural regenerations and plantations and should be continued till the area is suitable for early thinnings. Best and vigorous growing plants should be retained. All forked, crooked, sickly and damaged plants should be removed in cleanings, so as to provide growing space to better plants. Nothing more than but is absolutely necessary should be cut in cleanings. In Deodar areas, Kail is coming up naturally in plenty, must be cut at the initial stage to avoid suppression of Deodar. Cleaning should aim at the gradual spacing out of natural seedlings (or sowings where the original stocking has been too dense) until the young trees are spaced approximately 1.2x1.2m when 2 m high. All the cut material be invariable and immediately removed outside the area to avoid fire hazards.

2.22.6 Thinning

The regeneration last cleaned at about 10-15 years of age, will be subjected to an early thinning when it attains d.b.h. of 10 cm, giving a spacing of about 1.5 to 2m between plants. Thereafter, thinning will be carried out only in PB IV at the time of final fellings. Thinning will be carried out as per procedure laid down in Technical order No. I of Punjab Manual Vol. - III.

2.23 Regeneration Assessment

The regeneration survey of the felled PB I areas should be carried out every alternate year on 1:15,000 scale map to assess the progress of regeneration and to plan operations for the next year. Reason for failure should be sorted out and corrective measures taken forthwith.

2.23.1 Fencing

To get successful regeneration, all the PB I areas which have been felled for getting regeneration, should be closed with barbed wire fencing for protection against biotic interferences. Closure has to be effective and fences should be repaired regularly.

2.23.2 Artificial Regeneration

Artificial regeneration by patch sowing or planting by plants in P. bags will be required to be carried out to restock the blank areas and where natural regeneration followed after seeding fellilng is not established within 5 years of felling.

2.23.3 Other Regulations

Silvicultural availability. No trees should be granted in closed area.

2.23.4 Closure

Effective closure is most essential for the success of plantation/regeneration area. It is thus imperative that the PB I areas are closed immediately after vacation by the exploiting agency. The area will have to be closed for cattle grazing till the regeneration is established. Normally this period is 30 years. Government notification for such closures should be got issued well in time to avoid litigations.

2.23.5 Grazing & Cutting

The PB I areas after felling and vacation of lot by the exploiting agency

shall be closed for grazing till the regeneration is established. However, the controlled grazing will be allowed in other PBs as per rights of right holders. Similarly, there will be no restrictions on grass cutting in those areas which are not under regeneration. Grass cutting in closed area shall be allowed as per discretion of Range Officer and that too under supervision of Forest Guard to avoid damage to young seedlings.

2.23.6 Lopping

Lopping generally, is heavy near habitations and also in those forests which are on the road side. It should be stopped immediately, as it makes trees susceptible to diseases and retards growth. However, lopping may be allowed to the right holders strictly on silvicultural principles and action as per rule should be taken if a person overlaps the trees.

2.23.7 Fire Protection

Forests will be protected from fires through the frequency or forest fire in Deodar Forest is negligible. Young Deodar plantations and regeneration areas require special care and complete protection from fire. Special precautions are necessary in the areas adjoining Chil forests. Forest floors are to be kept clean of the debris and other combustible material. The fire lines, inspection and bridal paths should be kept clean to needless especially during summer. Firewatcher should be posted during fire season along with the fire fighting equipments. Above all, public co-operation is essential to keep fire out the area.

2.24 Regeneration Survey: -

Regeneration assessment survey of PB-I areas should be carried out every third year as per para 32 of the National Working plan code, 2004. Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

CHAPTER III

3. THE CHIL WORKING CIRCLE

3.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the pure Chil forests or the forests containing Chil as 60% or more in composition have been included in this working circle. It also includes all Chil forests of working plan under revision and Chil plantations which were raised in the past and have established well. The total area of this working circle is 4095.32 Ha.

3.2 GENERAL CHARACTER OF VEGETATION

The overall condition of the vegetation is that the forests are poorly stocked and mostly blanks with heavy biotic interference like grazing, fire, etc Defective resin tapping of trees for extraction of resin and uprooting of trees by wind and natural calamity have caused a vast destruction of the crop. Chil is the principal species. It occurs in pure form or in mixture with Ban-Oak, Rhododendron, Lyoni and a few other Broad leaved associates in depressions. Towards the upper transitional zone, Deodar and Kail also appear alongwith Chil.

3.3 FELLING SERIES AND CUTTING SECTIONS

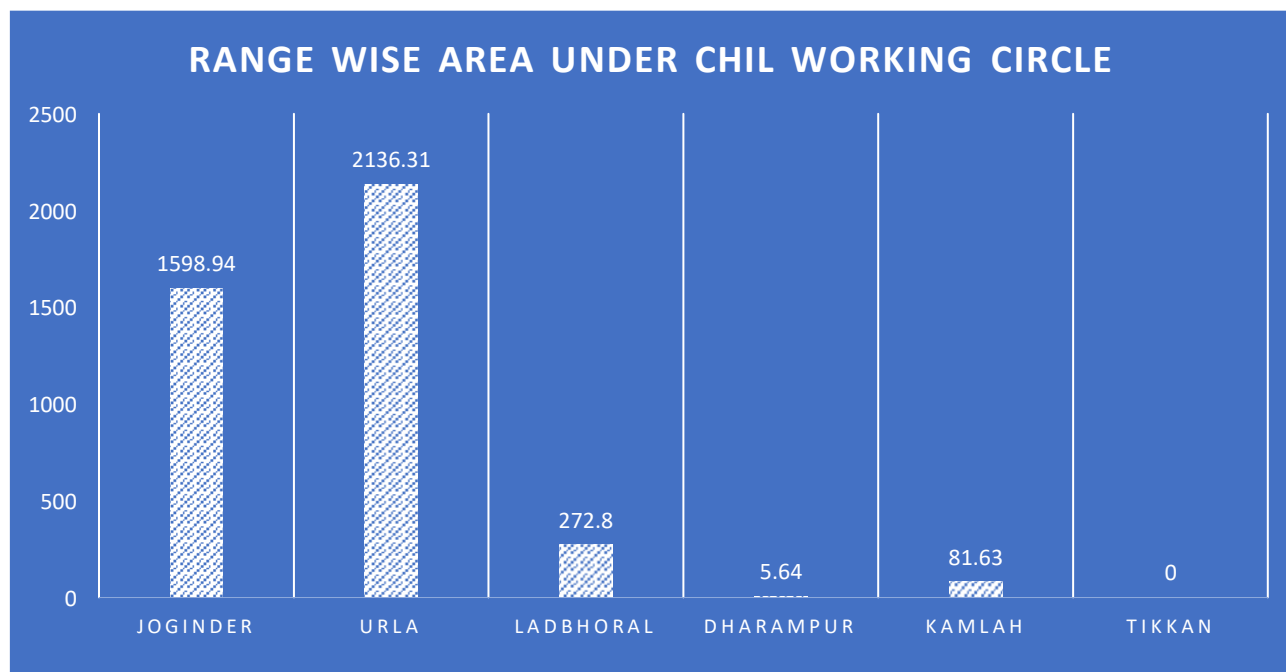
There will be one felling series only.

3.4 Area Statement:

The total area under this working circle is 4095.32 Ha. The distribution of area under chil working circle rangewise is as under:

Table 3.1: Area Statement.

Sr. No.	Range	Area in Ha
1	Joginder Nagar	1598.94
2	Urla	2136.31
3	Ladbhoral	272.8
4	Dharampur	5.64
5	Kamlah	81.63
6	Tikkan	0
G. Total		4095.32

Figure-9

3.5 Special Objects of Management:

The special object of management will be:-

- i) To convert the irregular crop to regular crop and to improve the stocking of the existing forests by natural regeneration to be supplemented by artificial means where ever necessary.
- ii) To harvest the standing mature/over mature Chil trees on a sustainable principle, with an aim to regenerate the forests and also to free from suppression the established regeneration of overhead shade to allow optimum conditions for growth.
- iii) Restocking of the poorly stocked and blank as far as possible through closure and afforestation.
- iv) To obtain the maximum possible yield of resin, timber, / on sustainable basis.
- v) Protection of forests from natural destruction as well as biotic interference.
- vi) To address the bonafide local demand of right holders to best possible extent.

3.6 Analysis and Valuation of the crop:

Stock maps have been prepared and have been attached in the compartment history files.

3.7 The species wise area for the working circle is tabulated as under:

Table 3.2: Species wise Area in Ha (Joginder Nagar Felling series)

Range/ Total	Deodar	Kail	Chil	Fir	Oak	Spruce	Misce Conifer	Mixed B/l, Conifer	Blank
J/Nagar	0	0	1161.94	0	110	0	0	219	108
Urla	0	0	1676.11	0	191.60	0	0	141.60	127
L/Bharol	0	0	212.80	0	0	0	0	20	40
Dharampur	0	0	5	0	0	0	0	0	0.64
Kamlah	0	0	68.59	0	0	0	0	4.54	8.50
Tikkan	0	0	0	0	0	0	0	0	0
Total	0	0	3124.44	0	301.6	0	0	385.14	284.14

3.8 Quality Classes:

Based on the height of two dominant trees, each compartment or sub-compartment has been allotted to one of the quality class as per standard fixed by FRI. The ocular estimate has been done for each compartment and sub-compartment. The quality classes so determined have been entered in the compartment history files. The Average quality class for whole working Plan has been taken to be III.

3.9 Age classes:

The distribution of age classes is found to be irregular. The middle age classes (30 cm to 50 cm) are predominated. The mature, maturing, sapling or poles and over mature trees are deficient.

3.10 Density:

The crown density of the compartments has been estimated ocularly and has been recorded in respective compartments history files. However average density for the working circle is 0.4 to 0.5.

3.11 Enumerations:

Total enumeration of all the compartments is basically too capital and time intensive. Therefore for better and good results as same to total enumeration,

many of the forests/compartments have been fully enumerated, some of the larger compartments of big forests have also been fully enumerated and for rest, a list of all compartments of Chil Working Circle was prepared and one sample plot was selected for enumeration on the basis of sample plot enumeration as suggested by FSI.. Enumerations were carried out in 10 cm diameter classes down to 10 cm diameter. The forest wise detail of enumerations is given in the Appendix.

3.12 Silviculture System:

The forests allotted to this working circle are to be worked under Punjab shelterwood system with fixed Periodic Blocks with provisions of selection markings on precipitous slopes and on uncertain terrain and retention of groups or patches of vigorously growing poles upto 30 cm d.b.h. not having density less than 0.7 and not less than 0.2 ha in extent as part of future crop. The natural regeneration in PB1 areas will be supplemented with artificial regeneration wherever it is required so that areas get fully restocked without undue delay.

3.13 ROTATION AND CONVERSION PERIOD

At present the Chill forests are in the process of conservation from irregular to more or less regular crops. However, on the basis of stump analysis data collected in the past it was been gathered that 60 cm d.b.h. is attained by Chill at the age of 94 years and since then the rotation is fixed at 100 years to be on conservative site. The general quality class of the tract is II/III FRI.

3.13.1 Regeneration Period: -

It is estimated that in 20 to 25 years the Chil plants grow to be height of 5 meters at which stage the forests can be allotted to PB IV and the regeneration can be considered reasonably estimated. Thus, the regeneration period of 25 years has been fixed to stock PB I or blank areas. However, the regeneration period varied to a great deal, depending upon the intensity of adverse biotic factors.

3.13.2 Exploitable diameter:

To produce timber for standard size sleepers and also obtain the maximum yield of resin, the exploitable diameter of 60cm d.b.h. has been fixed.

3.13.3 Felling cycle:

A felling cycle of 10 years has been fixed corresponding to the period of working plan.

3.14 Allotment to Periodic Blocks:

With 100 years as rotation and 25 years for regeneration, there will be 4 periodic Blocks. As the crop is generally of younger age classes with very few middle

aged-mature trees so PBs can not be divided on text book pattern. Yet every attempt is made to allot areas to be fitting PBs depending on dia classes available. The allotment is discussed as under: -

3.14.1 PB-I: -

Forests where middle aged, maturing and mature age classes are predominant and are unfelled have been allotted PB1. This type includes unfelled PB-I areas of previous working plan, besides forests in which stocking is very poor has also been placed in this periodic block. No fellings were generally done in the plan under revision in PB-1. Some closures for artificial regeneration were, however done in PB-1 areas. All such areas have been put in PB-1. In addition to some of the areas of PB-II of the plan under revision with mature stock has also been included in PBI. The area generally support young chil crop either scattered or in groups.

Table 3.3 : PB-I AREA UNDER CHIL WC

PB-I AREA UNDER CHIL WC				
Sr. No.	Range	Forest Name	Copartment	Area (Ha.)
1	JOGINDERNAGAR	ND 64 Bihun	C-I	8
2		OD 63 Silh	C-I	28.95
3			C-II	48.7
4			C-III	42.07
5		OD 67 Nainpur	C-I	18.67
6	LADBHAROL	ND 756 Bakarjan	Whole	143.2
7	URLA	ND 144 UrlaKasyan	C-III	18.23
8		ND 146 Doodhar	C-II	32.98
9			C-VI	13.25
10		ND 155 Khabal	Whole	6
11		ND 167 Kharnal	C-I	37.22
12		ND 174 Nagan	C-II	17.41
13		ND 177 Chukku	C-I	30
14		ND 178 Upper Khajri	C-VIII	24
15		OD 152 Dibkan	C-Ia	13.44
16		OD 172 Thorat	C-Vb	28.17
17		OD 179 Lower Khajri	C-I	22.09
		GRAND TOTAL		532.38

Table 3.4: SPECIESWISE, CLASSWISE TREES IN PB-I TO PB-IV IN CHILWC.

Number of Trees and Volume in PB-I				
Class & Vol	Species			Grand Total
	Ban	BL	Chil	
Class-V	7348	7733	45521	60602
Vol-V	0	0	1820.84	1820.84
Class-IV	7378	8404	41008	56790
Vol-IV	2065.84	2521.2	5741.12	10328.16
Class-III	2981	5528	26868	35377
Vol-III	2504.04	3869.6	11284.56	17658.2
Class-IIA	1007	2250	7545	10802
Vol-IIA	1711.9	2925	9582.15	14219.05
Class-IIB	810	452	3638	4900
Vol-IIB	2057.4	994.4	7712.56	10764.36
Class-IA	141	138	2013	2292
Vol-IA	438.51	455.4	5978.61	6872.52
Class-IB	60	201	646	907
Vol-IB	204	924.6	2745.5	3874.1
Class-IC	0	129	190	319
Vol-IC	0	812.7	967.1	1779.8
Class-ID	0	65	25	90
Vol-ID	0	520	148.5	668.5
Total-Class	19725	24900	127454	172079
Total Volume	8981.69	13022.9	45980.94	67985.53

Number of Trees and Volume in PB-II					
Class & Vol	Species				Grand Total
	Ban	BL	Chil	Deodar	
Class-V	18226	24314	34966	3	77509
Vol-V	0	0	1398.64	0.18	1398.82
Class-IV	10152	12163	32945	2	55262
Vol-IV	2842.56	3648.9	4612.3	0.46	11104.22
Class-III	5667	9323	49566	0	64556
Vol-III	4760.28	6526.1	20817.72	0	32104.1
Class-IIA	2306	1529	26913	0	30748
Vol-IIA	3920.2	1987.7	34179.51	0	40087.41

Class-IIB	2121	894	15407	0	18422
Vol-IIB	5387.34	..		0	40016.98
Class-IA	1146	513	8048	0	9707
Vol-IA	3564.06	1692.9	23902.56	0	29159.52
Class-IB	709	64	1206	0	1979
Vol-IB	2410.6	294.4	5125.5	0	7830.5
Class-IC	206	44	145	0	395
Vol-IC	700.4	277.2	738.05	0	1715.65
Class-ID	144	1	7	0	152
Vol-ID	489.6	8	41.58	0	539.18
Total-Class	40677	48845	169203	5	258730
Total Volume	24075	16402	123479	0.64	163956.38

Number of Trees and Volume in PB-III

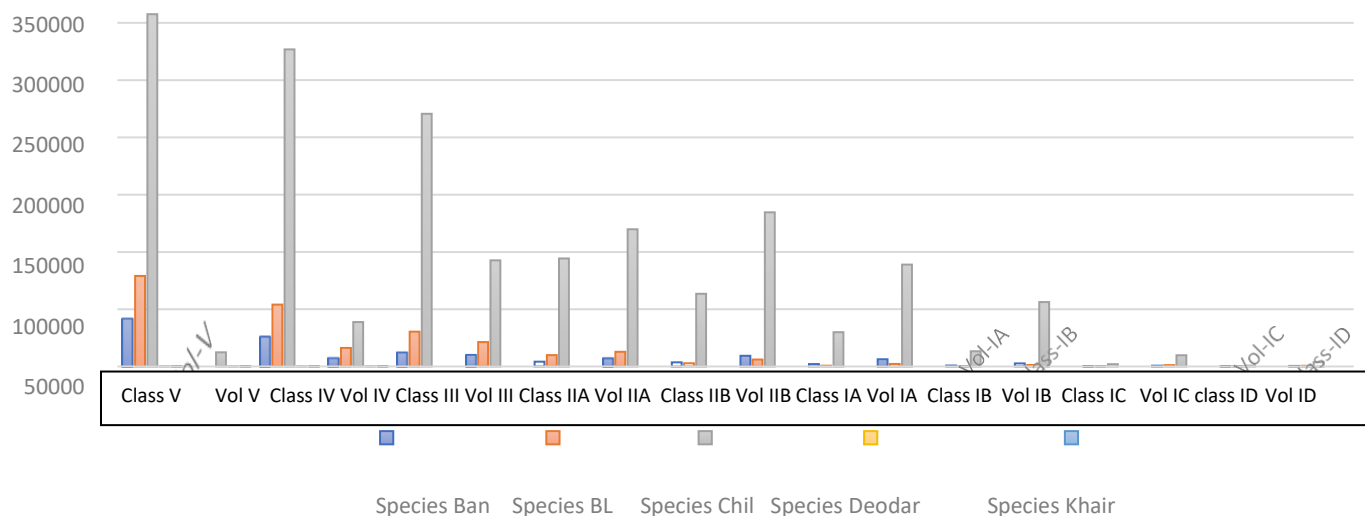
Class & Vol	Species			Grand Total
	Ban	BL	Chil	
Class-V	12251	26124	106625	145000
Vol-V	0	0	4265	4265
Class-IV	6976	22094	94870	123940
Vol-IV	1953.28	6628.2	13281.8	21863.28
Class-III	3280	11704	94964	109948
Vol-III	2755.2	8192.8	39884.88	50832.88
Class-IIA	717	4425	42519	47661
Vol-IIA	1218.9	5752.5	53999.13	60970.53
Class-IIB	702	1162	35936	37800
Vol-IIB	1783.08	2556.4	76184.32	80523.8
Class-IA	737	12	15728	16477
Vol-IA	2292.07	39.6	46712.16	49043.83
Class-IB	0	2	9303	9305
Vol-IB	0	9.2	39537.75	39546.95
Class-IC	0	1	1074	1075
Vol-IC	0	6.3	5466.66	5472.96
Class-ID	0	0	364	364
Vol-ID	0	0	2162.16	2162.16
Total-Class	24663	65524	401383	491570
Total Volume	10002.5	23185	281493.9	314681.39

Number of Trees and Volume in PB-IV

Class & Vol	Species			Grand Total
	Ban	BL	Chil	
Class-V	3709	20246	113771	137726
Vol-V	0	0	4550.84	4550.84

Class-IV	1556	10881	100563	113000		
Vol-IV	435.68	3264.3	14078.82	17778.8		
Class-III	448	3822	47167	51437		
Vol-III	376.32	2675.4	19810.14	22861.86		
Class-IIA	128	1623	16221	17972		
Vol-IIA	217.6	2109.9	20600.67	22928.17		
Class-IIB	15	252	7761	8028		
Vol-IIB	38.1	554.4	16453.32	17045.82		
Class-IA	4	9	3760	3773		
Vol-IA	12.44	29.7	11167.2	11209.34		
Class-IB	0	2	1786	1788		
Vol-IB	0	9.2	7590.5	7599.7		
Class-IC	0	—	300	301		
Vol-IC	0	6.3	1527	1533.3		
Class-ID	0	8	141	149		
Vol-ID	0	64	837.54	901.54		
Total-Class	5860	36844	291470	334174		
Total Volume	1080.14	8713.2	96616.03	106409.37		
TOTAL NUMBER OF TREES AND VOLUME IN CHIL W.C						
Class & Vol	Species					Grand Total
	Ban	BL	Chil	Deodar	Khair	
Class-V	41534	79060	307576	3	2	428175
Vol-V	0	0	12303.04	0.18	0.23	12303.45
Class-IV	26062	53998	276870	2	1	356933
Vol-IV	7297.36	16199.4	38761.8	0.46	0.218	62259.238
Class-III	12376	30389	220567	0	0	263332
Vol-III	10395.84	21272.3	92638.14	0	0	124306.28
Class-IIA	4158	9835	94311	0	0	108304
Vol-IIA	7068.6	12785.5	119775	0	0	139629.07
Class-IIB	3648	2762	63451	0	0	69861
Vol-IIB	9265.92	6076.4	134516.1	0	0	149858.44
Class-IA	2028	672	29951	0	0	32651
Vol-IA	6307.08	2217.6	88954.47	0	0	97479.15
Class-IB	769	269	13238	0	0	14276
Vol-IB	2614.6	1237.4	56261.5	0	0	60113.5
Class-IC	206	175	1920	0	0	2301
Vol-IC	700.4	1102.5	9772.8	0	0	11575.7
Class-ID	144	74	634	0	0	852
Vol-ID	489.6	592	3765.96	0	0	4847.56
Total-Class	90925	177234	1008518	5	3	1276685
TotalVol	44139.4	61483.1	556749	0.64	0.448	662372.388

Figure-10 TOTAL NUMBER OF TREES AND VOLUME IN CHIL W.C



3.14.2 PB-II:

The forests which have preponderances of age classes approaching maturity have been allotted to PB II. Some PB II areas of the working plan under revision have also been retained in this periodic block as they are not mature enough to be allotted to PB I as yet.

3.14.3 PB-III:

The pole to middle aged crop with a few mature and maturing trees have been allotted to this periodic block.

3.14.4 PB IV:

The forests having young, sapling and pole stage and partly with middle aged to mature trees including PB- IV areas of previous working plan have been allotted to PB IV. Besides, this some of the forests of PB-1 and plantation working circles of the expired working plan in which regeneration has established itself have also been allotted to this Periodic Block. It has been tried those areas allotted to each periodic block should be $1/4^{\text{th}}$ of the area of the working circle.

3.15 Calculation of Yield:

The yield has been calculated by volume separately for PB1 and PB IV on the basis of enumeration results. Increment has been ignored here as a safety factor against fire damages and damage done by other natural calamities and to serve as emergency reserves. The yield has been prescribed by volume. The growing stock as per the enumeration result for PB1 is given in the table below:

CALCULATION OF YIELD FROM PB-1 (CHIL) :

The Annual yield has been calculated by the following formula:

(a) Von Mantel's formula:

$$Y = \frac{2 \times GS}{R} \quad \text{Where: } Y \text{ is annual yield, } GS \text{ is growing stock, } R \text{ is rotation period of 100 years}$$

$$Y = \frac{2 \times 547569.87}{100} = 10951.39 \text{ m}^3$$

(b) Yield calculated by the Hufunagel's formula:

In view of the fact that only seeding felling will be carried out in PB1 areas during the period of the working plan, the yield has been calculated as under on the basis of the silvicultural availability assessed on the basis of past experience based on markings done in PB 1 areas by using Hufunagils as under:

$$Y = \frac{C_1V_1 + C_2V_2 + C_3V_3}{P}$$

Where; Y= Annual yield

P= Period of the Plan i.e 10 years

V1=Volume of I and over trees in PB1

V2= Volume of II and over trees in PB1

V3= Volume of III class tree in PB1

Total Volume of I class trees = 9839.71cum

Total Volume of II Class trees= 17294.71 cum

Total Volume of III trees= 11284.56 cum

$$AY = \frac{0.6 \times 9839.71 + 0.6 \times 17294.71 + 0.5 \times 11284.56}{10}$$

AY = 2192.30 cum or say **2150 cum**

(c) Yield calculation by the formula as per the code of Working Plan procedure under:-

$$AY = \frac{GS - (V_1 + V_2 + V_3)}{P}$$

Whereas AY= Annual Yield.

GS= Total Growing stock of PB-1

V1= Total volume of mother trees retained at the rate of 30 trees/ha.

V2= 20% of total growing stock of PB1 to be retained on precipitous slopes.

V3= 50% of total volume of V to III class trees to be retained as future crop.

P= Plan period i.e. 10 years.

Thus, AY= $\frac{45980.94 - (17822 + 4598 + 9423.26)}{10}$

10

$$\frac{AY = 27244.32}{10} = 2724.43 \text{ m}^3$$

10

The annual yield calculated by Von Mantel's Formula, Hofnagel's formula and formula as per code of Working Plan procedures of HP works out to be 10951.39 cum, 2150.00 cum and 2724.43 cum respectively. The yield calculated by Hufunagel's formula is on the conservative side, hence adopted for PB-1.

3.15.1 YIELD FROM PB-II:

No yield has been prescribed in this periodic block, as no commercial fellings have been prescribed. However, diseased and dying trees may have to be removed whenever and wherever necessary. This yield is going to contribute towards yield prescribed for working circle. The Growing stock of PB II is given as below:

Table 3.5: The Growing stock of PB II is given as below:

Spp	Class-V	Class-IV	Class-III	Class-IIA	Class-IIB	Class-IA	Class-IB	Class-IC
Chil								
No	34966	32945	49566	26913	15407	8048	1206	145
Vol	1398.64	4612.3	20817.72	34179.51	32662.84	23902.56	5125.5	738.05

3.15.2 Yield from PB III:

The yield from PB III will be in form of silvicultural and salvage markings only if at all these are available. These removals, if any would count towards yield.

Enumeration result of Chil Working Circle PB IV areas:

Class of trees V to III	Class of trees IIA & IIB.	Class of trees IA to ID	G. Total
302163	26000	6011	334174

3.15.3 Yield from PB-IV:

This periodic Block constitutes areas where Chil plantations have been raised in the past, which are established now. Calculations of yield from PB –IV has been done on the basis of enumeration results of these forests which are prescribed for final felling.

YIELD CALCULATION:-**For Chil :**

V-I- Total Volume of I class trees = 21122.24 m³

V-II Total Volume of II Class trees = 37053.99 m³

V-III Total Volume of III trees = 19810.4 m³

$$AY = \frac{0.6 \times 21122.24 + 0.5 \times 37053.99 + 0.5 \times 19810.4}{10}$$

10

AY = 4481.08 cum or say **4400 cum**

The annual yield from PBIV is therefore, prescribed as under:

Species	Cubic meter
Deodar	-
Kail	--
Chil	4400
Spruce	--
Total	4400

TOTAL PRESCRIBED YIELD:

PB	ANNUAL YIELD PRESCRIBED IN CUM
PB-1	2150
PB-II	Nil
PB-III	Nil
PB-IV	4400
TOTAL	6650

3.16 Control of Yield:

The removals from each Periodic Block shall count towards the yield of the working circle. The yield will include the markings done to meet the local right holders demand as well. The total deviation for a period of five years will not exceed 10 % of the annual prescribed yield. The removals will also depend upon the status of regeneration. The regeneration assessment should be done every year. In case the progress of regeneration is unsatisfactory, the further fellings shall be discontinued till the status of regeneration is satisfactory.

3.16.1 Methods of Executing Fellings in PB-1 areas:

- i) 15 to 18 Seed bearers per hectare should be retained on northern and eastern slopes and other favourable locations but on hot southern aspect with aspect with poor soil cover and steep slopes, 20 to 25 seed bearers per hectare should be retained.
- ii) Marking should be heavier in area with favourable soil conditions and lighter in areas with heavy soils, dense undergrowth, bad fire records and no hot aspects.
- iii) Seed bearers retained should be in 40-60 cms. d.b.h. range free from twist with well formed bole well formed crown, free from disease, free from all kind of malformations, free from rot, sound at tapping height. If required number of seed bearers in the d.b.h. range of 40-60 cms is not available, preference should be given to tree of 30-40 cms. d.b.h. instead of trees over 60 cms d.b.h.
- iv) Number of seed bearers should be more on ridges than on lower slopes.
- v) Number of seed bearers should be more when available trees have under developed feathery crowns instead of well developed crowns.
- vi) Seed bearers should be as evenly distributed as possible. However, quality of seed bearers should not be compromised for the sake of spacing.
- vii) Compact groups of well grown poles with average 30 cms d.b.h. and not less than 0.1 ha. in area should be retained as advance growth to form part of future crop. Such patches of advance growth should be thinned to C Grade of thinning along with marking in the area.
- viii) Scattered saplings expected to merge with future crop can be retained but scattered Poles not likely to merge with future crop should be marked for felling.
- ix) Only selection-cum-improvement marking will be carried out in 10 m wide belt on either side of main roads for road protection.
- x) In case of serious fires, heavy wind damage in PB-I areas under exploitations, marking should be revised.
- xi) All IV class and over trees of broad-leaved species will be marked for felling to extend till unless some are required to be retained and protection purpose.
- xii) On steep and broken ground, marking should conform to selection principles.

- xiii) Secondary felling be made when the young regeneration has attained a height of 1-2 m and has been properly tended.
- xiv) Final fellings will be made when young regeneration has attained a height of 3-4m and has been adequately spaced and control burnt twice.
- xv) Oaks and other broad-leaved species occupying nalas unsuitable for chil should be retained in the interest of soil conservation. In areas, suitable for chil, these however be removed or heavily lopped to make room for chil regeneration.
- xvi) Marking should be carried out by an officer not below rank of F.R. and at least 50% of the marking should be checked by senior officers.

3.17 Table 3.6: List of Forest in Chil PB-I

Sr. No.	Forest Name	Name of Compt.	Area (in Ha.)
1	131 ND 734 ND Bhalara	Whole	44
2	ND 110 Harabag-II	Whole	25.6
3	ND 144 UrlaKasyan	C-II	8
4	ND 146 Doodhar	C-III	24.41
5	ND 146 Doodhar	C-V	15.58
6	ND 148 Dhalyan	C-I	30
7	ND 15 Khalai Nala	Whole	39.2
8	ND 158 Lakhwan	C-IV	20
9	ND 16 Khalei Har	Whole	4.8
10	ND 19 Ladruhi	Whole	2.4
11	ND 22 Dahanetar	Whole	2.4
12	ND 37 Drahal 2nd	Whole	14.4
13	ND 448 Bahi-II	C-I	5.64
14	ND 740 Siun	Whole	12.4
15	ND 741 Banandar	Whole	3.6
16	ND 757 Tansal	C-II	16
17	ND 757 Tansal	C-III	29.6
18	ND 78 Gumharda	Whole	6
19	ND 82 BhallindraIst	Whole	5.6
20	ND 83 Bhallindra 2nd	Whole	2
21	ND 84 Bhallindra 3rd	Whole	2.8
22	ND 85 Machyallu	Whole	9.2
23	ND 95 Karan Pur Dhar 1st	Whole	24
24	ND 96 Karan Pur Dhar IInd	Whole	16
25	OD 1 Ghatta	C-I	25

26	OD 1 Ghatta	C-II	20.32
27	OD 172 Thorat	C-II	29.1
28	OD 192 Sarkidhar	C-II	21.59
29	OD 21 Dahanetar	Whole	23.47
30	OD 3 Bhajrala	C-I	50.07
31	OD 3 Bhajrala	C-III	28.14
32	OD 5 Ahjoo II	C-I	23.77
33	OD 89 Siyuri	C-Ia	20.04
34	OD 89 Siyuri	C-Ib	38.94
35	OD 89 Siyuri	C-IIa	36.03
36	OD 89 Siyuri	C-IIb	46.94
37	OD 89 Siyuri	C-IIc	26.29
38	OD 89 Siyuri	C-IIIf	52.05
39	OD 89 Siyuri	C-IVb	32.57
40	OD 89 Siyuri	C-IVc	30.2
41	OD 89 Siyuri	C-IVf	27.35
42	OD 89 Siyuri	C-IVg	26.63
43	OD 89 Siyuri	C-IVh	28.06
44	OD 89 Siyuri	C-IVi	38.05
	Grand Total		988.24

- i) Marking of seed bearers would only be done if the regeneration is 3-4 meters in height and the area has been control burnt at least twice.
- ii) If the regeneration is established completely, all seed bearer should be removed.
- iii) Seed bearers standing over the regeneration should be lopped upto the crown first and then felled to avoid damage to the young regeneration.
- iv) Cleaning will be done immediately after the felling have been completed.

3.18 Sequence of felling:

The sequence of felling in PB 1 and PB IV is given in the table below. If the need is felt to change due to natural calamities or some other factor then the sequence given could be changed with the approval of the competent authority

Table 3.7- The sequence of felling in PB-I and PB-IV

Year	Range	Forest Name	Name of Compt	Area (in Ha.)	Periodic Block	Nature of Felling
2022-23	DHARAMPU R	ND 448 Bahi-II	C-I	5.64	PB-IV	FF
	JOGINDER AGAR	ND 110 Harabag-II	Whole	25.6	PB-IV	FF
	JOGINDER N AGAR	ND 15 Khalai Nala	Whole	39.2	PB-IV	FF
	JOGINDER NAGAR	ND 64 Bihun	C-I	8	PB-I	SF
	JOGINDER NAGAR	OD 89 Siyuri	C-Ia	20.04	PB-IV	FF
	LADBHAROL	ND 757 Tansal	C-II	16	PB-IV	FF
	URLA	ND 144 UrlaKasyan	C-II	8	PB-IV	FF
2023-24	JOGINDER NAGAR	ND 16 Khalei Har	Whole	4.8	PB-IV	FF
	JOGINDER NAGAR	ND 19 Ladruhi	Whole	2.4	PB-IV	FF
	JOGINDER NAGAR	OD 63 Silh	C-I	28.95	PB-I	SF
	JOGINDER NAGAR	OD 89 Siyuri	C-Ib	38.94	PB-IV	FF
	LADBHAROL	ND 757 Tansal	C-III	29.6	PB-IV	FF
	URLA	ND 144 UrlaKasyan	C-III	18.23	PB-I	SF
	URLA	ND 146 Doodhar	C-II	32.98	PB-I	SF
2024-25	JOGINDER NAGAR	ND 22 Dahanetar	Whole	2.4	PB-IV	FF
	JOGINDER NAGAR	ND 37 Drahal 2nd	Whole	14.4	PB-IV	FF
	JOGINDER NAGAR	OD 63 Silh	C-II	48.7	PB-I	SF
	JOGINDER NAGAR	OD 89 Siyuri	C-IIa	36.03	PB-IV	FF

2025-26	LADBHAROL	ND 756 Bakarjan	Whole	143.2	PB-I	SF
	URLA	ND 146 Doodhar	C-VI	13.25	PB-I	SF
	JOGINDER NAGAR	ND 78 Gumharda	Whole	6	PB-IV	FF
	JOGINDER NAGAR	OD 63 Silh	C-III	42.07	PB-I	SF
	JOGINDER NAGAR	OD 89 Siyuri	C-IIb	46.94	PB-IV	FF
	LADBHAROL	131 ND 734 ND Bhalara	Whole	44	PB-IV	FF
	URLA	ND 155 Khabal	Whole	6	PB-I	SF
2026-27	URLA	OD 192 Sarkidhar	C-II	21.59	PB-IV	FF
	JOGINDER NAGAR	ND 82 Bhallindra Ist	Whole	5.6	PB-IV	FF
	JOGINDER NAGAR	OD 67 Nainpur	C-I	18.67	PB-I	SF
	JOGINDER NAGAR	OD 89 Siyuri	C-IIc	26.29	PB-IV	FF
	LADBHAROL	ND 740 Siun	Whole	12.4	PB-IV	FF
	URLA	ND 146 Doodhar	C-III	24.41	PB-IV	FF
	URLA	ND 167 Kharnal	C-I	37.22	PB-I	SF
2027-28	JOGINDER NAGAR	ND 83 Bhallindra 2nd	Whole	2	PB-IV	FF
	JOGINDER NAGAR	ND 84 Bhallindra 3rd	Whole	2.8	PB-IV	FF
	JOGINDER NAGAR	OD 1 Ghatta	C-I	25	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IIIf	52.05	PB-IV	FF
	LADBHAROL	ND 741 Banandar	Whole	3.6	PB-IV	FF
	URLA	ND 146 Doodhar	C-V	15.58	PB-IV	FF
	URLA	ND 174 Nagan	C-II	17.41	PB-I	SF
2028-29	JOGINDER NAGAR	ND 85 Machyallu	Whole	9.2	PB-IV	FF

	JOGINDER NAGAR	ND 95 Karan Pur Dhar 1st	Whole	24	PB-IV	FF
	JOGINDER NAGAR	ND 96 Karan Pur Dhar IIInd	Whole	16	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IVb	32.57	PB-IV	FF
	URLA	ND 148 Dhalyan	C-I	30	PB-IV	FF
	URLA	ND 177 Chukku	C-I	30	PB-I	SF
	URLA	ND 178 Upper Khajri	C-VIII	24	PB-I	SF
2029-30	JOGINDER NAGAR	OD 1 Ghatta	C-II	20.32	PB-IV	FF
	JOGINDER NAGAR	OD 21 Dahanetar	Whole	23.47	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IVc	30.2	PB-IV	FF
	URLA	ND 158 Lakhwan	C-IV	20	PB-IV	FF
	URLA	OD 152 Dibkan	C-Ia	13.44	PB-I	SF
2030-31	JOGINDER NAGAR	OD 3 Bhajrala	C-I	50.07	PB-IV	FF
	JOGINDER NAGAR	OD 3 Bhajrala	C-III	28.14	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IVf	27.35	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IVg	26.63	PB-IV	FF
	URLA	OD 172 Thorat	C-II	29.1	PB-IV	FF
	URLA	OD 172 Thorat	C-Vb	28.17	PB-I	SF
2031-32	JOGINDER NAGAR	OD 5 Ahjoo II	C-I	23.77	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IVh	28.06	PB-IV	FF
	JOGINDER NAGAR	OD 89 Siyuri	C-IVi	38.05	PB-IV	FF
	URLA	OD 179 Lower Khajri	C-I	22.09	PB-I	SF
	Grand Total			1520.62		

3.19 Treatment of PB II Areas:

No felling has been prescribed in PB II areas. The forests allotted to this periodic block shall be maintained in order to build up proper stock for future yield. The removals of dead, dying, dry, uprooted and fallen trees are allowed. All these removals are also to be credited as yield and would count towards the total yield of this working circle.

3.20 Treatment of PB III Areas:

No felling has been prescribed in PB III areas. The forests allotted to this periodic block shall be maintained in order to build up proper stock for future yield. The removals of dead, dying, dry, uprooted and fallen trees are allowed. All these removals are also to be credited as yield and would count towards the total yield of this working circle.

3.21 Treatment of PB IV Areas:

- i) Only 30 % of overwood shall be marked for fellings unless required on silvicultural ground.
- ii) Mother trees will be removed in two installments depending upon the condition of young regeneration. Young crop will be cleaned and thinned. Thinning will be plan period. Mother trees likely to damage young crop be lopped before felling them.
- iii) All malformed dead, deceased and dry trees shall be removed to improve the crop.

3.22 Subsidiary Silvicultural Operations:

Following subsidiary silvicultural operations are prescribed:-

- i) **Site clearance:** - In areas allotted to PB-I, seeding felling will be carried out as per felling sequence. After seeding felling every year, disposal of refuge is essential to obtain hospitable seed bed. Some of the refuge reduce site clearing cost and to meet right holders demand for fuel and earn their goodwill. In areas where regeneration already exists and secondary fellings are being carried out, no attempts at burning the felling debris should be made. In situations debris should simply be collected and dumped into nallas.

Following points should be kept in view during the course of above operations.

- The operation shall be carried out in winter only.
- Branches of trees and climbers should be cut, left over logs rolled away from seed bearers and slash stacked in open away from mother trees but close to the thickets of bushes
- Slash heaps should be burnt from top downwards.
 - i) All above operations must be carried out in the presence of Range Officer to avoid accidental fires.
 - ii) **Sowing and Planting:-** Though natural regeneration is expected to come in with the correct manipulation of the canopy and effective closures. Yet to reduce the period of closure and restock the area earlier or where the regeneration is inadequate the areas will be taken up for planting at earliest.

After site clearance, sowing and planting be done as under:-

- After seeding felling and site clearance in PB-I pits of 30 cms x 30 cm x 30 cm size shall be prepared at a spacing of 2.5 m x 2.5 m during pre-monsoon showers.
 - After site clearance and preparation of pits during pre- monsoon showers, planting will be done using age 1.5 years raised in polythene bags as per standard nursery technique and procedure. Areas planted should be securely fenced with barbed wire. These closed areas shall be protected and maintained for 15 years to ensure regeneration of PB-I areas.
- (iii) **Weeding and Bush Cutting:** This is most important because of high incidence of grasses and bushes. There should be two weedings- one during March and second during September in the first year and one weeding in Sept. every year for 3 years. Bushes will be cut twice once in March and once in Sept. every year till plants have out grown normal bush canopy and thereafter one during spring every year till the plantation is grown to a minimum height of 3m and is control burnt. Cut material should be disposed by using it to reinforced barbed wire fence or by burning it safely outside the plantation area to reduce fire hazards.
 - (iv) **Cleaning and Climber cutting:-** Cleaning should start at the age of 3 years and cut material should be carried out side the grass under regeneration and burnt or thrown into nullahs vigorous and healthy seeding should be spaced upto 2.5 m apart. No pruning is to be done. Climber cutting is necessary.
 - v) **Mechanical Thinning:** - In PB-IV areas when the crop is in the young pole

stage (3m-5m height & 10-20 cm dia), it will be subjected to stock thinnings. The technique has been given Punjab Forest Leaflet No.1 and 1A. If cleaning mentioned in the preceding paragraph are carried out, if the necessity of mechanical thinning may be obviated.

- vi) Control burning:-**All chil areas shall be control burnt once in every two years except the regeneration area where regeneration is less than 1.5, meter height. Recently .there is policy document from govt of hp regarding collection and removal of chir pine needles from forest land . the efforts should be mad in context to that with nall stake holders for livelihood and to reduce forets fire hazard in toto.

3.23 ARTIFICIAL REGENERATION

For artificial regeneration, following points should be kept in mind:-

- i) Chil seedlings should be raised in Polythene bags. They should be 1.5 years old at the time of planting. The plants should be at least 30 cms in height and possess good vigour. Such plants should be planted out in the field with the onset of the monsoons in pits and size 30 cm x 30 cm x 30 cm at a spacing of 3 x 3 m.
- ii) Collection of seeds and raising of seedlings in the nurseries should be scientifically and carefully done as success depends on the plants planted in the field.
- iii) **Pre-Sowing treatment:-** Seed should be soaked in cold water at least 24 hours at least before sowing.
- iv) The adoption of the proper technique and the time bound programme for planting is must.
- v) Before planting/Sowing, area should be closed to grazing by fencing.

Plantings:

Though natural regeneration is expected to come in with the correct manipulation of the canopy and effective closures, Yet to reduce the period of closure and restock the area earlier or where the regeneration is inadequate the areas will be taken up for planting at earliest. The planting programme to be taken is suggested as under:

Table 3.8

Year	Range	Forest Name	Name of Compt.	Area (inHa.)	Area proposed for planting
2023-24	JOGINDER NAGAR	ND 64 Bihun	C-I	8	3

2024-25	JOGINDER NAGAR	OD 63 Silh	C-I	28.95	8.5
2024-25	URLA	ND 144 UrlaKasyan	C-III	18.23	6
2024-25	URLA	ND 146 Doodhar	C-II	32.98	11
2025-26	JOGINDER NAGAR	OD 63 Silh	C-II	48.7	16
2025-26	LADBHAR OL	ND 756 Bakarjan	Whole	143.2	48
2025-26	URLA	ND 146 Doodhar	C-VI	13.25	4
2026-27	JOGINDER NAGAR	OD 63 Silh	C-III	42.07	14
2026-27	URLA	ND 155 Khabal	Whole	6	2
2027-28	JOGINDER NAGAR	OD 67 Nainpur	C-I	18.67	6
2027-28	URLA	ND 167 Kharnal	C-I	37.22	13
2028-29	URLA	ND 174 Nagan	C-II	17.41	6
2029-30	URLA	ND 177 Chukku	C-I	30	10
2029-30	URLA	ND 178 Upper Khajri	C-VIII	24	8
2030-31	URLA	OD 152 Dibkan	C-Ia	13.44	4.5
2031-32	URLA	OD 172 Thorat	C-Vb	28.17	9
	Grand Total			510.29	169

Note: It is expected that 2/3 of the area will be regenerated naturally and only 1/3 of the felled area has been proposed for planting.

3.24 OTHER REGULATIONS

Fire Protection: -

Chil forests are vulnerable to risk of fire. Most of the damage from fires occurs during pre-monsoon summer months of April to June when lot of inflammable material is present on the forest floor. Fires can be accidental caused by sparks from

falling stones lightening charcoal burning, fires by travelers, Shikaries, Honey hunters, labourers and throwing away of burning cigarette butts. Such fires can be controlled if detected in the starting stage. Other fires can be deliberate due to business rivalry between people engaged in forest working, political reasons uncontrolled burning of Ghasnis to induce nascent growth of grass, kindling of fires to drive away wild animals or to cover evidence of forest crimes. In such cases of incendiarism, results are really destructive over extensive areas and it is very difficult to control such conflagrations.

General instructions on forest fire protection, prevention, detection and fighting are amply explained in Punjab Forest Leaflet No.8 and CCF.HP standing Order No.5 dated 03-05-80 which must be followed religiously and treated as an integral part of the prescriptions of this working plan. The Govt. has made Himachal Pradesh Forests (Protection from Fire) Rules, 1999.

3.25 Direct Measures:

- i) **Maintenance of existing fire lines:** - All existing fire lines be maintained by control burning and bush cutting during winters as given in **Appendix-XIII**.
- ii) **Cleaning of roads and paths:** - All roads and paths criss-crossing forests should be kept swept clean so that there is no inflammable material. Labour be engaged under MNREGA scheme.
- iii) **Timely completion of forest extraction operations:-** Extraction operations in all govt. forest must be completed before March.
- iv) **Control burning along roads and paths:-** A belt of 1.5 width on up hill side and 3m width on the down hill side of every road should be control burnt annually during winter.
- v) **Application of IFA 1927:-** Provision of IFA-1927 concerning right holders in case of fires should be applied tactfully and in a reformatory spirit. Habitual and mischievous offenders should, however, be dealt with sternly after proper enquiry through Deptt. or police.
- vi) **Timely salvage operations:-** Salvage removals must be carried out regularly to exclude fire hazards.

- vii) **Disposal of felling refuge:-** Immediately on close of felling operations , felling refuge should be collected and control burnt at safe points inside or outside the operations area so that fire hazards are reduced.
- viii) **Display of educative slogans and warnings:-** Sign boards carrying educative slogans and warnings should be displayed at conspicuous points all over for information of the general masses.
- ix) **Maintenance of fire record:-** All fires should be properly documented. A detailed fire report in prescribed proforma along with location map in respect of every fire should be submitted by R.Os to DFO within a week. A fire cases register should be maintained by R.Os.
- X) **Indirect Measures:-** With the object of preventing fires by winning the goodwill of right holders and general public living in the vicinity of forests, should meet their reasonable demands for fuel, grazing, grass cutting and by intelligent enforcement of closures etc.

3.26 Resin Tapping: -

Following broad guidelines should be followed: -.

- i) Method of tapping in force should be continued
- ii) On experimental basis, bore hole method to be put in use during the plan.
- iii) No resin tapping should be carried out in PB-I areas under regeneration.

3.27 Control Burning: -

The programme of Triennial control burning is given as Vol-II.

3.28 Planting: -

Planting of Chil be done in felled PB-I areas after waiting for three years for natural regeneration.

3.29 Weeding: -

It is an essential and most important activity that young regeneration should

be properly weeded by freeing it from thick grasses and over head shade of bushes.

3.30 Cleanings: -

It should be attended to as early as possible in order to produce healthy stems and minimize fire hazards.

3.31 Closures:

All PB-I areas shall be closed immediately after felling work is over. The duration will be about 25 years or till such lesser period when plants attain a height of more than 3 meters.

3.32 Grazing and grass cutting: -

Grass cutting will be prohibited in all PB-I areas after the commencement of regeneration operations till the young crop is beyond damage i.e 75 cms and above. Grass cutting shall be allowed under strict supervision in order to avoid damage to young seedlings. Grazing shall be strictly prohibited in regeneration areas during the closer period.

3.33 Regeneration Survey: -

Regeneration Survey shall be carried out once in every fifth year in all the PB- I areas as per para 32 of the National Working plan code, 2004. Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

CHAPTER IV

4. THE FIR/SPRUCE WORKING CIRCLE

4.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the pure Fir/Spruce crop or Fir/Spruce crop as 60% or more in an area will be allotted to this working circle. The basic forests with the considerations of accessibility for exploitation and suitability for regeneration purpose, occurring either pure or in mixture with broad leaved species containing constitution of this working circle will remain the same as in the earlier plan. This working circle will be managed under the Punjab Irregular Shelterwood system in compartments of all Demarcated protected forests. The total area of this working circle is 1057.77 Ha.

4.2 GENERAL CHARACTER OF VEGETATION

The overwood is nearly constituted of spruce and Fir, Deodar and kail is also found scattered in small pockets along the spurs. Walnut, Maple, Bird cherry and Hoursechestnut are found in nalas or depression. All age classes are found mixed in these forests, Mature and over mature trees predominate where as young generation, especially of Fir is deficient. Stocking is generally moderate.

4.3 FELLING SERIES AND CUTTING SECTIONS

There will be only one felling series.

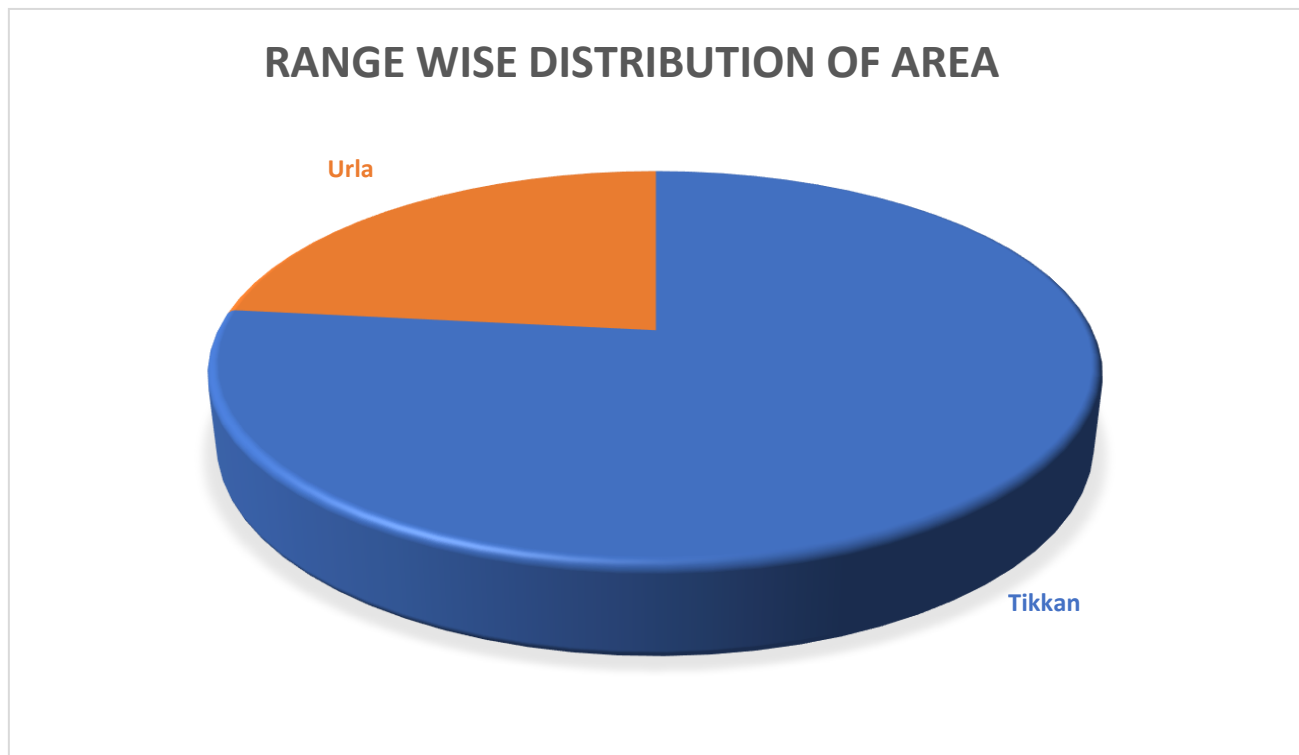
4.4 Area Statement:

The total area of the working circle is 1057.77 ha. Its range wise distribution is as under:-

Sr. No.	Range	Area (in Ha)
1	Tikkan	811.71
2	Urla	246.06
	TOTAL	1057.77

4.5 SPECIAL OBJECTIVES OF MANAGEMENT

- i) To restock the areas deficient in regeneration either naturally or artificially.
- ii) To replace mature and over mature growing stock within the conversion period.
- iii) To obtain maximum progressive sustained yield.
- iv) To improve the forests cover for soil and water conservation.
- v) To protect these forests from damages caused by various agencies.

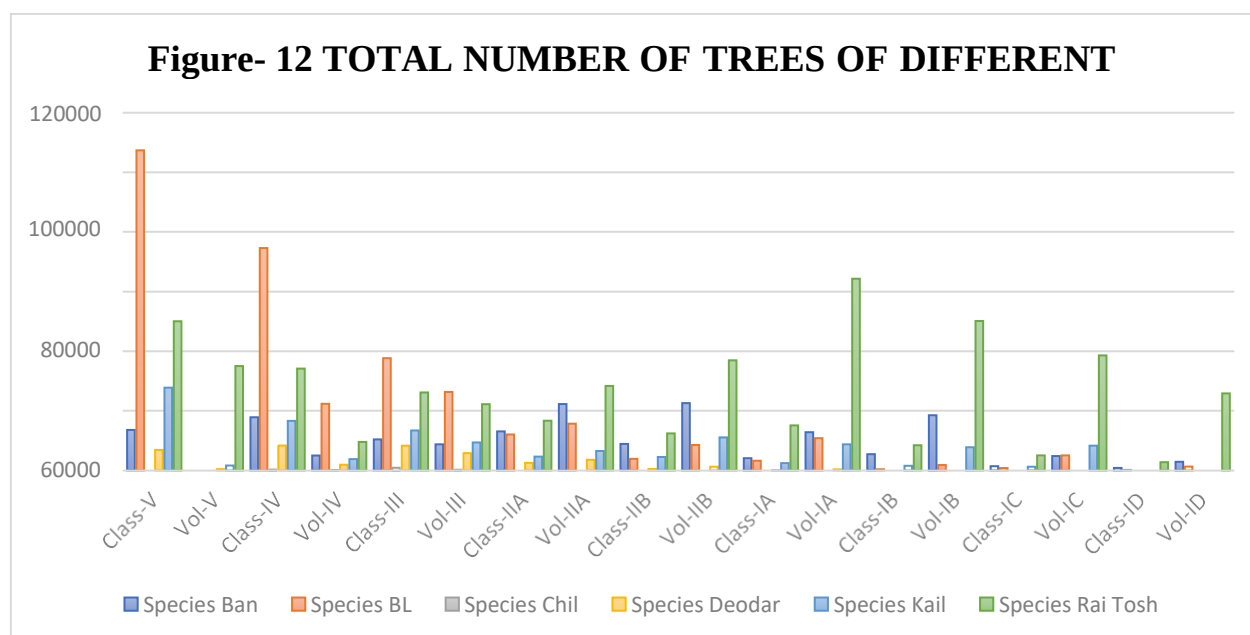
Figure- 11 Range wise distribution of area**4.6 Stock maps:**

All the forests constituting this working circle have been mapped and have been attached in the concerned compartment history files.

4.7 Age classes:**Table 4.1: Details of growing stock available**

TOTAL NUMBER OF TREES OF DIFFERENT DIAMETER IN FIR W.C							
Class & Vol	Species						Grand Total
	Ban	BL	Chil	Deodar	Kail	Rai Tosh	
Class-V	13593	107412	0	6885	27761	50061	205712

Vol-V	0	0	0	413.1	1665.66	3504.27	5583.03
Class-IV	17841	74618	504	8351	16639	34171	152124
Vol-IV	4995.48	22385.4	70.56	1920.7	3826.97	9567.88	42767.02
Class-III	10415	37661	1015	8305	13405	26178	96979
Vol-III	8748.6	26362.7	426.3	5813.5	9383.5	22251.3	72985.9
Class-IIA	13100	12090	0	2532	4639	16682	49043
Vol-IIA	22270	15717	0	3570.12	6540.99	28359.4	76457.51
Class-IIB	8891	3888	0	505	4505	12439	30228
Vol-IIB	22583.14	8553.6	0	1242.3	11082.3	36943.83	80405.17
Class-IA	4126	3284	0	96	2478	15133	25117
Vol-IA	12831.86	10837.2	0	339.84	8772.12	64315.25	97096.27
Class-IB	5447	400	0	0	1575	8440	15862
Vol-IB	18519.8	1840	0	0	7796.25	50133.6	78289.65
Class-IC	1418	801	0	0	1238	5053	8510
Vol-IC	4821.2	5046.3	0	0	8306.98	38604.92	56779.4
Class-ID	857	165	0	0	0	2769	3791
Vol-ID	2913.8	1320	0	0	0	25862.46	30096.26
Total-Class	75688	240319	1519	26674	72240	170926	587366
Total Volume	97683.88	92062.2	496.86	13299.59	57374.77	279542.91	540460.21



4.8 Enumerations: -

Total enumeration of all the compartments is basically too capital and time intensive. Therefore, for better and good results as same to total enumeration, many of the forests/compartments have been fully enumerated, some of the larger compartments of big forests have also been fully enumerated and for rest, a list of all compartments of Working Circle was prepared and 10 % ,with minimum of one sample has been selected for PB-I. While 5 %, with minimum of one sample has been selected for PB-U.

Table 4.2: Number of trees of different Dia classes PB-I

Number of Trees and Volume of Different Dia. Classes In PB-I							
Class & Volume	Species						
	Ban	BL	Chil	Deodar	Kail	Rai Tosh	Total
Class-V	160	18953	0	2225	4284	4512	30134
Vol-V	0	0	0	133.5	257.04	315.84	706.38
Class-IV	2555	13594	240	2706	2579	4306	25980
Vol. IV	715.4	4078.2	33.6	622.38	593.17	1205.68	7248.43
Class-III	180	2856	480	3307	1720	3570	12113
Vol.III	151.2	1999.2	201.3	2314.9	1204.00	3034.5	8905.1
Class-IIA	580	379	0	1202	1060	2805	6026
Vol. IIA	986.00	530.6	0	2043.4	1494.6	4768.5	9823.1

Class-IIB	0	183	0	240	1430	3578	5431
Vol. IIB	0	475.8	0	590.4	3517.8	10626.66	15210.66
Class-IA	0	303	0	50	730	6207	7290
Vol. IA	0	424.2	0	177.00	2584.2	26379.75	29565.15
Class-IB	0	0	0	0	750	1261	2011
Vol. IB	0	0	0	0	3712.5	7490.34	11202.84
Class-IC	0	185	0	0	540	1361	2086
Vol. IC	0	1165.5	0	0	3623.4	10398.04	15186.94
Class-ID	0	0	0	0	0	581	581
Vol. ID	0	0	0	0	0	5426.54	5426.54
Total of Trees	3475	36453	720	9730	13093	28181	91652
Total Vol.	1852.6	8673.5	234.9	5881.58	16986.71	69645.85	103275.14

4.9 YIELD CALCULATION FOR FIR/ SPRUCE:

The yield has been calculated by volume. Increments have been ignored as a safety factor against fire and other natural calamities and to serve as emergency reserve. For PB-I the yield has been calculated keeping in view the growing stock available for fellings as per the marking rules and silvicultural system followed. 50% of the volume of growing stock for fir and spruce has been taken as growing stock of Fir and Spruce is all together.

The Annual yield has been calculated by the following formula:

(a) Von Mantel,s formula:

$Y = \frac{2 \times GS}{R}$ Where: Y is annual yield, GS is growing stock, R is rotation period of 150 Years

$$Y = \frac{2 \times 382252.56}{150} = 5096.70 \text{ cum or say } 5090 \text{ cum}$$

(b) Yield calculated by the Hufunagel's formula:

In view of the fact that only seeding felling will be carried out in PB1 areas during the period of the working plan, the yield has been calculated as under on the basis of the silvicultural availability assessed on the basis of past experience based on markings done in PB 1 areas by using Hufunagils as under:

$$Y = \frac{C1V1 + C2V2 + C3V3}{P}$$

Where ; Y= Annual yield
P= Period of the Plan i.e 10 years
V1=Volume of I and over trees in PB1

V2= Volume of II and over trees in PB1

V3= Volume of III class tree in PB1

C1, C2 , C3 are constants to represent the proportion of I ,II, III classes which are estimated to be available for felling during the regeneration period for different species. The values of constants C1, C2 ,C3 for different species is as under;

Species	C1	C2	C3
Deodar	0.5	0.5	0.5
Kail	0.7	0.6	0.5
Fir/ Spruce	0.6	0.5	0.5
Chil	0.6	0.6	0.5

For Fir/spruce :

V-I Total Volume of I class trees = 24847.33 cum

V-II Total Volume of II Class trees = 7697.58 cum

V-III Total Volume of III trees = 1527.25 cum

$$AY = \frac{0.6 \times 24847.33 + 0.5 \times 7697.58 + 0.5 \times 1517.25}{10}$$

10

AY = 1951.58 cum or say 1950 cum

For Deodar :

Total Volume of I class trees = 177 cum

Total Volume of II Class trees = 2633.8 cum

Total Volume of III trees = 2314.9 cum

$$AY = \frac{0.5 \times 177 + 0.5 \times 2633.8 + 0.5 \times 2314.9}{10}$$

10

AY = 256.20 cum or say 250 cum

For Kail:

Total Volume of I class trees = 9920.1 cum

Total Volume of II Class trees = 5012.4 cum

Total Volume of III trees = 1204 cum

$$Ay = \frac{0.7 \times 9920.1 + 0.6 \times 5012.4 + 0.5 \times 1204}{10}$$

Ay = 1055.3 cum or say 1050 cum

For Chil:

Small volume, as such no felling is prescribed.

The annual yield from PB1 is therefore, prescribed as under:

Species	Cubic meter
Deodar	250
Kail	1050
Chil	-
Fir/ Spruce	1950
Total	3250

**(c) Yield calculation by the formula as per the code of Working Plan
procedures for HP is as under:-**

$$AY = \frac{GS - (V1 + V2 + V3)}{P}$$

P

Whereas AY= Annual Yield.

GS= Total Growing stock of PB-1

V1= Total volume of mother trees retained at the rate of 30 trees/ha.

V2= 20% of total growing stock of PB1 to be retained on precipitous slopes.

V3= 50% of total volume of V to III class trees to be retained as future crop.

P= Plan period i.e. 10 years.

$$\text{Thus, } AY = \frac{226711.89 - (1761 + 45342 + 113355)}{10}$$

10

AY= 5025.38 cum or say 5000 cum

TOTAL PRESCRIBED YIELD:

PB	ANNUAL YIELD PRESCRIBED IN CUM
PB-1	3250
PB-II	Nil
PB-III	Nil
PB-IV	Nil
TOTAL	3250

The annual yield calculated by Von Mantel's Formula, Hufunagel's formula and formula as per code of Working Plan procedures of HP works out to be 5090 cum, 3250 cum and 5000 cum cum respectively. The yield calculated by Hufunagel's formula is on the conservative side, hence adopted for PB-1.

4.10 Silvicultural System:

The Indian Irregular Shelterwood system with floating PBs shall be adopted. Only PB-I will be allotted and the remaining areas will be termed as PB unallotted. The trees growing on precipitous slopes and rocky out crops shall not be subjected to concentrated fellings. Groups of poles below 40 cm. d.b.h. and at least 0.2 ha. extent will be retained as part of future crop. In PB-I middle aged trees will be preferably be retained as shelter. In addition, V and IV class isolated trees of Fir will not be felled to avoid sacrifice of young crop. Thus, rigid uniformity in the crop would not be possible. In PB-I artificial regeneration with specific species will be carried out immediately after fellings. The natural regeneration will be well protected. In artificial regeneration, Nursery raised plants will be planted. No direct sowings except for Spruce, Aesculus etc. would be resorted to. In PB-U, no operations are proposed except removal of dead dying and diseased trees and thinning cum improvement felling.

4.11 ROTATION AND CONVERSION PERIOD

There is no need as such to go very fast for conversion. Since regeneration of spruce and silver fir could not keep pace with felling due to shortage. Therefore, the rotation will be 150 years for all the species in Fir/Spruce Working Circle and exploitation diameter is fixed at 60 cm dbh.

4.12 EXPLOITABLE DIAMETERS

The exploitable diameter of the Fir and Spruce is fixed 60 cm dbh.

4.13 Regeneration Period:

A period of 30 years is sufficient to regenerate and restock the area, more over

when natural regeneration is going to be supplemented with artificial regeneration wherever necessary. Fir and spruce are expected to attain height of 4 to 5 meters in a span of 30 years, when these can be considered as established and beyond damage by cattle.

4.14 Division into Periodic Blocks:

4.14.1 Division into periods and allotment to PBs

Floating PB system is followed. Only PB-I is identified and the remaining areas are named as PB-un-allotted (PB-U).

P.B.-I

The areas of low density, where the regeneration is lacking, where large scale fellings have been done to meet the right holders demand and also such areas which predominates with mature to over mature trees including unfelled areas of previous working plan ,have been allotted to this Working Circle with an area of **140.57** ha.

4.14.2 P.B. Un-allotted

Remaining forests will be named as PB un-allotted. Though, the trees in this PB are young to middle aged but the crop is mostly irregular with predominance of middle-aged class. The total area of this PB is **917.20** ha. If any forest in PB un-allotted is destroyed by natural calamities like snow and fire etc., it will be transferred to PB-I and an equivalent area from PBI due for felling shall be transferred to PB un-allotted before felling.

The PB-I areas after establishment of the crop will be allotted to PB un-allotted and equivalent area fit for PBI will be transferred from PB un- allotted, thereby maintaining 1/5th of total area of the Working Circle in PB-I.

Table 4.3: The forests allotted to FIR WC are listed below:

Sr. No.	Range	Forest Name	Compartment	Area (Ha.)
1	TIKKAN	ND 190 Rulang	Whole	41.98
2		ND 185 Schannal	Whole	93.08
3		ND 194 Lamba Chak	Whole	95.1
4		ND 196 Khaban	Whole	76.08
5		ND 197 Gahang	Whole	50.99
6		ND 198 Lachhyan	Whole	55.85
7		ND 208 Dharyan	Whole	53.02
8		ND 209 Modhurwan	Whole	70.01
9		ND 210 Latran	Whole	24.69
10		ND 211 Jhukan	Whole	25.5
11		ND 215 Richhunul	Whole	56.25
12		ND 216 Rajban	Whole	42.49
13		OD 184 Schannal Old	C-IIa	60.13
			C-IIb	66.54
14	URLA	ND 123 Jhanjerawari-Ist	C-I	29.74
			C-II	38.76
			C-III	27.87
			C-IV	26.01
			C-V	26.5
15		ND 125 Kathyaru-II	Whole	28.4
16		ND 130 Naman	C-I	40
17		OD 120 Mayot-I	C-I	28.78
			G.Total	1057.77

PB I Areas

Sr No	Range	Forest	Compartment	Area(in Ha)
1	Urla	ND 123 Jhanjerawari-	C-II	38.76
		ND 123 Jhanjerawari-	C-III	27.87
2	Tikkan	ND 190 Rulang	Whole	41.68
		OD 184 Schannal Old	C-IIa	60.13
TOTAL				168.44

4.15 Felling Cycle:

A felling cycle of 10 years corresponding to the plan period has been adopted.

Sequence of Felling						
Year	Range	Forest Name	Name of Compt.	Area (in Ha)	Periodic Block	Nature of Felling
2023-2024	Urla	ND 123 Jhanjawari(1/4Area of Compartment)	C-II	9.5	PB-I	SF
	Tikkan	ND 190 Rulang (1/4 Area of Compartment)	Whole	11	PB-I	SF
2024-2025	Urla	ND 12Jhanjawari(1/4 Area of Compartment)	C-II	9.5	PB-I	SF
	Tikkan	ND 190Rulang (1/4 Area of Compartment)	Whole	11	PB-I	SF
2025-2026	Urla	ND 123 Jhanjawari(1/4Area of Compartment)	C-II	9.5	PB-I	SF
	Tikkan	ND 190Rulang (1/4 Area of Compartment)	Whole	11	PB-I	SF
2026-2027	Urla	ND 123 Jhanjawari(1/4Area of Compartment)	C-II	10.2 6	PB-I	SF
	Tikkan	ND 190Rulang (1/4 Area of Compartment)	Whole	5.9	PB-I	SF
	Tikkan	OD 184 Sachnal (1/4 Area of Compartment)	C-IIa	15	PB-I	SF

4.16. Total Yield from PB-I:

The yield calculated from PB-I area is 3250 m³ which included salvage removal from FIR working circle and removal by right Holders. The sequence of felling from PB-I area is tabulated as under.

Sequence of Felling						
Year	Range	Forest Name	Name of Compt.	Area (inHa.)	Periodic Block	Nature of Felling
2023-2024	Urla	ND 123 Jhanjawari (1/4 Area of Comptt.)	C-II	9.5	PB-I	SF
	Tikkan	ND 190 Rulang (1/4 Area of Comptt.)	Whole	11	PB-I	SF
2024-2025	Urla	ND 123 Jhanjawari (1/4 Area of Comptt.)	C-II	9.5	PB-I	SF
	Tikkan	ND 190 Rulang (1/4 Area of Comptt.)	Whole	11	PB-I	SF
2025-2026	Urla	ND 123 Jhanjawari (1/4 Area of Comptt.)	C-II	9.5	PB-I	SF
	Tikkan	ND 190 Rulang (1/4 Area of Comptt.)	Whole	11	PB-I	SF
2026-2027	Urla	ND 123 Jhanjawari (1/4 Area of Comptt.)	C-II	10.26	PB-I	SF
	Tikkan	ND 190 Rulang (1/4 Area of Comptt.)	Whole	5.9	PB-I	SF
	Tikkan	OD 184 Sachnal (1/4 Area of Comptt.)	Whole	15	PB-I	SF

2027-2028	Tikkan	OD 184 Sachnal (1/4 Area of Comptt)	Whole	15	PB-I	SF
2028-2029	Tikkan	OD 184 Sachnal (1/4 Area of Comptt)	Whole	15	PB-I	SF
2029-2030	Tikkan	OD 184 Sachnal (1/4 Area of Comptt)	Whole	15.13	PB-I	SF
2030-2031	Urla	ND 123 Jhanjawari(1/4 Area of Comartment)	C-III	13	PB-I	SF
2031-2032	Urla	ND 123 Jhanjawari(1/4 Area of Comartment)	C-III	14.87	PB-I	SF

4.17 Total prescribed yield:

Since, no yield is being prescribed from PB Un-alloted as such, the total annual yield prescribed from this circle will be 3250 cum for Jogindernagar felling series. The yield prescribed will be inclusive of trees marked to right holders. Any other kind of felling whatever proposed would also count towards yield.

4.18 Control of Yield:

All removals shall count towards yield. The yield is going to be controlled separately for each species for the whole working circle. The yield from PB-I and PB Unalloted would be controlled jointly. The annual excess and deficit will be carried forward in the control forms and will be adjusted in the end of five years period when it should be within 10% for each species and within 5% at the end of the Plan.

4.19 Intermediate Yield:

The thinning is going to be done on strict silvicultural principles and it must be very conservative. There will be no control of thinning and it shall be done according to requirement.

4.20 Method of Executing Fellings:

The marking shall be carried out by the D.F.O or A.C.F and invariably checked by the C.F. In addition, the following broad guidelines are laid down for the marking officer: -

PB-I Areas: -

- i) Mother trees should be uniformly distributed all over the area and tall well grown healthy trees with superior poles and well developed crown should be selected as mother trees. These should be preferably of class II A and II B.
- ii) In case of mixture of the Fir and Spruce, preference will be given to Fir which results in higher volume productions due to more number of trees per ha.
- iii) In case, however, deodar and Kail are found occurring in good proportion which may be the case on steep slopes/ southern aspects, then these species will be preferred as seed bearers.
- iv) Broad Leaved trees occurring mixture with Fir/Spruce shall not be marked rather retained as shelterwood because these create conditions like reducing acidity of soil for regeneration. However care is to be taken to open the canopy sufficiently and if need be lesser number of Fir/Spruce trees be retained in such cases as their place will be taken over by B.L. trees as shelterwood. Regarding regeneration, it is already specified that it will be secured artificially in the first instance because of uncertainty of natural one.
- v) Vigorously growing samplings and poles upto 30 cm. d.b.h compact groups with area exceeding 0.1 ha. and density exceeding 0.5 shall be retained as advance growth.
No marking shall be done on slopes exceeding 40 %.
- vi) Wherever B/L trees are found creating excess overhead shade to Fir and Spruce, these should be marked. However no attempt should be made to introduce Fir and Spruce in areas suitable for B.L species.
- vii) Trees standing over established regeneration should be lopped before felling. All dead, dying, diseased, malformed and fallen trees will be marked for removal.
- viii) Markings on rocky and precipitous slopes, along road and nallas and also in areas liable to erosion, shall not be done. However, on steeper slopes and broken grounds, marking will be done on selection principles.
- ix) A strip of 50m wide along either side of main road and 25m wide along nallas/streams shall not be marked for felling
- x) Before undertaking any forest for seeding felling it shall be ensured that nursery stock is ready to for planting and subsequent beating up immediately after the timber has been extracted from the forest. In case neither the nurseries have been raised nor the stock is available, no marking/felling shall be done.

4.21 Subsidiary Silvicultural Operations:

Subsidiary Silvicultural Operations in PB-I Areas

Immediately after the fellings are over, the subsidiary silvicultural operations will be carried out in the same year or in the next year, as given below:-

4.21.1 Removal of damaged and un-felled marked trees.

4.21.2 The disposal of slash after main fellings as per rules laid down in Forest Manual Volume-III.

4.21.3 Thinning/lopping or even removal of the inferior species interfering with the promising growth of young poles and saplings.

4.21.4 Climber/Shrub cutting and cleaning in the year following the main fellings and in the subsequent years as may be necessary to help the regeneration operations.

4.21.5 All operations should be done so carefully so that no damage is caused to regeneration.

4.22 Artificial Regeneration in PB-I

The natural regeneration is scanty for deficient in almost all areas will be planted with Fir/Spruce artificially as soon as possible so that area could be fully regenerated. For it as far as possible, temporary nurseries should be raised near the planting sites, much in advance to reduce the cost on transportation and also to avoid damages to seedlings during transportation.

Before planting raw humus be scrapped out or control burnt. This is must to expose mineral soil to plant otherwise all attempts of planting will go waste. Planting will be done of site specific. Broad Leaved should be given due emphasis and about one and half year to two and half years old plants of species like Walnut, Maple, Bird Cherry etc. shall be planted in moist localities along nalas. Detailed treatment map (1:3750) shall be prepared indicating the areas which are to be stocked with different species. Tall plants of Spruce, Fir and Deodar attain the plantable height of 80-90cm in 4.5, 4.5 and 3.5 years respectively and should be planted in pits of 60cm X 60cm.

The natural regenerations of conifers/important Broad Leaves species are to be well protected and encouraged.

4.23 Other Regulations

4.23.1 Weeding

For the healthy growth of plants and establishment of regeneration,

timely and regular weedings are of immense importance. The growing season is limited from April to September months and plants must be kept free of weeds during this period. Thorough weedings of young plantations of all species are essential. Two weedings every year i.e., pre and post monsoon weedings will be carried out till the plants over grow the weeds. Similarly cleanings will also be carried out wherever necessary.

4.23.2 Thinning

Thinnings will be carried out in accordance with the general principles of thinning laid down in H.P. Forest Manual Volume-IV. For natural pruning and production of clean boled timber Spruce and fir requires much more side shade than Deodar and Kail. In young pole crops, where mixture of Fir and Spruce occurs by single stems, the thinning will be done to favour Spruce. Where the mixture is in groups, each group will be required to be thinned according to the silvicultural requirement of the species growing in a particular group. However, practically no thinning is required in the existing crop.

4.23.3 Closure

All the areas taken up for regenerations will be closed for grazing for a period of 30 years in the same manner as per PBI areas of other Working Circles. It should be ensured that adequate area is closed for regeneration every year. The fence must always be kept in good condition.

4.23.4 Grazing

The areas under this working Circle are heavily grazed during summer months by the migratory graziers. All areas under regeneration operations should be strictly protected against the grazing. Other areas should not be allowed to be overgrazed beyond the grazing capacity of the area.

4.23.5 Lopping

Lopping in some of the forest is also observed which is more confined to the forests which are nearer to the habitation. Efforts should be made to stop this practice to enable the trees to grow to their optimum.

4.24 Fire Protection

Generally, the entire Working Circle lies beyond the fire zone, but as the coniferous species growing in the area are susceptible to fire, all the precautionary measures must be taken to protect the forests from fire. Extra care should be taken in areas being taken for fellings.

4.25 Right Holder's Requirements

The requirements of Right Holders will be met from these forests as

per settlement provision. No trees will however, be marked from PBI areas after the markings for seeding felling have been done till the area is fully regenerated. Though, the timber requirement from these forests is less but, as far as possible, it should be met from the dead, dying, uprooted and snow damaged trees or those available in thinning and improvement fellings. No green trees be felled for meeting the local demands, unless it is strictly silviculturally available.

4.26 Regeneration Survey: -

Regeneration Survey of felled PB-I areas shall be carried out as per para 32 of National Working Plan Code, 2004 once every five years as the progress of regeneration is directly linked with fellings.

CHAPTER-V

5 THE PROTECTION WORKING CIRCLE

5.1 GENRAL CONSTITUTION.

This circle will include DPFs having steep, precipitous, inaccessible and broken terrain comprising of conifers, Ban or open crop of broad leaved species along with the DPFs allotted to Oak working circle in the last working plan. These forests are mainly situated in difficult precipitous and erodible terrain and form the catchments of River Beas and perennial streams.

5.2 GENRAL CHARACTER OF VEGETATION

The general character of vegetation has been described in chapter-IIA of part- I. The forests of this circle represent almost all forest types which are found in the tract. Some apart from conifers, Ban Oak some forests having Ban, Mohru, kharsu crop have been allotted to this working circle. The description of individual forests has been placed in the respective compartment history files.

5.3 SPECIAL OBJECTS OF MANAGEMENT

- i) Protection of hill sides from denudation and erosion by preserving and enhancing the forest cover.
- ii) To improve the growing stock in quality as well as in quantity by sowing and planting.
- iii) To protect the forests from indiscriminate exploitation and to preserve them as representative of Eco-system of the region.
- iv) To provide a suitable habitat to wild animals in forests within the boundary of wild life sanctuary.
- v) Consistent with the principles of soil conservation, to provide for grazing of sheep, goats and buffaloes of local and migratory graziers who come to these areas and also to meet the genuine demands of right-holders for timber and other forest produce.
- vi) To improve the forest cover for soil and water conservation and to preserve specially Oak forests for rejuvenation /recharge of watersheds.

5.4 BLOCKS AND COMPARTMENTS

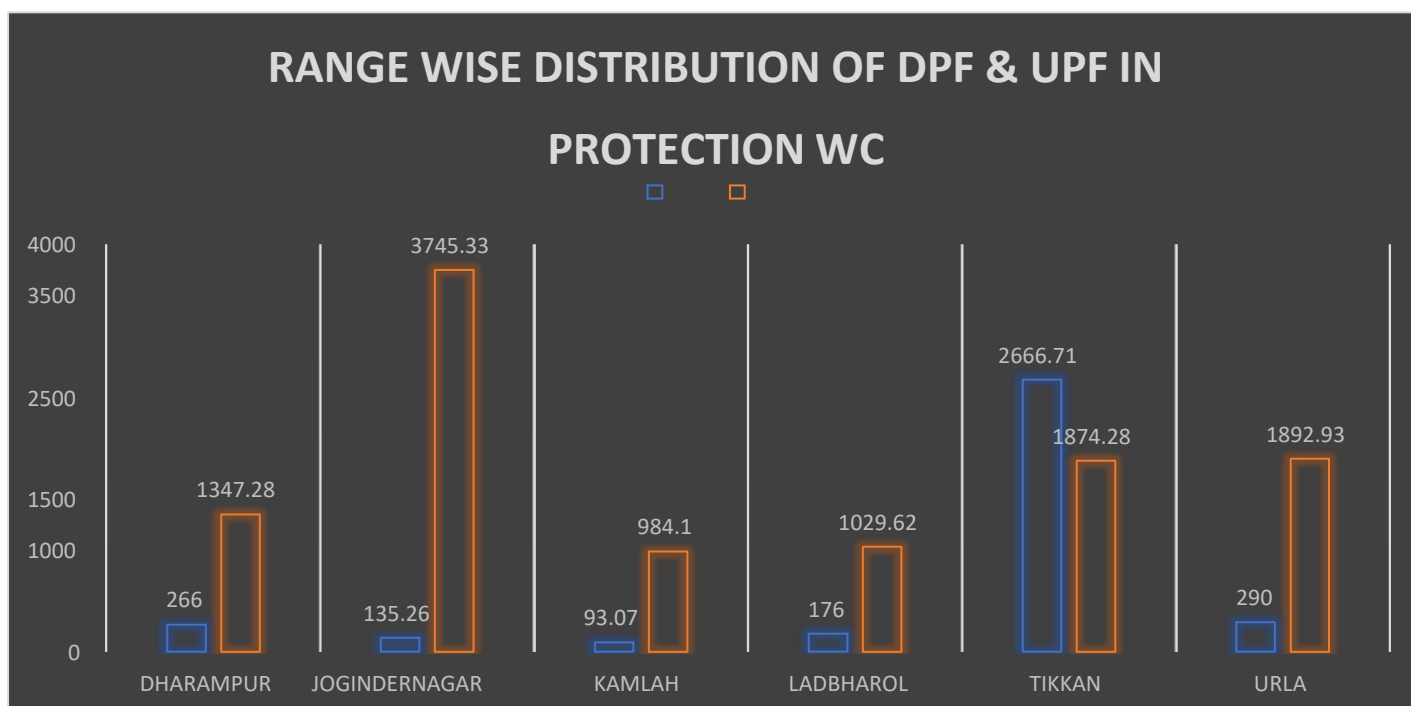
Existing sub-divisions have been retained as such.

5.5 FELLING SERIES

There will be no felling series since no yield has been prescribed.

5.6 AREA STATEMENT UNDER PROTECTION WC:

Range	UPF	DPF	Total
DHARAMPUR	266	1347.28	1613.28
JOGINDERNAGAR	135.26	3745.33	3880.59
KAMLAH	93.07	984.1	1077.17
LADBHAROL	176	1029.62	1205.62
TIKKAN	2666.71	1874.28	4540.99
URLA	290	1892.93	2182.93
GRAND TOTAL	3627.04	10873.54	14500.58



5.7 LIST OF PROTECTION WORKING CIRCLE AREA: -

Table 5.1: List of protection working circle area

A: - DPF

Range	Forest Name	Compartment	Area (in hac.)
DHARAMPUR	ND 440 Dharnghod	Whole	9.52
	ND 423 Murah Dhar-I	Whole	934.22
	ND 427 Mahan	C-I	32.55
	ND 428 Manal Gehra	Whole	53.38
	ND 429 Kalehri	Whole	51.08
	ND 430 Jatehri	Whole	27.91
	ND 432 Chouns	C-I	45.6
	ND 442 Chhijkhobhla	Whole	20.83
	ND 443 Didnu	Whole	20.83
	ND 444 Bhadiyar	Whole	63.84
	ND 445 Darku	Whole	43.77
	ND 446 Jamprol	Whole	23.15
	ND 448 Bahi-II	C-II	20.6
JOGINDER NAGAR	ND 10 Chountra	Whole	3.6
	ND 100 Bagra Dhar Ist	Whole	45.6
	ND 101 Bagra Dhar IInd	Whole	
	ND 102 Bagra Dhar IIInd		43.68
	ND 103 Banard	Whole	25.6
	ND 104 Dugagehar 1st	Whole	225.39
	ND 105 Dugagehar 2nd	Whole	156.4
	ND 106 SuidharIst	Whole	106.89
	ND 107 Suidhar 2nd	Whole	20.8
	ND 108 Tarmunda	Whole	76.4
	ND 109 Jimjima	Whole	6
	ND 111 Diggli-I	Whole	26.8
	ND 112 Diggli II	Whole	43.68
	ND 113 Awayar	C-II	36.8
	ND 114 Badan	C-I	100
	ND 115 Chiladhar	C-II	16.8
	ND 116 ChhanagdharIst	Whole	31.2
	ND 117 ChhanagdharIInd	Whole	35.1
	ND 118 BhamanuNal	Whole	18.2

	ND 12 Marhola 1st	Whole	57.6
	ND 13 Marhola 2nd	Whole	177.2
	ND 14 Marhola 3rd	Whole	17.6
	ND 17 Khaprotulst	Whole	39.6
	ND 18 Khaprotu IInd	Whole	25.2
	ND 20 Bhadyara	Whole	13.6
	ND 23 Khetru	Whole	40
	ND 25 BhalaRihra 1st	Whole	10.8
	ND 26 BhalaRihra 2nd	Whole	24.8
	ND 27 Magru	Whole	36.4
	ND 28 Ropri	Whole	25.2
	ND 29 Banon	C-I	32
		C-II	60
		C-III	81.2
	ND 30 Magru Dhar	Whole	54
	ND 32 Chalaharg	Whole	9.2
	ND 33 Bhaboridhar	C-I	18
		C-II	16
		C-III	23
		C-IV	60
		C-IX	24
		C-V	45
		C-VI	45
		C-VII	38
		C-VIII	45
		C-X	74.38
		C-XI	40
		C-XII	45
		C-XIII	48
	ND 35 Matkehar	Whole	14.57
	ND 38 Drahal 3rd	Whole	16.4
	ND 40 Makriri 1	Whole	12.4
	ND 41 Makriri 2	Whole	27.6
	ND 43 Silh	C-I	30
		C-II	44
	ND 44 Ramsi	C-I	13
	ND 45 Hyun Hanan	Whole	26
	ND 46 Kunkar	Whole	8.8
	ND 47 Drubbal	Whole	18.8
	ND 48 Choranjh	C-I	11.4
	ND 49 Kungaba	C-I	50

	ND 50 Thana Balh	Whole	6.8
	ND 54 Samkhetar	Whole	10
	ND 55 Baddu	Whole	7.6
	ND 68 KafalKot	Whole	16
	ND 7 Taramat	Whole	12.4
	ND 73 Rihra	Whole	36
	ND 76 Makaura	C-III	68
	ND 79 Bhararu	Whole	2
	ND 8 Sukkar 1st	C-I	40
		C-II	76
	ND 80 Bindh	C-I	31.2
	ND 81 Kharon	C-I	64
	ND 88 Majharnoo	Whole	6
	ND 9 Sukkar 2nd	Whole	26
	ND 92 JaralTikkar	Whole	22
	ND 93 Dhelu-I	Whole	2.4
	ND 94 Dhelu-II	Whole	7.6
	ND 97 Galu	Whole	12.4
	ND 98 Riunti Dhar	C-I	60
	ND 99 Mahyara Dhar	C-I	80
		C-II	78.4
	ND Bagra Dhar IInd	Whole	43.2
	OD 11 Marhola	C-I	80
		C-II	164.02
	OD 67 Nainpur	C-III	28.19
	OD 89 Siyuri	C-Ic	33.35
		C-Id	29.08
KAMLAH	ND 453 Manyoh	Whole	10.88
	ND 455 Sadhoti	Whole	90.35
	ND 459 Sarohli	Whole	12.82
	ND 460 Dodar	C-II	85.84
		C-III	139.84
		C-V	74.5
	ND 461 Manwadhar	C-II	19.43
	ND 463 Kamlah	Whole	25.53
	ND 466 Khumbal	Whole	14.06
	ND 467 Nagani	Whole	42.18
	ND 468 KolhuRicheer	Whole	26.8
	ND 475 Tandu-I	C-II	47.61
	ND 476 Tandu-II	Whole	14.93
	OD 457 Jander	C-I	85.84
		C-III	139.84

		C-V	74.5
	OD 464 Kamlah	Whole	14.95
	OD 465 Khumbal	C-I	64.2
LADBHAROL	116 ND 694 ND Kotla	C-II	35
	118 ND 697 ND Draman-II	C-II	32
	120 ND 701 ND Gokhu	C-I	56
	123 ND 706 ND Drug Khuddi	Whole	102.8
	124 ND 707 ND Mahot	C-I	4
	126 ND 714 ND JahanuBhaytu	C-I	6
	127 ND 724 ND Chil Gujral	C-II	76.2
	128 ND 720 ND Daled	Whole	5.2
	129 ND 722 ND Chil Chitra	C-I	5
	133 ND 736 ND Barnod	C-II	25
	613 ND 692 ND Balu	C-II	29.6
	614 ND 693 ND Palaun	C-II	56
		C-III	45
	617 ND 691 ND Draman-I	C-II	60
		C-VII	26
	ND 703 ND Bhabhoridhar	C-I,C-II,C-IV	185.35
		C-III,C-V	103.27
	ND 713 ND Fagla	C-II	8
	ND 715 Nageshwar Mahadev	C-I	16
	ND 716 ND Bhadrangan	C-III	4
	ND 728 ND Patha	Whole	13.6
	ND 731 ND Chhanchhehar	Whole	25.6
	ND 747 Tameshwaridhar	C-I	25
		C-II	34.6
	ND 750 Patnugarned-III	Whole	11.2
	ND 752 Matehar	Whole	14.4
	ND 753 Bag	Whole	4
	ND 754 Taur	Whole	20.8
TIKKAN	ND 191 Dharangan	Whole	21.05
	ND 193 Rawanal	Whole	48.97
	ND 205 Laryan	Whole	104.1
	ND 206 Kharyan	Whole	105.63
	ND 214 Terang	Whole	65.97
	ND 221 Daintnal	Whole	92.27
	ND 222 Tarswan	Whole	53.02

	ND 223 Dharmehar	Whole	136.79
	ND 224 Bharyan	Whole	55.44
	ND 231 Dhanwan	Whole	50.2
	ND 233 Gagwan	Whole	29.55
	ND 234 Bulang	Whole	20.24
	ND 235 Dagwan	Whole	62.65
	ND 236 Ghaghtain	Whole	32.39
	ND 237 Sudhar	Whole	25.51
	ND 238 Kopaldhar	C-I	15.92
	ND 239 Bralang	Whole	56.66
	ND 240 Kungari	Whole	45.33
	ND 241 Kortang	Whole	191.42
	ND 245 Bhubhu	Whole	67
	ND 246 Wangan	Whole	161
	ND 247 Farehar	Whole	67.61
	ND 248 Sawar	Whole	12.14
	ND 249 Taldhar	Whole	21.86
	ND 250 Hurang	Whole	17.81
	ND 251 Thaltu	Whole	40.87
	ND 252 Sangdhar	Whole	109.27
	ND 253 Balgan	Whole	40.89
	ND 256 Kathog	Whole	83.87
	ND204 MathiBajgan	Whole	38.85
URLA	ND 121 Mayot-II	Whole	29
	ND 122 Khalyal	Whole	9.6
	ND 124 Jhanjerawari-Iind	Whole	22.26
	ND 127 Barot	C-II	38.48
		C-III	16.19
	ND 128 Sartwaj	Whole	71.68
	ND 133 Siriphat	C-I	80
		C-II	100
	ND 134 Dalausa	C-I	194
		C-II	74
	ND 135 Markhan-II	Whole	50
	ND 137 Sarchnala	C-I	32
		C-III	40
	ND 138 Jhatingari	Whole	71.6
	ND 140 Satnog	Whole	175.2
	ND 143 Barthwan	Whole	49.6
	ND 149 Pharah	Whole	34.8
	ND 158 Lakhwan	C-III	28.44
	ND 161 Silhswad	Whole	92

	ND 173 Thorat New	Whole	74.8
	ND 180 ChabBhararu	Whole	94.4
	ND 181 Saprak	Whole	46.3
	ND 182 Bhagwahar	Whole	22
	ND 186 Rajhaun	Whole	55.6
	ND 187 Radhan	Whole	102
	ND 190 Nausha -2	Whole	19.6
	ND 191 Badwahan	Whole	32.8
	OD 120 Mayot-I	C-II	35.97
	OD 132 Jamtehar	C-IIb	39.7
	OD 142 Badhaundhar	Whole	72.8
	OD 160 Silhswar	C-I	42.49
	OD 176 Kadoond	C-VI	45.62

B: UPF

S.N	Range	Block	Beat	Status	Name of Forest	Area (in ha.)
1		Chountra	U/Chountra	UPF	Patku	16
2		Chountra	Chountra	UPF	Ghatta	5
3		J/Nagar	J/Nagar	UPF	Dhalu	2
4		J/Nagar	J/Nagar	UPF	GarhnalIst	5
5		J/Nagar	J/Nagar	UPF	Garnal-I	10
6		Bhararu	Drubal	UPF	Jalar	10
7		Chountra	Upper Chountra	UPF	Bag	5
8		Bhararu	Bhararu	UPF	Khraun	30
9		Bhararu	Bhararu	UPF	Bharu	5.26
10		Bhararu	Bhararu	UPF	Bagru	5
11		Bhararu	Nainpur	UPF	Silh	6
12		Bhararu	Nainpur	UPF	Chhamb-I	7
13		Bhararu	Nainpur	UPF	Chhamb – II	13
14		Bhararu	Nainpur	UPF	Langha	6
15		Bhararu	Nainpur	UPF	Batnaheer	7
16		Bhararu	Nainpur	UPF	Ghagasnal	3
				Total	16	135.26

17	Lad Bharol	Daled	Panjalag	UPF	GadiaraC.I	15
18		Daled	Panjalag	UPF	Gadiara C.2	12
19		Daled	Panjalag	UPF	Julgan	20
20		Daled	Panjalag	UPF	Sanahali	9
21		Daled	Panjalag	UPF	Manglod	3
22		Daled	Panjalag	UPF	Antola /Dohda	4
23		Daled	Daled	UPF	Balhaara	6
24		Daled	Outpur	UPF	Gawala	7
25		Pandol	Pandol	UPF	Ghaniroo	20
26		Pandol	Pandol	UPF	Taprehar	5
27		Pandol	Pandol	UPF	Taurkaral	3
28		Pandol	Barnod	UPF	Chhuhar	15
29		Pandol	Golwan	UPF	Sanan Khera	7
30		Pandol	Barnod	UPF	Mattogarh	8
31		Pandol	Barnod	UPF	Chir Bajrala	15
32		Pandol	Barnod	UPF	Chhular Bharer	5
33		Pandol	Barnod	UPF	Namelari	13
34		Pandol	Barnod	UPF	Dugh	9
				Total	18	176
35	Urla	Chukku	Khajri	UPF	Punhara	10
36		Urla	Silhswar	UPF	Barahtu	200
37		Chukku	Khajri	UPF	Banog	15
38		Chukku	Chukku	UPF	Salahara	10
39		Chukku	Chukku	UPF	Ghajiwana	10
40		Chukku	Khajri	UPF	Khajari	10
41		Chukku	Khajri	UPF	Lower Khajari	30
42		Urla	Thorat	UPF	Lundra	5
				Total	8	290
43	Dharampur	Dharam pur	Dharam pur	UPF	Banal	6
44			Dharam pur	UPF	Sarskan	1

45		Dharam pur	Dharam pur	UPF	Kushari	5
46			Dharampur	UPF	Riur	8
47		Mandap	Brang	UPF	Morla	32
48			Brang	UPF	Brang	36
49			Brang	UPF	Bhdiyar	26
50			Baroti	UPF	Baroti	15
51			Baroti	UPF	Maloun	24
52			:Baroti	UPF	Baral	10
53			Ludhiana	UPF	Banerdi	51
54			Ludhiana	UPF	Jatehari	15
55			Ludhiana	UPF	Dhawali	5
56			Ludhiana	UPF	Hayolag	21
57			Ludhiana	UPF	Pehad	5
58			Ludhiana	UPF	Gehra	4
59			Ludhiana	UPF	Kumardha	2
				Total	17	266
60	Kamlah Range	Sandhole	Sandhole	UPF	Chamehar	8
61		Tihra	Masot	UPF	Manyoh	12
62			Tihra	UPF	Sakota	15
63		Kamlah	Sherpur	UPF	Seri	14.52
64			Sherpur	UPF	Sherpur	11.07
65			Dodar	UPF	Binga	22.42
66				UPF	Phihar	7.24
67				UPF	Churu-Ra-Balh	2.82
				Total	8	93.07
68	Tikken Range	Tikken	Tikken	UPF	Khaban	26
69			Tikken	UPF	Bardhan	21
70			Tikken	UPF	Lachkandhi	5
71			Tikken	UPF	Kuljhan	19
72			Tikken	UPF	Lachhayan	33
73			Tikken	UPF	Chelang	1.75
74			Tikken	UPF	Dhamchyan	8.02
75			Tikken	UPF	Bajot	1.43

76			Tikken	UPF	Singdhar	5.51
77			Tikken	UPF	Bhamchawan	17
78			Thuji	UPF	Thuji	24
79			Thuji	UPF	Galu	38
80			Thuji	UPF	Dharangan	18
81			Thuji	UPF	Rulang	220
82			Thuji	UPF	Deodar	345
83			Boaching	UPF	Lapas	13
84			Boaching	UPF	Boaching	16
85			Boaching	UPF	Kadhiyan	12
86			Boaching	UPF	Kashmal	18
87			Boaching	UPF	Sahan	52
88		Deogarh	Deogarh	UPF	Latrain	25
89			Deogarh	UPF	Madherwan	166
90			Deogarh	UPF	Mathi Bajgain	17
91			Graman	UPF	Draggari	122
92			Graman	UPF	Garhgaoun	216
93			Graman	UPF	Dhar	40
94			Graman	UPF	Tarswan	32
95			Graman	UPF	Terange	67
96			Graman	UPF	Graman	242
97			Graman	UPF	Pagounde	237
98			Graman	UPF	Durman	90
99			Graman	UPF	Dharmehar	203
100		Silh budhani	Silh budhani	UPF	Silhbudhani	21
101			Silh budhani	UPF	Dhamwan	20
102			Silh budhani	UPF	Sawar	6
103			Silh budhani	UPF	Kartong	15
104			Silh budhani	UPF	Graman	23
105			Silh budhani	UPF	Kungri	100
106			Silh	UPF	Kalangehar	12

			budhani			
107			Silh budha	UPF	Silh	39
108			Hurang	UPF	Ferhar	21
109			Hurang	UPF	Kathog	39
110			Hurang	UPF	Hurang	12
111			Hurang	UPF	Bhared	2
112			Hurang	UPF	Sawar	6
				Total	42	2666.71
			G.Total	109	3627.04	

5.8 ANALYSIS & VALUATION OF THE CROP:

5.8.1 STOCK MAPS:

All the demarcated protected forests have been stock mapped and have been placed in the concerned compartment history files. Undemarcated protected forests more than 2hac have also been stock mapped.

5.8.2 Site Quality and Age classes:

On the basis of assessment of the forests, the site qualities of Chil, Deodar, Kail, Fir, Spruce and Oak varies from I/II to III. The age classes vary from young to middle aged with fair proportion of mature trees and few over mature trees. Crop composition, site quality and enumeration data have been recorded in the concerned compartment history files of the forests.

5.8.3 Density

This has been ocularly assessed and incorporated in the concerned compartment history files. The density is moderate and varies from 0.5 to 10 with an average of 0.6.

5.9 ENUMERATIONS:

5% enumerations were carried out in order to assess the growing stock. The enumeration results are given in compartment history files and the growing stock is tabulated as under:

List of Class and Volume of Trees in Protection Working Circle

Table 5.2: Total Number of Trees in Different Diameter under Protection WC

TOTAL NUMBER OF TREES IN DIFFERENT DIAMETER UNDER PROTECTION WC

Class&Vol	Species								Grand Total
	Ban	BL	Chil	Deodar	Kail	Khair	Pi pal	Rai Tosh	
Class-V	534885	482921	142912	44171	27764	14509	15	19903	1267080
Vol-V	0	0	5716.48	2650.26	1665.84	1668.535	0	13932.1	25633.215
Class-IV	405852	318574	174264	35046	24686	6407	2	11115	975946
Vol-IV	113638.56	95572.2	24396.96	8060.58	5677.78	1396.726	1	3112.2	251856.006
Class-III	245852	172690	80868	25507	19531	6288	3	17454	568193
Vol-III	206515.68	120883	33964.56	17854.9	13671.7	3332.64	3	14835.9	411061.38
Class-IIA	163861	66114	21130	11585	7268	626	0	5798	276382
Vol-IIA	278563.7	85948.2	26835.1	16334.85	10247.88	655.422	0	9856.6	428441.752
Class-IIB	99915	35373	9788	5518	3732	322	0	9660	164308
Vol-IIB	253784.1	77820.6	20750.56	13574.28	9180.72	413.126	0	28690.2	404213.586
Class-IA	57860	10923	3463	3256	1781	187	0	8988	86458
Vol-IA	179944.6	36045.9	10285.11	11526.24	6304.74	239.921	0	38199	282545.511
Class-IB	37648	8407	138	781	736	0	0	6257	53967
Vol-IB	128003.2	38672.2	586.5	3865.95	3643.2	0	0	37166.58	211937.63

Class-IC	19423	12749	1389	176	1040	0	0	12173	46950
Vol-IC	66038.2	80318.7	7070.01	1180.96	6978.4	0	0	93001.72	254587.99
Class-ID	1588	4129	52	138	0	0	0	3776	9683
Vol-ID	5399.2	33032	308.88	1073.64	0	0	0	35267.84	75081.56
Total-Class	1566884	1111880	434004	126178	86538	28339	20	95124	3448967
Total Volume	1231887.24	568292.8	129914.16	76121.66	57370.26	7706.37	4	274062.14	2345358.63

5.10 SILVICULTURAL SYSTEM:

As no fellings or exploitations other than marking to the local right holders are proposed in Treatments Prescribed

- i) The gaps in the forests will be filled up artificially. Sowing and planting will be resorted to. Species best suited to the areas will be preferred and no attempt will be made to replace the local species or to plant exotics.
- ii) The broadleaved species will be preferred in UPFs to meet the requirement of fuel and fodder. The forest shall be closed in phased manner to improve their stocking. However, the species required to be planted in the areas, have been recorded in the respective compartment history files.
- iii) Green felling will not be allowed from these forests except salvage removal for meeting the bonafide demand of right holders.
- iv) These forests will be protected from soil and water conservation, aesthetic and tourist point of view besides maintaining the mountain ecological balances.

Hence for these forests, no silvicultural system is prescribed.

5.11 ROTATION:

The forests allotted to this working circle are to be preserved in order to protect the hill sides against denudation and soil erosion; hence no exploitation works are to be carried out and the rotation therefore would be physical one depending upon the natural longevity of the trees.

5.12 PLANTATION PROGRAMME:

Culturable blanks are proposed to be planted. Species which are best suited for the areas concerned and according to the natural trend of vegetation are to be planted. Fodder trees should be preferred. The planting programme is given as under:

Table 5.3: The planting programme

years	Name of Range	Name of area	Area in Ha.	Working Circle
2022-23	Jogindernagar	Trimunda	6.00	Protection
2022-23	Jogindernagar	DPF Channagdhar	5.00	Protection
2022-23	Jogindernagar	DPF Channagdhar	5.00	Protection
2022-23	Jogindernagar	DPF Diglidhar	10.00	Protection
2022-23	Jogindernagar	Suhidhar	6.00	Protection
2022-23	Jogindernagar	Suhidhar	10.00	protection
2022-23	Urla	Bari Jharwar	2.00	Protection
2022-23	Urla	Shila Swad	10.00	Protection
2022-23	Urla	DPF Kalu Bagla	10.00	protection
2022-23	Lad Bharol	DPF T/dhar-2nd	2.00	Protection
2022-23	Lad Bharol	Mata Goli-ri-Rihadi	5.00	Protection
2022-23	Lad Bharol	Khole Ra-Phat	5.00	Protection
2022-23	Lad Bharol	Khudda-Ri-Rihadi	5.00	Protection
2022-23	Lad Bharol	Bhaboridhar DPF	20.00	Protection
2022-23	Lad Bharol	Bhedkawali	10.00	Protection
2022-23	Lad Bharol	kakkarpani	10.00	Protection
2022-23	Lad Bharol	DPF Barnod	20.00	Protection
2022-23	Dharampur	Beri	3.00	Protection
2022-23	Kamlah	DPF Sadhoti	6.50	Protection
2022-23	Kamlah	DPF Dodar	38.49	protection

2022-23	Kamlah	DPF Sarohali	5.00	Protection
2022-23	Kamlah	DPF Manyoh	20.00	Protection
2022-23	Kamlah	DPF Sadhoti	20.00	Protection
2022-23	Kamlah	DPF Jandar	20.00	Protection
2022-23	Tikken	Pajound	4.00	Protection
2022-23	Tikken	Terang	4.00	Protection
2022-23	Tikken	Dwandehra	3.00	protection
2023-24	J.Nagar	DPF Channag Dhar	10.00	Protection
2023-24	J.Nagar	DPF Digli Dhar	10.00	Protection
2023-24	J.Nagar	Suhi Dhar	4.00	Protection
2023-24	J.Nagar	DPF Ropri	15.00	Protection
2023-24	J.Nagar	Nag nalla	5.00	Protection
2023-24	J.Nagar	KudnuDarkoti Dhar	5.00	Protection
2023-24	Urla	Punahali	10.00	Protection
2023-24	Urla	Fag Rihda	5.00	Protection
2023-24	Urla	Satnog	10.00	Protection
2023-24	Lad bharol	Tameshwari Dhar 1 st	2.00	Protection
2023-24	Lad bharol	DPF Bhabori Dhar	3.00	Protection
2023-24	Dharampur	Didnoo	1.00	Protection
2023-24	Kamlah	Sandhoti	2.00	Protection
2023-24	Tikken	DPF Richunal	3.00	Protection
2023-24	Tikken	DPF Kathog	2.00	Protection
2024-25	J.Nagar	DPF Bhabhoridhar	4.00	Protection
2024-25	J.Nagar	DPF Bagra	3.00	Protection
2024-25	Dharampur	Ghera	2.00	protection

2024-25	Kamlah	Sahan	1.00	Protection
2025-26	J.Nagar	DPF Ramsi	6.00	Protection
2025-26	J.Nagar	DPF Bhadyara	4.00	Protection
2025-26	Lad bharol	DPF Gokhu C-I	3.00	protection
2025-26	Lad bharol	DPF Khuddi	2.00	Protection
2025-26	Lad bharol	DPF Nageshwar Mahadev	3.00	protection
2025-26	Lad bharol	DPF Tamesh waridharIInd	2.00	Protection
2025-26	Tikken	DPF Lambachak	2.00	Protection
2026-27	J.Nagar	DPF Silh	5.00	Protection
2026-27	Urla	DPF Barthwan-Bhurju	2.00	Protection
2026-27	Lad bharol	DPF Gokhu C-I	2.00	Protection
2026-27	Kamlah	kamlah	2.00	Protection
2026-27	Tikken	DPF Terang	2.00	Protection
2027-28	J.Nagar	Tramat	4.00	Protection
2027-28	Lad bharol	DPF Jahanu-Bayotu	2.00	Protection
2027-28	Dharampur	DPF Morahdhar	1.00	Protection
2027-28	Kamlah	DPF Jandar	1.00	Protection
2027-28	Tikken	DPF kotang	5.00	Protection
2027-28	Tikken	DPF Rajban	2.00	Protection
2027-28	Tikken	DPF Tarswan	2.00	Protection
2028-29	J.Nagar	DPF Bindh	7.00	Protection
2028-29	Urla	DPF Chabh-Bhararu	10.00	Protection
2028-29	Lad bharol	DPF Khaddar	2.00	Protection
2028-29	Kamlah	Deogarh	1.00	Protection
2028-29	Tikken	DPF Shangdhar	2.00	Protection

2029-30	J.Nagar	DPF Sukkar	3.00	Protection
2029-30	J.Nagar	DPF Dugagehan	4.00	Protection
2029-30	Tikken	DPF Daintnalla	2.00	Protection
2030-31	J.Nagar	DPF Suhidhar	3.00	Protection
2030-31	J.Nagar	DPF Makaini	4.00	Protection
2030-31	Dharampur	Kounsai	2.00	Protection
2030-31	Tikken	DPF kapaldhar	4.00	Protection
2031-32	Kamlah	DPFManyoh	1.00	Protection
2031-32	Tikken	DPF Kungri	3.00	Protection
2031-32	Tikken	DPF Dhanwan	10.00	Protection

5.13 SUBSIDIARY SILVICULTURAL OPERATIONS:-

5.13.1 Sowing and Planting

Regeneration in most of the forests of this working circle is satisfactory. However, some forests are partly re-stocked and needs to be stocked by resorting to artificial planting in P. bags.

5.13.2 Direct Sowing

Patches of 45 cm x 45 cm x 45 cm should be made at 3 meters apart and soil should be dug to a depth of 15-20 cms and well pulverized cow dung and insecticide in proportionate, should be mixed with soil. The acorns should be sown about 2 cm deep, just before the onset of monsoon rains. For sowing 1.0 ha. of area, about 10 kg seeds are sufficient. The seeds are germinated during the monsoon and takes about two to five weeks. The seed collected in the same year gives 60-70% germination success. Weeding and bush cutting shall be done once during the first year and once during the second year after the monsoon is over. The sown areas should be protected against grazing, fire and other biotic interferences.

5.14 Regeneration Assessment

It is also to be carried out by territorial staff for under stocked areas after every 5 years. In case regeneration does not keep pace satisfactorily corrective measures shall be taken to restock the area in prescribed time.

5.15 Tending Operations

5.15.1 Cleaning

Cleaning in coppiced areas worked in the past shall be done judiciously and

vigorous shoots per stump shall be retained. The sowing and planting will also be cleaned of congestion and shrub growth.

5.15.2 Thinning

Thinnings also to be carried out in coppiced areas depending on the density of crop. The operations will be required in young crops, and shall be carried out as and when necessary. The number of shoots on each stumps shall be reduced to two to three. The mention of required thinning has been made in the CH files and these removals by way of thinning can be best utilized for the fence posts.

5.16 Other/Miscellaneous Regulations

5.16.1 Grass Cutting

Grass cutting in the area under regeneration should be restricted for at least first 2 to 3 years but may be permitted after that depending upon the success and that too at the discretion of Range Officer.

5.16.2 Lopping

Lopping should not be allowed in the forests already heavily lopped. In case of Oak it has seeds on two year shoots, so strict enforcement of exercise of rights is required in the forests allotted to this working circle. The lopping may be allowed in other areas strictly on silvicultural principles.

5.16.3 Monkey Damage

All care should be taken to protect the young Oak plants from damages caused by monkeys.

5.16.4 Right Holder Requirement

The requirements of right holders in respect of fuel wood and timber for agricultural implements shall be met with from dead, uprooted and fallen trees.

5.16.5 Fire Protection

All the forests allotted to this circle and plantations carried out will be strictly protected against fire specially the chil and oak forests which are prone to fire.

5.16.6 Soil Conservation Measures

Soil conservation measures alongwith afforestation, will be taken up as per availability of the funds, in the forests which are denuded and under active erosion.

5.16.7 Closure

All areas where plantation is to be done will be closed till plants reaches above the damage of browsing, fire etc. i.e. till they reach a height of 3m or more. However, grass cutting may be permitted at the discretion of RO subject to the condition that it may not cause soil erosion or may not hamper in the growth of the plantations. The list of forest/ areas requiring sowing /planting under this working circle is given in table-5.2 .

CHAPTER VI

6 THE PLANTATION WORKING CIRCLE

6.1 GENERAL CONSTITUTION OF WORKING CIRCLE

Human population has increased manifold and is further increasing day by day. Their requirements for fuel-wood, fodder, timber, NTFP and water has also increased manifold thereby putting pressure on traditional forests which in turn are degrading day by day. Now, time has come when each and every corner of earth (land) is put to use economically as per land capabilities. This working circle comprises the area of previous working plan. Only such areas will be included which have site factor favorable for raising plantations, closure is possible, in view of the fact that not more than one third area of a forest can be closed at a time and where the resultant plantations will be economically viable. The areas adjacent to village habitations where the species of local requirement of fodder and fuel can be raised are also included in this working circle. The depleted scrub forests and the plantations raised in the plan period but not fully established are also included in this working circle. Focus will be on restoring the species composition from timber centric to other useful species for fuel, fodder, NTFPs. Total area of this working circle is 4513.80 ha.

6.2 GENERAL CHARACTER OF VEGETATION

Since the forests assigned to this working circle are situated in different altitudinal zone, therefore, the vegetation varies. These forests are either blank or poorly stocked by mixed deciduous species, with some coniferous trees. There is heavy pressure of grazing, lopping, grass cutting and browsing in these areas. Detailed description of each forest is posted in the respective compartment history files.

However, the major coverage is in the lower elevation and vegetation whatsoever present conforms mainly to the following forests types: -

1. 9/C1B Upper or Himalayan Chil pine
2. 9/C1/DS1 Himalayan sub tropical Scrubs
3. 9/C1/DS2 Sub tropical Euphorbia Scrubs
4. 10/C1 Olea Ferruginea Scrub forests.

6.3 PLANTATION SERIES

There will be only one plantation series, the division being the unit for the purpose of control.

6.4 AREA STATEMENT UNDER PLANTATION WC: -

Table 6.1: AREA STATEMENT UNDER PLANTATION WC

Sr. No.	Range	Area (Ha.)
1	DHARAMPUR	543.74
2	JOGINDERNAGAR	1094.59
3	KAMLAH	777.95
4	LADBCHAROL	1623.4
5	URLA	474.12
6	TIKKAN	--
Grand Total		4513.8

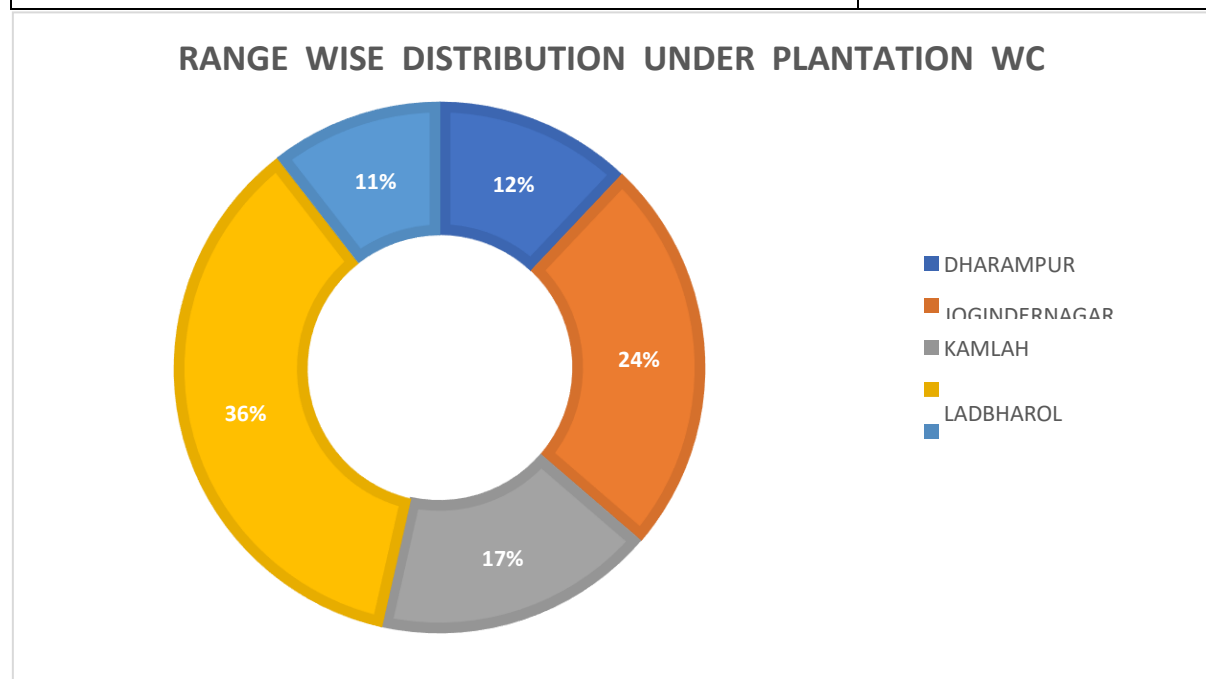


Figure-13

6.5 SPECIAL OBJECTIVES OF MANAGEMENT

The special objects of management are: -

1. To raise plantations of suitable species of bio-diversity importance and augment forest resources of the area in order to meet the demand of the local right holders for fire woods, fodder etc.
2. To conserve soil and water conservation through afforestation.
3. To rehabilitate degraded area, low density and blank areas to

increase forest cover so as to reduce the pressure on the existing forests.

4. To introduce economically important NTFP suitable to the locality and to promote income generating activities under JFM programme.
5. To execute works through participatory management made use PRA technique for monitoring as well by providing special assistance of JFM.
6. To raise plantations of suitable species of bio-diversity importance and augment forest resources of the area in order to eradicate the problem of Alien Invasive species.
7. To train staff and labour regarding planting techniques and also that of nursery techniques.

6.6 LIST OF PLANTATIONS WORKING CIRCLE AREAS

Table 6.2: LIST OF PLANTATIONS WORKING CIRCLE AREAS

Sr. No.	Range	Forest Name	Compartment	Area (Ha.)
1	DHARAMPUR	ND 424 Janetari	C-I	80.29
			C-II	57.21
2		ND 425 Giun	Whole	15.62
3		ND 426 Janetari (P)	C-I	23.97
			C-II	57.84
4		ND 427 Mahan	C-II	19.5
5		ND 431 Kounsai	Whole	29.86
6		ND 432 Chouns	C-II	57.32
7		ND 433 Narwhal	Whole	54.8
8		ND 434 Jol	Whole	6.86
9		ND 435 Balhra	Whole	6.58
10		ND 436 MathiBanwar	Whole	8.5
11		ND 437 Chhapanu	Whole	12.7
12		ND 438 Langha	C-I	26.65
			C-II	16.5
13		ND 441 Bardana	Whole	11.77
14		ND 447 Bahi-I	Whole	4.26
15		ND 448 Bahi-II	C-III	27.4
16		OD 439 Kheri	Whole	26.11
17	JOGINDER NAGAR	ND 113 Awayar	C-I	30
18		ND 114 Badan	C-II	64

19		ND 115 Chiladhar	C-I	14
20		ND 24 Thathar Dhar	Whole	23.6
21		ND 39 Baila	Whole	14
22		ND 4 Ghatta Gala	Whole	6
23		ND 42 BasahiRakh	Whole	7.69
24		ND 48 Choranjh	C-II	5
25		ND 51 Pipli	Whole	11.2
26		ND 52 Ghaneytar	Whole	3.2
27		ND 53 Bharyahu	Whole	5.2
28		ND 56 Manaru	Whole	19.6
29		ND 57 Batnahar	Whole	8.8
30		ND 58 Chanehar	Whole	5.2
31		ND 59 Majhakar	Whole	27.2
32		ND 6 Ahjoo-I	Whole	10
33		ND 62 Silh	C-II	13.2
34		ND 65 Atharh	Whole	123.6
35		ND 69 Nagdyara	Whole	21.2
36		ND 70 Bir Dhar 1st	Whole	2.8
37		ND 71 Bir Dhar 2nd	Whole	8
38		ND 72 Bir Dhar 3rd	Whole	8
39		ND 74 Bagru	Whole	23.6
40		ND 75 Ghorl	C-I	85
			C-II	81.8
41		ND 76 Makaura	C-I	92
			C-II	32.4
42		ND 77 Gaduhi	Whole	36.4
43		ND 80 Bindh	C-II	40
44		ND 81 Kharon	C-II	32
			C-III	72
45		ND 86 Manoh	Whole	39.2
46		ND 87 Chaprot	Whole	37.2
47		ND 90Harabag 1st	Whole	5.2
48		OD 5 Ahjoo II	C-II	25.91
			C-III	29.21
			C-IV	31.18
49	KAMLAH	ND 162 Sannu-Ri-Phet	Whole	29.5
50		ND 449 Mangletta (P)	Whole	11
51		ND 451 Ghorigarh	Whole	32.47
52		ND 452 Raksui	Whole	75.74

53		ND 454 Jaral Noun	Whole	144.76
54		ND 456 Pharsal	Whole	16.96
55		ND 458 Kuralu	Whole	89.64
56		ND 460 Dodar	C-I	16.96
			C-IV	32.77
57		ND 461 Manwadhar	C-I	21.77
58		ND 469 Bakari	Whole	23.69
59		ND 471 Masot-I	Whole	16.5
60		ND 472 Masot -II	Whole	11.89
61		ND 473 Baradhar	Whole	49.79
62		ND 474 Labha	Whole	6.46
63		ND 475 Tandu-I	C-I	41.95
64		OD 450 Mangletta	C-III	26.95
65		OD 457 Jander	C-II	82.56
			C-IV	32.77
66		OD 470 Masot	C-II	13.82
67	LADBHAROL	115 ND 695 SajanuNal	Whole	16.8
68		116 ND 694 ND Kotla	C-I	26.6
69		118 ND 697 ND Draman-II	C-III	32.8
			C-IV	56
70		119 ND 696 ND Kanja-Ra-Rasoa	C-I	50
			C-II	46
71		120 ND 701 ND Gokhu	C-II	88.4
72		121 ND 702 ND Dagu	C-I	40
			C-II	41.2
73		122 ND 712 ND Khaddar	Whole	7.6
74		124 ND 707 ND Mahot	C-II	17.6
75		125 ND 717 ND Tain	C-I	30
			C-II	20
			C-III	70
76		126 ND 714 ND JahanuBhaytu	C-II	9.2
77		127 ND 724 ND Chil Gujral	C-I	3
78		129 ND 722 ND Chil Chitra	C-II	11.4
79		133 ND 736 ND Barnod	C-I	25
			C-III	25.2
			C-IV	26
80		613 ND 692 ND Balu	C-I	12
81		614 ND 693 ND Palaun	C-I	24.6

82	617 ND 691 ND Draman-I	C-I	96
		C-III	54
		C-IV	60
		C-V	36
		C-VI	36
83	ND 698 ND Bindh	Whole	17.6
84	ND 699 ND Dakhnehar	Whole	49.2
85	ND 700 ND Kund	Whole	8.8
86	ND 704 ND TharaZazar	Whole	30.8
87	ND 705 ND Gulana	Whole	18.8
88	ND 708 ND Chakrahan	Whole	36.8
89	ND 709 ND Jharanger	Whole	3.2
90	ND 710 Nd Rahar	Whole	34.4
91	ND 711 ND Khuddi	Whole	11.6
92	ND 713 ND Fagla	C-I	16.4
93	ND 715 Nageshwar Mahadev	C-II	23.2
94	ND 716 ND Bhadrangan	C-I	28
		C-II	28
95	ND 718 Jamthala	Whole	4.4
96	ND 719 ND Droub	Whole	5.6
97	ND 721 ND Bagora	C-I,C-II	21.6
98	ND 723 ND Langesher	Whole	21.2
99	ND 725 ND Silh Kawar	Whole	21.6
100	ND 726 ND Kaleheru -I	Whole	6.8
101	ND 727 Kaleheru-II	Whole	7.2
102	ND 729 ND Ropri	Whole	15.6
103	ND 730 ND Lahari	Whole	18.4
104	ND 732 ND Katkal	Whole	3.6
105	ND 733 ND KatkalDadhan	Whole	10.4
106	ND 735 ND Gangoti	Whole	5.6
107	ND 737 Soun	Whole	16.4
108	ND 738 Soun- Pihar Behadaloo -II	Whole	9.6
109	ND 739 Soun- Pihar Behadaloo -I	Whole	6
110	ND 742 Thara	Whole	4
111	ND 743 Jalar	Whole	7.2
112	ND 744 Karsal	Whole	20

113		ND 745 Bhamba-ra-nal	C-I	25
			C-II	35
114		ND 746 Dugali	Whole	26.4
115		ND 748 Patnugarned-I	Whole	30
116		ND 749 Patnugarned-II	Whole	10.4
117		ND 751 Lohla	Whole	4
118		ND 755 Kufroo	Whole	7.2
119		ND 757 Tansal	C-I	12
120	URLA	ND 136 Markhan-I	Whole	5.2
121		ND 147 Satiphkot	C-I	20
			C-II	12
122		ND 148 Dhalyan	C-II	120.8
123		ND 154 Gawali-II	Whole	6
124		ND 156 Urla	Whole	3.2
125		ND 157 Hiun	C-I	32.35
			C-II	14.45
126		ND 158 Lakhwan	C-I	20
			C-II	20
127		ND 159 Chunkoo Padhar	Whole	7.6
128		ND 162 Nagwan	Whole	8
129		ND 163 Kadhar-II	Whole	7.2
130		ND 164 Kadhar -I	Whole	8
131		ND 165 Siyarunala	Whole	22
132		ND 166 Chiladhar	Whole	34
133		ND 169 Har -I	Whole	9.31
134		ND 170 Har-II	Whole	34.7
135		ND 183 Batnagar-I	Whole	42.8
136		ND 184 Batnagar-II	Whole	24.4
137		ND 185 Batnagar-III	Whole	8.91
138		ND 188 Roprinal	Whole	3.6
139		ND 193 Mulsoo	Whole	3.6
140		OD 152 Dibkan	C-Ic	6
Grand Total				4513.8

6.7 ANALYSIS AND VALUATION OF CROP:

6.7.1 Stock Maps:

Stock Maps of all the compartments of this working circle have been prepared and placed in the respective compartment history files.

6.7.2 Density:

These areas are mostly blank or sparsely covered with trees and bushes. The quality in general is poor. Density is estimated ocularly which in general is below average and recorded in the respective compartment history files.

6.8 ENUMERATIONS:

These forests are almost blank and 5% stratified random sampling has been carried out for the enumeration purpose to know the growing stock total and per ha. number and volume of various species in plantation working circle.

6.9 SILVICULTURAL SYSTEM

As the main objective is to raise plantations, no silvicultural system is prescribed. The plantations will be raised by artificial means. However, as and when plantations are established, areas as per crop composition will be allotted to respective working circles in next working plans.

6.10 CHOICE OF SPECIES:

The Choice of Species to be planted will vary according to the altitudinal zone and locality factors. Species best suited to the locality and which can fulfill the demand of fuel, fodder and timber will be preferred. Planting of exotic species will be avoided in general; the broad leaved species like Khair, Sheesham, Bamboos, Robinia, Darek etc. will be preferred in lower zone. Chil will be preferred for rocky portions in between 800 to 1500 meters. Deodar and kail will be raised between 1500 to 2500 meters. However, fir/spruce and walnut etc. will be planted in between 2500 to 2800 meters. The specific entries regarding choice of species have been made in the general recommendations for different altitudinal zones are as under:

Table-6.4 Suggested list of species to be planted according to altitudinal zone

Altitude	Species suggested for plantation
Up to 1000 metres	Shisham, Bamboo, Khair, Ritha, Toon, Bihul, Siris, Khirk, Kachnar, Daru, Harar, Bahera
1000 to 1500 metres	Robinia, Bihul, Toon, Ritha, Kachnar, Willow, Leucaenia, Bamboo, Khair, Khirk, Kikker, Daru, Hill Poplar

1500 to 2500 metres	Deodar, Walnut, Hill Poplar, Willow, Robinia, Ban Oak, Horse Chestnut
2500 to 3000 metres	Silver Fir, Maple, Walnut, Moru Oak, Bird Cherry, Ash, Hill Poplar

However, DFO has liberty for planting different species depending on locality factors and site quality.

6.11 PLANTATIONS CARRIED OUT IN J/ NAGAR FOREST DIVISION FROM 1999-2000 TO 2021-22.

Table 6.3: Plantations carried out in Joginder Nagar Forest Division from 1999-2000 to 2021-22

PLANTATIONS CARRIED OUT IN JOGINDER NAGAR FOREST DIVISION FROM 1999-2000 TO 2021-22			
S.N	Year of Plantation	Name of Range	Area in ha.
1	1999-2000	J.Nagar	125
		Urla	152.5
		Lad bharol	171.5
		Dharampur	199
		Kamlah	130
	Total		778
2	2000-01	J.Nagar	91
		Urla	122
		Lad bharol	144
		Dharampur	114
		Kamlah	110
	Total		581
3	2001-02	J.Nagar	70
		Urla	138.5
		Lad bharol	78.25
		Dharampur	85.5
		Kamlah	72
	Total		444.25
4	2002-03	J.Nagar	32
		Urla	70
		Lad bharol	59
		Dharampur	50
		Kamlah	48
	Total		259
5	2003-04	J.Nagar	50.3
		Urla	93.5
		Lad bharol	54.5

		Dharampur	56
		Kamlah	47
	Total		301.3
6	2004-05	J.Nagar	82.5
		Urla	53.5
		Lad bharol	51
		Dharampur	39.5
		Kamlah	41.5
	Total		268
7	2005-06	J.Nagar	133.5
		Urla	201
		Lad bharol	79
		Dharampur	92
		Kamlah	61.5
	Total		567
8	2006-07	J.Nagar	234
		Urla	557
		Lad bharol	216
		Dharampur	234.3
		Kamlah	327.5
	Total		1568.80
9	2007-08	J.Nagar	110
		Urla	88
		Lad bharol	90
		Dharampur	185.5
		Kamlah	107
	Total		580.5
10	2008-09	J.Nagar	97.53
		Urla	59.5
		Lad bharol	63.6
		Dharampur	68.96
		Kamlah	58
	Total		347.59

11	2009-10	J.Nagar	65
		Urla	78
		Lad bharol	55
		Dharampur	80.5
		Kamlah	67
	Total		345.5
12	2010-11	J.Nagar	80
		Urla	50
		Lad bharol	37
		Dharampur	41
		Kamlah	39
	Total		247
13	2011-12	J.Nagar	11
		Urla	30.55
		Lad bharol	17
		Dharampur	20.5
		Kamlah	17
	Total		96.05
14	2012-13	J.Nagar	88.55
		Urla	59.17
		Lad bharol	41.4
		Dharampur	31.23
		Kamlah	40
	Total		260.35
15	2013-14	J.Nagar	69
		Urla	21
		Lad bharol	30
		Dharampur	48
		Kamlah	55
	Total		223
16	2014-15	J.Nagar	79
		Urla	58
		Lad bharol	32

		Dharampur	40
		Kamlah	40
		Tikken	20
	Total		269
17	2015-16	J.Nagar	39
		Urla	46
		Lad bharol	21.6
		Dharampur	34.11
		Kamlah	35.5
		Tikken	34.8
	Total		211.01
18	2016-17	J.Nagar	19
		Urla	19
		Lad bharol	18
		Dharampur	20
		Kamlah	15
		Tikken	37
	Total		128
19	2017-18	J.Nagar	44
		Urla	28
		Lad bharol	29
		Dharampur	46
		Kamlah	37
		Tikken	14
	Total		198
20	2018-19	J.Nagar	24
		Urla	16
		Lad bharol	18
		Dharampur	26.5
		Kamlah	15
		Tikken	11
	Total		110.5
21	2019-20	J.Nagar	14.5
		Urla	28

		Lad bharol	10
		Dharampur	14
		Kamlah	43.5
		Tikken	22
	Total		132
22	2020-21	J.Nagar	17
		Urla	12
		Lad bharol	21.5
		Dharampur	123.5
		Kamlah	33.5
		Tikken	18.5
	Total		226
23	2021-22	J.Nagar	17.02
		Urla	29.976
		Lad bharol	9
		Dharampur	8
		Kamlah	16.58
		Tikken	4
	Total		84.576

6.12 Proposed Plantation Programme

Sno	year	Name of Range	Name of area	Area in hac
1	2022-23	Jogindernagar	DPF Siyuri C-III	2hac
			DPF Siyuri C-IV	4hac
			DPF Jalpa	2hac
			DPF Bihun	2hac
			DPF Kumharda	3hac
			Trimunda	6hac
			Jalpa	10hacs
			Panjagan	4hac
			DPF Channagdhar	5hac
			DPF Channagdhar	5hac
			DPF Diglidhar	10hac
			Suhidhar	6hac
			Suhidhar	10hac
			Jalpa	10hac

			Jalpa	10hac
			Siyuri C-IV	10hac
			Ode-Ra Phat	5hac
			DPF Kudnu Dharkotidhar	10hac
			DPF Hiun	1.5hac
			Total	115.5 ha
		Urla	Pundal(DPF kalu Bagla	10.2352
			Urla kharyan-III	2hac
			Nagan-III	5hac
			Kao	2hac
			Bari Jharwar	2hac
			Nichala thorat	10hac
			Shila Swad	10hac
			Fag Rehda	5hac
			DPF Mulsu	10hac
			DPF Kalu Bagla	10hac
			DPF Lakhwan	10hac
			DPF Kalu Bagla	10hac
			Total	86.2352
		Lad Bharol	DPF Saun	3.2hac
			DPF T/dhar-2nd	2hac
			Mata goli-ri-Rihadi	5hac
			Khole Ra-Phat	5hac
			Khudda-Ri-Rihadi	5hac
			DPF Barnod	5hac
			Daggu	5hac
			Daggu	5hac
			Bhargain saroon	5hac
			Gonthla	5hac
			Barnod DPF	10hac
			Pallani Re Rihadi	10hac
			Daggu	15hac
			Chira –ra-Phat	5hac
			Bhaboridhar DPF	20hac
			Bhedkawali	10hac
			kakkarpani	10hac

			DPF Barnod	20hac
			Total	145.2 ha
		Dharampur	Beri	3hac
			Malowa	2hac
			Total	5 ha
		Kamlah	DPF Sadhoti	6.5hac
			DPF Dodar	38.4934hac
			DPF Manwadhar	15hac
			DPF Sarohali	5hac
			DPF Manyoh	20hac
			Jaralnoun	20hac
			DPF Sadhoti	20hac
			DPF Tandu	20hac
			DPF Jandar	20hac
			DPF Ghorighar	20hac
			Total	184.9934 ha
		Tikken	Paound	4hac
			Terang	4hac
			Dharyan	2hac
			Rulang	5hac
			Sachan	5hac
			Dwandehra	3hac
			Total	23 ha
			G.Total	559.9286 ha
			2023-24	
2.	2023-24	J.Nagar	DPF Channag Dhar	10 ha
			DPF Digli Dhar	10 ha
			Suhi Dhar	4 ha
			DPF Siyuri	10 ha
			DPF Ropri	15 ha
			Nag nalla	2 ha
			Nag nalla	3 ha
			DPF Kudnu darkoti dhar	5 ha

			Total	59 ha
		Urla	Punahali	10 ha
			Fag Rihda	5 ha
			DPF Mulsu	10 ha
			DPF Lakhwan	10 ha
			Satnog	10 ha.
			DPF Dhalyan	7.14hac
			Total	52.14 ha
		Lad bharol	T/Dhar 1 st	2 ha.
			Chir Garjal	2 ha.
			Bhambe ra Nal	2 ha.
			DPF Bhabori Dhar	3 ha
			DPF Bhambe-Ra-Nal	5hac
			Total	14 ha
		Dharampur	Didnoo	1hac
			Total	1 ha
		Kamlah	Sandhoti	2hac
			Total	2 ha
		Tikken	DPF Richunal	3hac
			DPF Kathog	2hac
			Total	5 ha
			G.Total	133.14 ha
			2024-25	
3	2024-25	J.Nagar	DPF Bhabhoridhar	4hac
			DPF Bagra	3hac
			Total	7 ha
		Urla	Nagan	5hac
			Baddli	5hac
			Total	10 ha

		Lad bharol	DPF Barnod	2 ha
			Narholi	2 ha
			DPF Ropri	3 ha
			Total	7 ha
		Dharampur	Ghera	2hac
			Total	2 ha
		Kamlah	Sahan	1hac
			Total	1 ha
		Tikken	DPF Rangan	6hac
			Total	6 ha
			G.Total	32 ha
			2025-26	
4	2025-26	J.Nagar	DPF Ramsi	6hac
			DPF Bhadyara	4hac
			Total	10 ha
		Urla	DPF Mulsu	2ha
			Total	2 ha
		Lad bharol	Patnu Garnod	2 ha
			DPF Gokhu C-I	3 Ha
			DPF Khuddi	2 Ha
			DPF Nageshwar Mahadev	3 ha
			DPF Katkal Dadhon	3 ha
			T/dhar IInd	2hac
			Total	15 ha
		Dharampur	Janitary	2ha
			Total	2 ha
		Kamlah	Bakori	2ha
			Total	2 ha

		Tikken	DPF Latran	2ha
			DPF Lambachak	2ha
			Total	4 ha
			G.Total	35 ha
			2026-27	
5.	2026-27	J.Nagar	DPF Silh	5hac
			DPF Ghatta	3hac
			Total	8 ha
		Urla	DPF urla Kasyan	2hac
			DPF Barthwan- Bhurju	2hac
			Total	4 ha
		Lad bharol	DPF Gokhu C-I	2hac
			DPF Bhadrangan	3hac
			Total	5 ha
		Dharampur	Hayolog	2hac
			Total	2 ha
		Kamlah	kamlah	2hac
			Total	2 ha
		Tikken	DPF Bumchan	4hac
			DPF Terang	2hac
			Total	6 ha
			G.Total	27 ha

			2027-28	
6.	2027-28	J.Nagar	Tramat	4hac
			DPF Siyuri	6hac
			Total	10 ha

		Urla	DPF Chuku	10hac
			Total	10 ha
		Lad bharol	DPF Jahanu-Bayotu	2hac
			Total	2 ha
		Dharampur	Modhar	1hac
			Total	1 ha
		Kamlah	Jandar	1hac
			Total	1 ha
		Tikken	DPF kotang	5hac
			DPF Rajban	2hac
			DPF Tarswan	2hac
			Total	9 ha
			G.Total	33 ha

			2028-29	
7	2028-29	J.Nagar	DPF Bindh	7hac
			DPF Khalaihar	4hac
			Total	11 ha
		Urla	DPF Chabh-Bhararu	10hac
			Total	10 ha
		Lad bharol	DPF Khaddar	2hac
			Total	2 ha
		Dharampur	Bahi	1hac
			Total	1 ha
		Kamlah	Deogarh	1hac
			Total	1 ha
		Tikken	DPF Rulang	4hac

			DPF Madhuran	2hac
			DPF Shangdhar	2hac
			Total	8 ha
			G.Total	33 ha

			2029-30	
8.	2029-30	J.Nagar	Suppara	3hac
			Karanpurdhar	4hac
			Dugagehan	4hac
			Total	11 ha
		Urla	kalogh	2hac
			Total	2 ha
		Lad bharol	DPF Tain	3hac
			Total	3 ha
		Dharampur	oddi	1hac
			Total	1 ha
		Kamlah	Raksui	1hac
			Total	1 ha
		Tikken	DPF Daintnalla	2hac
			DPF Lachkandi	4hac
			Total	6 ha
			G.Total	24 ha

			2030-31	
9	2030-31	J.Nagar	Suhidhar	3hac
			Bihun	3hac
			Makariri	4hac
			Total	10 ha
		Urla	DPF Kalhog	5hac
			Total	5 ha
		Lad bharol	DPF khaddar	2hac

			Total	2 ha
		Dharampur	Kounsai	2hac
			Total	2 ha
		Kamlah	Talli	1hac
			Total	1 ha
		Tikken	DPF Jhukan	4hac
			DPF Thujji	2hac
			DPF kapaldhar	4hac
			Total	10 ha
			G.Total	30 ha
			2031-32	
10	2031-32	J.Nagar	Drahal	4hac
			Basahi Rakh	5hac
			Total	9 ha
		Urla	DPF upper Khajari	10hac
			Total	10 ha
		Lad bharol	Chorbar	2hac
			Total	2 ha
		Dharampur	Tanehar	2hac
			Total	2 ha
		Kamlah	Banyoh	1hac
			Total	1 ha
		Tikken	DPF Kungri	3hac
			DPF Dhanwan	10hac
			Total	13 ha
			G.Total	37 a

6.13 TREATMENT OF EXISTING PLANTATION

All existing young plantations must be strictly protected and tended properly. Maintenance operations such as fence repair, weeding, bush cutting, beating up of failures etc. should be carried out for a period of at least 5 years after the planting.

6.14 NURSERY

It is axiomatic that the degree of survival of plantations is directly linked to the quality of nursery stock raised in nurseries. More so, when we are faced with increasing swings in seasonal fluctuations, both in terms of erratic rainfall and rising temperatures. These recent changes in weather patterns exacerbate our historical woes of compacted soil, damage by fire and cattle and general lack of interest (and therefore concern) of local communities in our plantations. Vastly improved nursery stock can in a major way address most of these impediments coming in the way of establishing successful plantations in and outside forests. Few important qualities of any good nurseries would include:

- a) It should be large in size (atleast 0.5ha) so that it is cost effective and also proper infrastructure including water supply, germination chamber (poly-house), Mali-hut, soil mixing yard, vermicompost etc can be developed.
- b) Adequately trained, dedicated staff should be available in each nursery. Mali and labourers should be trained and guided from time to time about raising of quality stock.
- c) Each nursery should specialize in 5-6 species suited to the area and have large stock of each species, which is graded from time to time so that only quality stock goes for planting.
- d) Soil mixture is most vital component for raising quality stock. Thus, care must be taken not to compromise with quality of soil mixture (ideally 1:1:1 of soil: sand: vermicompost)

6.15 Tall Planting

One of the main reasons for failure of plantations is grazing / trampling by cattle. Also, drought, fire hazards contribute to failure. Thus, to overcome pressure of grazing and drought, planting of tall plants (above grazing height) with well developed root system and good collar girth is desirable. Such plants will be able to cope with droughts owing to their well-developed spread-out root system, will be above grazing height and thus will survive grazing pressure and their good collar girth will help them withstand trampling. Such plants can be raised in nurseries for which month-wise operation activity has

been given here.

Table-6.4 Raising of Deodar in Nurseries

Month	Activities for Raising Deodar
Nov-Dec Ist year activity	1. Sow seeds in trays filled with only Vermicompost. Keep the trays in polyhouse. (1 kg deodar seed contains 8000-10000 seeds approximately)
July (second year activity)	1. Prick the germinated seedlings in 9"x5" bags with potting mixture of 1:1:1 of sand :soil: vermicompost
July (Third Year activity)	1. Transfer to 9"x14" bag along with ball of earth, add some more soil at bottom and sides for raising tall [plants as per requirement at least 50% and keep rest as same for raising normal plants in 5"x9" p bags itself as per second year activity
July (Fourth year activity)	1. Normal plants of 2.5 years can be planted in normal plantations where as the tall plants will be kept as it for growth
July (Fifth year activity)	The tall plants of minimum height 90cm and collar diameter at least 1.1 cm will be tall plants as desired for effective plantation in the field

Similarly month wise activity chart for raising Ban is given here:

Table-6.5 Raising of Ban/Oaks in Nurseries

Month	Activities for Raising Ban/Oak
Nov	1. Sow seeds in fresh cow dung immediately after collection
	as oak seeds are viable only for 7-14 days.
Jan (1 st Year activity)	1. Prick the germinated seedlings in 9"x5" bags with potting mixture of 1:1:1 of sand :soil: vermicompost.
April to march (((second year activity)	1. Will be kept for one year in 5x9' p bags for growth

July (Third Year activity))	1. Transfer to 9"x14" bag along with ball of earth, add some more soil at bottom and sides for raising tall [plants as per requirement at least 50% and keep rest as same for raising normal plants in 5"x9" p bag as itself as per second year activity
July (Fourth year activity)	1. Normal plants of 2.5 years can be planted in normal plantations where as the tall plants will be kept as it for growth
July (Fifth year activity)	1. The tall plants of age 3.5 years , minimum height 90cm and collar diameter at least 1.1 cm will be tall plants as desired for effective plantation in the field.

Tall plants of other deciduous species will also be raised in a similar way as that of Oak, sowing time and technique will be as per species requirement. For further detail please refer to nursery raising protocol of the department for raising normal and tall plants dated 21.02.2018.

6.16 PLANTATION PROGRAMME:

There are essentially three types of areas constituting this working circle. First category comprises blanks or degraded under stocked forests which require rehabilitations through afforestation. Secondly, areas which are already planted but are not fully established till date. Third category consists of areas which have already been planted and are fully established but require tending operations, like cleanings and thinning to be carried out in such areas. The following programme for planting blanks and degraded areas is attached as under.

Table 6.8: Programme for planting blanks and degraded areas.

years	Name of Range	Name of area	Area in Ha.	Working Circle
2022-23	Urla	Pundal(DPF Kalu Bagla	10.24	Plantation
2022-23	Urla	DPF Lakhwan	10.00	Plantation
2022-23	Urla	DPF Kalu Bagla	10.00	Plantation
2022-23	Urla	DPF Hiun	1.50	Plantation
2022-23	Lad Bharol	DPF Saun	3.20	Plantation
2022-23	Lad Bharol	DPF Barnod	5.00	Plantation
2022-23	Lad Bharol	Daggu	5.00	Plantation
2022-23	Lad Bharol	Daggu	5.00	Plantation
2022-23	Lad Bharol	Bhargainsaroon	5.00	Plantation

2022-23	Lad Bharol	Gonthla	5.00	Plantation
2022-23	Lad Bharol	Barnod DPF	10.00	Plantation
2022-23	Lad Bharol	Pallani ReRihadi	10.00	Plantation
2022-23	Lad Bharol	Daggu	15.00	Plantation
2022-23	Lad Bharol	Chira –ra-Phat	5.00	Plantation
2022-23	Dharampur	Malowa	2.00	Plantation
2022-23	Kamlah	Manwa Dhar	15.00	Plantation
2022-23	Kamlah	Jaralnoun	20.00	Plantation
2022-23	Kamlah	DPF Tandu	20.00	Plantation
2022-23	Kamlah	DPF Ghorighar	20.00	Plantation
2023-24	Urla	DPF Mulsu	10.00	Plantation
2023-24	Urla	DPF Lakhwan	10.00	Plantation
2023-24	Lad bharol	Chir Garjal	2.00	Plantation
2023-24	Lad bharol	Bhambera Nal	2.00	Plantation
2023-24	Lad bharol	DPF Bhambe-Ra-Nal	5.00	Plantation
2024-25	Lad bharol	DPF Barnod	2.00	Plantation
2024-25	Lad bharol	Narholi	2.00	Plantation
2024-25	Lad bharol	DPF Ropri	3.00	Plantation
2025-26	Urla	DPF Mulsu	2.00	Plantation
2025-26	Lad bharol	PatnuGarnod	2.00	Plantation
2025-26	Lad bharol	DPF KatkalDadhon	3.00	Plantation
2025-26	Dharampur	Janitry	2.00	Plantation
2025-26	Kamlah	Bakori	2.00	Plantation
2026-27	Dharampur	Hayolog	2.00	Plantation
2029-30	Lad bharol	DPF Tain	3.00	Plantation
2029-30	Dharampur	DPF Oddi	1.00	Plantation
2029-30	Kamlah	DPF Raksui	1.00	Plantation
2030-31	Lad bharol	DPF khaddar	2.00	Plantation
2030-31	Kamlah	Talli	1.00	Plantation
2031-32	J.Nagar	DPF BasahiRakh	5.00	Plantation

6.17 Notification of Closures: -

Every area to be taken up for plantation should be notified for closure one year in advance. The period of closure may be 15-20 years.

6.18 Plantation Practices: -

Under the current departmental policy, a mixture of species in departmental plantations is required in the following proportion: -

30% medicinal trees suitable for the area, 20% wild fruit trees suitable for the area and the remainder to be the main species of the forest type either conifers or broad leaved. It has, therefore, to be ensured that for plantation programmes

sufficient diversity of tree species is grown and available in the nurseries. It is also prescribed that wherever deodar is being planted the plants should be at least 2 and a half years old. Similarly broad-leaved species should be at least 1 year old. Deciduous broad-leaved species are to be planted during winter while conifers are to be planted during the rainy season.

6.19 Plantation Journals: -

It is essential that whenever a site is selected for plantation a proper hard bound nursery journal is prepared for that site. The nursery journal must have a large sketch map of the area showing boundaries and other details like nullas, rocky outcrops, existing patches of trees etc. It is important that GPS coordinates of at least 6 to 8 points around plantations are recorded and entered in the plantation journal along with the altitude of the area. Details of all works carried out must be entered in the plantation journals and signed by the concerned officials showing date of signature. All inspecting officers are to record their visits and comments/observations in the plantation journals. Once a plantation journal is complete i.e. in the fourth and fifth year of the plantation, it should be transferred to the division office and kept properly in record there.

6.20 Fencing:-

Fencing needs to be done around plantation sites only where it is necessary. Fencing along their steep slope's cliffs, should be avoided where it serves no purpose. However, it is advisable to plant bio-engineering species suitable for the area along three strand barbed wire fencing especially in areas where grazing incidence is high. Fencing work should be taken up during the rainy season along with live fence support even for area which is to be planted in the ensuing winter. Where economical, and especially along roads, treated bamboo posts should be used for fencing. Where adequate live fence material is planted, only 2 strands of barbed wire may be sufficient. Tall plants of broad leaved species (6 -8 ft high) wherever available can also be planted along the fence.

6.21 Site Clearance: -

In the past it has been a practice to cut and remove all bushes & shrubs from the plantation area. This practice is to be discontinued as shrubs & bushes help prevent soil erosion and add in moisture retention. However, if the area has exotic weeds/ aliens' species like lantana, Parthenium etc. then these are to be removed when the area is fenced.

6.22 Advance earth work: -

Pits of the standard size (30cm x 30 cm x 30 cm for chil and broad leaved for normal planting and 60cmx60cmx60cm for tall planting should be

dug about 3-4 months in advance and the soil be heaped on the lower side of the pit. This helps in weathering and improvement of the soil.

6.23 Weeding: -

Bush cutting and weeding of lants shell be done in accordance ith the practice for each species, preferably in the rainy season. For chil and deodar to weedings in the month of July and August will be done.

6.24 CLOSURES:

All areas under plantations are already closed for grazing. Areas selected for raising plantations year wise are also to be closed to grazing for a period of 15 years. The area so closed is firstly to be cleared of all kinds of bush growth. These closures should also be got notified. The area taken up for planting should always be fenced before planting is done. No grass cutting is to be allowed in plantation areas till the seedlings grow beyond height of grasses growing in that area. Thereafter grass cutting may be allowed to the local rights holders under strict supervision of Forest Guard.

6.25 OTHER REGULATIONS

6.25.1 Grazing: -

All plantations' areas shall remain closed for grazing for 15 to 20 year's period depending upon the progress of the new crops. The closure should be effective and for the minimum possible time, so that least hardships is experienced by right holders. However, depending upon the progress of the young crop, particular area may be thrown open to kine grazing even before the period of closure expires. This will be so, especially in the case of Chil plantations when after 8-10 years of effective closure, the young crop will be nearly 2m in height and cattle grazing will also minimize damage by fire.

6.25.2 Grass Cuttings:-

No grass cutting shall be allowed except under strict supervision of the forest guard. Removal of grass reduces competition and also mortality due to overhead shade.

6.25.3 Lopping: -

Trees standing in the plantation areas shall remain prohibited for lopping during the closure period.

6.25.4 Fire Protection:-

All the old and new plantations area will be strictly fire protected.

Young Chill plantation should receive special attention in this behalf. The methods of fire protection and control burning suggested in Chil Working Circle shall be followed.

6.25.5 Plantation Paths:-

A Path should be aligned in each plantation area in March -April after slash clearance in the area is over. This will facilitate planting work as well as supervision and inspection.

6.25.6 Beating up

Beating Up of failures will be carried out for at least up to 5 years after the planting if the survival is less than 90%. Where the success is more than 90% no beating up is to be done unless the failures are in compact block of 0.2 ha. or more in extent. Therefore, suitable funds for maintenance of old plantation should be made in the annual budget estimates.

6.25.7 Pruning, Cleaning and Thinning

These operations will be carried out in old plantations. Pruning be done up to 1/3rd height of the chil plants when the crop has a mean height of 3 meter, cleaning and thinning should be done where the crop is dense and the height of plant is 5 meter or above one cleaning shall be enough.

6.25.8 Weeding

At least two weedings in the first year and one weeding during the rains in the following year are considered as essential.

6.25.9 Treatment Map

Treatment Map on 1:3,750 scale shall be prepared for each plantation area showing the plantable, unpalatable locations, soil depth, slope and species to be planted. This map should be maintained in the compartment history files/ plantation journals.

6.25.10 Plantation Journal

It is essential that whenever a site is selected for plantation a proper hard bound plantation journal is prepared for that site. The plantation journal must have a large sketch may be of the area showing boundaries and other details like nallas, rocky, crops, existing patches of trees etc. It is important that GPS coordinates of atleast 6 to 8 points around plantations are recorded and entered in the plantation journal along with the altitude of the area. Details of all works carried out must be entered in the plantation journals and signed by the concerned officials showing date of signature. All inspecting officers are to record their visits and comments/observations in the plantation journals. Once a plantation journal is complete i.e. in the sixth and seventh year of the plantation, it should be transferred to the division office and kept properly in record there.

CHAPTER-VII

7. MISCELLANEOUS REGULATIONS

7.1 Petty fellings:

Fellings of a petty nature, as detailed below may be carried out.

- i) Dry or green trees required to meet the demand of right holders as per record of right in settlement report.
- ii) Dry or green trees required for ordinary departmental works.
- iii) Dry or green trees to meet special free grant for construction of houses destroyed by natural calamities.
- iv) Trees falling along electric lines or roads or water channels to be constructed under various plan schemes. No fellings will however be done till the alignments of electric lines, roads or water channels to be constructed have been finally approved by the competent authorities.
- v) Dry and fallen trees which can not be disposed off by giving them to right holders may be auctioned.

Tee under S.No.1 to 3 will be sanctioned by the Divisional Forest Officer or as per orders on the subject issued from time to time. In case of petty felling under serial no.4, above, sanction of competent authority will be necessary before such felling is made. The Divisional Forest Officer should exercise strict control on such felling and not allow any over felling under the gab of petty fellings. Such fellings will be counted towards prescribed felling yield removed in petty felling will always be shown in the compartment history files.

7.2 DEVIATION:

Any large or unusual fellings not prescribed in working plan will constitute deviation and will require prior sanction of the competent authority. The following types of fellings will constitute the deviation.

- i) Special fellings to meet the demand of a particular local small scale industry.
- ii) Felling of trees along the major roads of electric lines alignments.
- iii) Unusually large scale fellings for departmental works.

The sanction of the above or any other deviation should be applied for well in time and should be obtained before the trees are sold.

7.3 TIMBER FOR RIGHT HOLDERS REQUIREMENTS:

The demand of right holder for trees is already very heavy and is increasing every year. It will be met as per settlement reports provisions and from the forests where they have recorded rights in addition to the adjoining undemarcated protected forests. In view of the nominal price which the right holder's have to pay for timber they always exaggerate their demand. Trees to right holders should therefore, be sanctioned only after careful verification of their demand. The trees to right holder should be marked according to silvicultural availability as discussed in different working circle and not merely to suit their convenience. Wasteful use of timber by right holders should be discouraged.

7.4 DEMARCATION AND SURVEY:

The old demarcated protected forest numbering 370 have been surveyed and mapped on 4" to 1 mile scale but boundary pillar register have been prepared for these forests but needs to be rechecked and correlated with revenue record. The boundaries of these old demarcated protected forests should be checked with the help of their maps and boundary registers of each range be updated accordingly. No new undemarcated forests were declared as demarcated protected forest in the present working plan.

7.5 FOREST BOUNDARIES:

The majority of boundary pillars of forests are not available on spot and these have been damaged and removed from their original place near habitations. The entire boundary pillars should be checked from the map of the forests and erected a fresh on spot and their forward and backward bearing (Latitude and Longitude with GPS) be taken and recorded in the boundary register both in case of old DPF and New DPF.

In case of newly constituted demarcated protected forests, the boundary pillars have been constructed in many of them. These pillars should be constructed immediately as it may be difficult to locate them correctly on the ground after a lapse of time. The boundary pillars should conform to standard specification. Intermediate boundary pillar should also be constructed where ever necessary.

All boundary pillars along the external boundary of forests as well as along the boundary of included cultivation are kept in order to check encroachments. The forest boundaries should be checked periodically with the help of boundary register. The following quinquennial programme for checking repairing of boundary pillars is prescribed as under:

Table 7.1: No. of forests whose boundaries will be checked and repaired

No. of forests whose boundaries will be checked and repaired in theyear given in column.						
Year	Name of Ranges					
	Joginder nagar	Urla	Ladbharol	Tikkan	Dharampur	Kamlah
2022-23	10	6	4	10	3	3
2023-24	15	10	6	8	2	2
2024-25	10	6	4	10	3	3
2025-26	15	10	6	8	2	2
2026-27	10	6	4	10	3	3
2027-28	15	10	6	8	2	2
2028-29	10	6	4	10	3	3
2029-30	15	10	6	8	2	2
2030-31	10	6	4	10	3	3
2031-32	15	10	6	8	2	2

The Range Officer will record a certificate in the register to be maintained for checking of boundaries to the effect that the boundaries of the forests included in the above quinquennial programme have been checked and repaired. The Divisional Forest Officer should check this register at the time of office inspection and should ensure that the boundaries are regularly checked.

7.6 ROADS:

A net work of motor able roads is necessary to economically transport the forest produce, especially to make possible the introduction of modern methods of logging and for proper and intensive management of the forests. With the construction of new motor roads and the extension of the existing ones, the forests of this tract will become more accessible. The work is being done by the public works department and therefore no motor roads have been suggested to be constructed by the forest department.

7.7 BRIDLE PATH:

There are very few bridle paths in the area. The existing bridle paths are given in appendix. They are not properly aligned and have not been regularly repaired. Immediate attention is necessary to restore them to proper condition and the alignment should also be improved at places. More bridle paths are required to

be constructed to make the forests accessible and to facilitate inspections. All these bridle paths should be aligned on motorable gradient. List of bridle paths proposed to be constructed is given in appendix.

7.8 INSPECTION PATHS:

The list of existing inspection paths is given in appendix. Immediate and extensive repairs are required to make them useful. The more inspection paths need to be constructed on a gradientsuitable for motorable gradient is given in appendix.

7.9 BUILDINGS:

The list of existing building has been given in appendix Vol-II. More buildings are necessary for proper supervision and management of forests and should be constructed forthwith. The priority of construction of these buildings may be decided by the Divisional Forest Officer. List of buildings proposed to be constructed is given in appendix.

7.10 BUILDING COMPOUND:

All the forest building must have proper compound. Some flowering trees and fruit trees suited to the locality should be planted in the compounds. Seasonal flowers should also be grown in the compound of the forest building.

7.11 WATER SUPPLY:

The present state of water supply in most of the forest buildings is far from satisfactory. All the forest buildings must have permanent supply of portable water. For this the nearby perennial springs and stream should be tapped. The water should be sufficient not only for drinking purposes, but also for irrigating flower beds and the nursery, if any maintained in the compound. The existing buildings as well as those to a constructed in future should be provided with sanitary fittings or atleastself flushing or ever clean types of latrines.

7.12 MAPS:

Management maps and forest type maps have been prepared on 1:5000 scale. This division is cover by 53-A/13, 53-A/9, 52-A/10, 53-A/14, 52-D/16, 52-A/13, 53-E/1, 53-D/16 and 52-D/12 survey sheets. Four inch to a mile scale stock maps of some old demarcated protected forests and 1:5000, scale of old and new demarcated protected forests have been prepared and pasted in concerned compartment history files of forests.

7.13 BEAT MAP:

Each forest guard should be provided with a map of his beat of 4"=1 mile scale showing the boundaries of all the forests, position of boundary pillars,

included cultivations, inspection paths and bridle paths etc. The Divisional Forest Officer should check these maps during field inspections and should ensure that these are kept upto date.

7.14 INCLUDED CULTIVATION:

There are included cultivations in most of the demarcated protected forests. The boundary pillars along the periphery of such cultivations should be periodically checked and repaired to ensure that the forests are not encroached upon. Efforts may also be made to exchange the included cultivations by giving land outside such forests.

7.15 NAUTORS:

Natures have been granted freely in the past especially in scrub and grassy blank areas many such area are steep slopes and shallow soil. In future nautors should not be granted never in wooded areas. A close coordination between the forest and revenue staff is necessary in the matter of grant of nautors as, after the enactment of Forest Conservation Act, 1980, forest land could not be put any other use except forestry without the prior approval of Govt. of India. Hence the case of nautor grant from forest area comes under the preview of ibid Act. At present Nautors are not granted.

7.16 RESEARCH AND SAMPLE PLOTS:

There are no such plots in the division and so the necessity of laying out such plots cannot be over emphasized. The Divisional Forest Officer should select areas and take necessary action to lay them out.

7.17 PRESERVATION PLOTS:

No preservation plot exists in the area at present. Preservation plots should normally be laid out in virgin forests, but as no virgin stands are met within the tract the following areas, should serve the purpose.

Table 56: Forests Suggested For Laying Out Preservation Plots.

Species	Forests
Deodar	ND 127 BAROT C-3
Chil	ND 13 MARHOLA-II
Ban Oak	ND 33 BHABHORI DHAR C-5

7.18 PRESEVED AND MONUMENTAL TREES:

All the preserved and monumental trees will continue to be preserved and their important species should be selected and preserved.

7.19 TEMPLE GROVES:

No temple grooves exist in Jogindenagar Forest Division.

7.20 METROLOGICAL DATA:

Rain gauges have been installed in the compounds of range offices, rest houses and some cases at block and beat headquarters. The number of these rain gauges is sufficient and they are spread throughout the tract. Therefore, installation of more rain gauges is not needed. It has been observed that rain fall is not being recorded properly and regularly in most of these stations as such the very purpose of their installation is defeated. It is therefore, imperative that rain fall be recorded properly and regularly and rain gauges repaired wherever these are out of order.

7.21 SNOW:

In order to collect temperature and humidity data maximum thermometer and hygrometers should be installed at Range head-quarters or any other suitable place in each range.

7.22 FIRE PROTECTION:

Fairly large area of chil and kail were burnt by fires in this tract. It is extremely important to protect the forests from fires. Fire danger is maximum during summer months. To ensure protection of forests from fires, it is essential to have contented population and a network of roads, paths and fire lines to make fire fighting operations possible. The following measures are suggested to protect the forests of this tract from fires.

7.23 MEETING RIGHT HOLDERS REQUIREMENTS:

It is not possible to protect the forests from fires without the goodwill and co-operation of the local people. The reasonable demand of the right holders for timber, fuel fodder and grazing should, therefore, be met without undue delay. The closure where necessary, should be done for the minimum possible period and after taking into consideration the requirements of the villagers for grazing, fuel and water courses.

7.24 FIRE LINES:

A number of fire lines were suggested in the expired working plan but these have

not been cleared and maintained. This neglect of an important fire protection measure is almost criminal. It will be ensured that these fire lines are cleared uriltentfullier delay and properly maintained as given below: -

Table 7.3: Details of Fire Lines already constructed in joginder Nagar Forest Division

Details of Fire Line already Constructed in Joginder Nagar Forest Division			
S.No	Name of Range	Name of Fire line	Lenth
1	Urla	Thorat to Patyuri	10km
		Galu to pandoo	5km
		Har to ThoratGalu	3km
		kadhar to Chiladhar	3km
		Dibkan to Farah	10km
		Radahan to Gawali via satidhar	10km
		Chukku toKadoond	6km
		ChabhBhararuto uperkhajri	7km
		Kandyar to satnog	5km
		Jilhan to Dalusa	4km
		Sarchnal toTindunal	5km
		SihriPhat to Kalhog	5km
2	Lad Bharol	Gokhu totrembali	5km
		Tansal to Bakarjan	2km
		Golwan toDraman	1km
		Bhabhoridhar	1km
		Tameshwaridhar to garh	2km
3	J/Nagar	Fire line Cum Road to Village Salhen	750mtr
		Fire line Cum Road to village Tinidhar	750mtr
		DPF Khprotu	4.5km
		Gharongala to Thachi	5km
		Uperkhojrito ChhambBhararu	7km
		Ghatta toMohanghati	4km
		Shiv Temple to Ghamiruphat	1.5km
		Ahju toGhatta	3km
		Siyuri Temple to Gharongala	2km
4	Kamlah	Garlito Ghorigarh	2km
		Masot to Baradhar	2km
		Raksui toGhorigarh	2km
		Pavodhar to kamlah	2km
5	Tikkan	Thuji to Rawa nala	500mtr

		Chelang to Sarwan	3km
		Rakahan Nall to Likti	3km
		Badi Bajgain to Dharyan	2km
6	Dharampur	Janitary to Gurdwara	1km
		Janitary to Sihan	3km
		Sundal to Murah dhar	6km
		Padka to Banog Galu	2km

Trees standing in these fire lines should be disposed off by way of marking to right holders. The fire lines should be kept clean of needles during the fire season.

7.25 COMMUNICATION:

A network of roads, bridle paths and inspection paths is necessary to facilitate quick assembly of the people to extinguish forest fires. Installation of telephones at important places will be of great help in promptly locating and reporting forest fires. Mobile phone be made useable for collection of fires information.

7.26 FOREST SETTLEMENT:

DFO should make effort of bring areas if any have come to vest in the state Govt. under the H.P. ceiling and land Holding Act, 1972. The H.P. village common Lands vesting and utilisation Act, 1974 and from Deputy Commissioner Pool System under forest for scientific management with consultation of Forest Settlement Officer. Efforts should also be made to get this forest area entered in Reserve record as such.

7.27 ENCROACHMENT ON FOREST LAND/FOREST:

Encroachment on Forest land is a serious problem. It should be tackled on top priority basis. With the increase of population and division of family's land hunger has increased many fold. The allotment of land to landless people has enhanced this menace. The land has been allotted in par trooping manner. These landless families have encroached the adjoining forest/Govt. land adjoining to their own allotted land. Thus, there left any land for exercising rights and pressure shifted to Demarcated Protected forests. In addition to this, people encroaches the forest land for the following purposes adjoining to their own land.

1. For raising orchards.
2. For raising grass for their cattle.
3. For Agriculture land.
4. For construction of buildings.

To ban this maintenance the following preventive and control measures be

adopted.

7.28 Preventive Measures:

- i) “Pucca” boundary pillars should be constructed around the boundary line of forest land.
- ii) Boundary pillars should annually be white washed.
- iii) The trees growing along boundary line of forests should not be marked for any purpose at any cost.

7.29 Control Measures:

- 1) The notice of encroachment should be taken immediately and offender should be booked to take further action.
- 2) Revenue staff such as Patwari, Field Kanungo and Naib Tehsildar should be recruited to prepare the cases of encroachment for taking action against offenders to save forest wealth.
- 3) The cases of encroachment should be put to Collector-cum- Divisional Forest Officer for trial immediately, as per H.P. Govt. Notification No./1-21/71 LSG dated 8.6.1994.
- 4) The orders of Collector-cum- Divisional Forest Officer should be implemented promptly regarding ejectment.
- 5) The filed staff should be imparted training of implementing orders of Collector-Cum- Divisional Forest Officer.
- 6) Village Encroachment Committee be formed to get their help in these cases.

CHAPTER VIII

8. ESTABLISHMENT AND LABOUR

8.1 ESTABLISHMENT:

The position of staff as per sanctioned strength and existing strength on 31.3.2020 has already been tabulated in para 4.1 of Chapter IV (Part-I). The rapid pace of development and increasing human population has put immense pressure on forest land and wealth. There is an increasing thrust on construction of roads and erection of transmission lines. At the same time the demand for timber for improved residential houses by locals has also seen an upward trend. The vigilance and protection of forest wealth should therefore be intensive than extensive. It is therefore suggested that for effective and intensive working vacant positions of staff are required to be filled immediately.

8.2 LABOUR:

The labour engaged in Resin tapping and timber extraction works, is generally imported from other districts of the state by contractors, due to their skill in these works. These skilled workmen are generally paid at higher rates as compared to the government daily wage rates. To meet with the scarcity of labour D.F.O. should frame a schedule in such a way that the services of recently regularized daily wagers are used in systematic way so that the seasonal work of forestry schemes are not hampered for want of labour. The distribution should be done in such a way that each range has proportionate number according to the working targets. While engaging daily wagers or regularizing them the detailed instructions issued by govt. vide PER (AP- II)'B(2), 5/86-III dated 11.7.95 and subsequently should be kept in view.

8.3 TRAINING:

Functioning of Forest Department now has more role of people's participation. Execution of various schemes and projects is now being done through locally constituted VDCs under participatory approach. Therefore, a skill is required to convince the people and to get scheme implemented in a successful way. For which short term training courses are being run at Forestry Training Schools and Dr. Y.S. Parmar University of Horticulture and Forestry. Therefore, it is proposed that different category level staff be rendered training from these institutions.

CHAPTER-IX

9. CONTROL AND RECORDS

9.1 COMPARTMENT HISTORY FILES:

Two copies of the compartment history files (one each for the Division and Range), have been prepared for all the protected forests of the division. Efforts have been made to tag the old record, where-ever available, with the new compartment history files. Stock maps of forest- wise (for the whole forest) have been appended in all Compartment History files alongwith the management prescriptions and enumeration results.

The past record of maintenance and posting of Compartment History files has not been satisfactory. It is, therefore, emphasized that the compartment history files be posted regularly and accurately, under the supervision of the DFO/ACF. The inspection notes of the DFO, CF and other Superior Officers be tagged properly in the concerned compartment history file. The works being done in the forest areas under various schemes and projects, even by agencies other than Joginder Nagar Forest Division should also be included in the Compartment History Files. The DFO is required to submit a certificate to CF, alongwith the control forms, that all compartment history files have been brought up-to-date. The DFO is advised to make a special mention regarding the updating of this record during the Range Inspections.

9.2 CONTROL FORMS:

In order to exercise proper control over the observance and implementation of prescriptions and suggestions of the Working Plan, the DFO shall submit the control forms 2a, b, and c compartments out-turn and miscellaneous regulations etc., on the prescribed format to the CF, on an annual basis, without fail. These control forms have been standardized and, as given in the "Code of Working Plan Procedure" and have been appended with the respective compartment history files for maintenance of these records for each compartment/sub-compartment.

9.3 PLANTATION AND NURSERY JOURNALS:

In order to have complete information on plantations done in any area other than those covered by a compartment history file i.e. outside DPF and UFs, separate plantation journals incorporating details regarding year and month of planting, species planted, cost of different operations, survival beating up, maintenance activities, shall be maintained and posted regularly till the plantation is beyond danger. A map of the plantation along with boundaries and legal status of the area and its physiographic should also be appended. In the event of failure of any plantation, specific reasons for the

same are recorded therein. The field officers should also make a note of their observations during their tour/visit to the plantation. These journals should be maintained at the Range level. Similarly, Nursery journals should be maintained at Range level that shows the complete record about the origin of seed, date of sowing, germinating, cost of various operations and stock position. The cost of raising the plants be entered at the end of each season in this journal. Reasons and observations for good/bad results be incorporated for further reference and record.

9.4 FOREST GUARD MANUAL (BEAT BOOK):

The importance of this manual to the concerned forest guard for proper control and efficiency cannot be over emphasized. These require to be standardized for the whole division and these should be got printed. Information on the following aspects must mandatorily be available in a beat book.

- (a) List of forests in the beat along with their area and allotment in the Working Plan. It should have sufficient space for further allotments in the event of revision of the Working Plan.
- (b) Map of the beat, showing the various forests, maps of the different forests in the beat traced from the respective compartment history files, showing the boundaries of the compartment, sub-compartment, boundary pillars, roads, paths etc.
- (c) Copy of the boundary register of each forest in the beat.
- (d) Extracts of important Acts, and notifications relevant to a Forest Guard.
- (e) Duties of the beat guard.
- (f) Range Officer's standing instructions.
- (g) Details of PB-I areas, if any, in his beat.
- (h) List of plantations raised with space for updating.
- (i) Class-wise volume and market rate of important timber species.
- (j) Names, addresses and telephone numbers of important/ resourceful persons/institutions in the beat.
- (k) Record of habitual offenders.

This will update the knowledge of the beat guard and help him discharge his duties effectively and efficiently. The Divisional Forest Officer shall ensure that all the beat guards are supplied with the beat book and

maintained properly. Handing over the charge of the beat, in the event of transfer, will be smooth and orderly and important information will not be lost. The Range Officer should insist on checking the beat book once every month on the payday.

9.5 DIVISIONAL NOTE BOOK:

This book is maintained for the use and guidance of Divisional Forest Officer. The divisional note book properly maintained is of great assistance to the DFO as it helps him/her by providing information on a variety of subjects of day to day working e.g. experiments, methods of estimating output, trends of prices of various forest products, prices/auction of timber/trees, status of court cases under section 52A, IFA and P.P.A.

9.6 RECORD OF MACHINERY:

These registers should be maintained to keep a record of all vehicles, machinery etc. incorporating the year of purchase/receipt, initial cost, repairs done and its cost, other relevant details etc.

9.7 FIRE RECORDS:

A record of fires in the division shall be maintained in accordance with the instructions issued from time to time. The annual digital map of the fire affected areas should be pasted on the register. The fire measures should be digitized and list of fire sensitive beats should be pasted.

9.8 REGISTER OF ROADS, BUILDING, PATHS, FIRE-LINES ETC

These should be maintained Range wise, mentioning the year of construction, cost incurred, plinth area, length of road, path. All works under capital expenditure should be incorporated in this register and this should be updated yearly.

9.9 REGISTER OF REGENERATION ASSESSMENT SURVEYES:

The details of various regeneration surveys carried out as per the prescription of Working Plan should appear in this register that should be maintained on the prescribed proforma. The compiled annual report of such survey conducted will be conveyed to DFO by concerned Range Office.

CHAPTER-X

10 WILD LIFE-CUM-ECO-TOURISM (OVER-LAPPING) WORKING CIRCLE

10.1 GENERAL:

This working circle includes areas which are important for recreational forestry to encourage nature based eco-tourism and wild life conservation, comprising of demarcated and un-demarcated protected forests of all other working circles except chil and plantation working circles. It includes all forest areas situated in and around the National Highways, aesthetic point of view and those forests constituted the importance of wild life conservation and protection of development of Eco-tourism and all high lying forests habitat for wild life conservation and protection etc.

Wide range in altitude results in marked variation in the climatic conditions met within the different parts of this division. The climate is tropical and sub-tropical in the lower areas, temperate in the middle portions. During winter, it snows down to an elevation of about 1500 meters but does not lie for a long period below 2000 meters. The wide range of altitude, temperature, and rainfall results in diversified and rich forest flora, varying from Northern tropical dry mixed deciduous forests to alpine pastures. The forests, are however, not uniformly distributed through out the tract and are mostly confined to higher hills and interior valleys. The forests in the lower areas are scattered and have sparse tree growth. Very varied and interesting wild life is found in this division as a result of great variation in elevation, topography, climate and forest cover. Wild animals and bird capable of living under different climate conditions ranging from tropical to arctic climate and form a thick forest cover to sparse tree growth is found in this tract. We have in our forest's wild animals of different sizes, shades, and habits, like wild animals, a great variety of wild birds are also found. Our forests will be very much poorer without the varied wild life, we have in them.

10.2 IMPORTANCE OF WILD LIFE:

The value and importance of wild life from cultural, aesthetic, scientific, economic and recreational point of view is immense and is recognized all over the world. With this end in view, the very idea of preservation of wild life forms a part of our religion and culture which is as old as civilization itself. We have seen wild life is woven into the mythology and folklore of the land. It finds a place of pride in the Hindi scriptures. Our sacred and legendry books are full of love for wild life. One has merely to recall the significant passages from Kautilya's Arth- Shastras, which provides severe punishment for entrapping, killing or molesting deer, Bison, Bird or fish in protected areas. Fifth pillar epic of Ashoka the Great, which is as old as third century B.C. depicts, Ashoka's commandments for giving protection to wild animals,

birds, fishes and forests. Vedas are full of hymns in veneration of animals. Our religion would become very much poor without this feeling of loving kindness towards animal life. We must preserve this singularly precious heritage.

Wild life is important from the cultural, scientific or biological, economic, recreational and aesthetic point of view also.

10.3 CULTURAL VALUE OF WILD LIFE:

Indian mythology, art and literature are bound intimately with animals and birds in a hundred verses are echoed in the prayers of the Vedic hymns, praising the cattle Nandi as the Vahan of Shiva, Garuda of Vishnu, Swan of Saraswati and Peacock of Kartikeya, while Lakshmi is surrounded by elephants. How Krishna leans against a Kadamba tree attended by cows or driving them home at sun set to the gates of Vrindaban is depicted in thousand pictures. Similarly, lion is the charger of Durga in her fight against the forces of darkness and barbarism. It is because of this association that lion has become the symbol of Dharma.

10.4 SCIENTIFIC AND BIOLOGICAL VALUES:

In some quarters there is an erroneous notion prevalent that the wild animals are instrumental in damaging the field crops and domestic animals. Hence out of ignorance many people resort to indiscriminate destruction of these animals. The fact is other way round. The herbivorous animals do not damage the field crop if sufficient food is available in their natural habitat. The animals check the cover growth of vegetation and their population provides food for the carnivore. If man does not indiscriminately destroy the wild animals, the Carnivorous animals will not lift his domestic animals or attack him. When the natural balance of wild animal population is upset by the callousness of human beings, they invade the fields and human habitations. The birds are helpful and useful to man in innumerable ways. Apart from their beautiful look, feathers and sweet songs, they devour millions of crop pests and rodents. They also scavenge the forests; bring about pollination of flowers of some of the fruit and forest trees and help in dispersal of seeds. But for the help of birds in destroying the crop pests, which multiply at a tremendous rate, it would have been rather impossible to raise field crops. These pests live on wood, living on plant leaves, flowers and fruits and eat 2 to 200 times of their body weight per day, on alarming magnitude indeed. Thus, the contribution of bird population in maintaining the vegetational cover on earth and help in raising the field crops for food cannot be over emphasised. And hence the importance of balance in the constituents of nature nevertheless, the animals damaging crops, lifting domestic animals and man eaters have to be killed and thus the balance restored.

How then, can we dis-associate ourselves from these creatures? Ancient oriental wisdom constantly emphasised on the unity of all earthly life and science is bringing us back to some point. And yet, we appear to be utterly impervious to the

urges of the wisdom distilled either from ancient philosophy or from modern science. It is also wise to remember that we can destroy a species but surely, we can never recall it.

10.5 ECONOMIC VALUE:

There is economic side of wild life too. This implies the benefits or profits; we may get from the use of wild animals. The monkeys, for instance, have been useful in research for cures of human diseases. The musk pods of the musk deer are of great repute.

10.6 RECREATIONAL & AESTHETIC VALUE:

The beauty of wild animals and birds fascinates the bird watchers, sport enthusiasts, photographers-both amateur and professionals, animal and bird ecologists and biologists, and the gaiety hunters, the tourists from within and outside the country. The country side blessed with natural beauty bearing beautiful woods, wild animals and birds attract a multitude of tourists for sight seeing, sport and rest in such surroundings. Tourism earns substantial revenue for the state. Besides, revenue, people of the areas including hoteliers, transporters etc. are also benefitted in many ways.

10.7 WILD LIFE PROBLEMS OF THE TRACT

There is evidence to show that in the good old days, placid recesses of these mountains used to be dwelt by a rich fauna. But the increase of human population and multifarious development activities that took place in the region, had affected the existence of wild life. Indiscriminate poaching had brought many species of wild animals and birds on the verge of extinction. Due to inadequate staff, it has become difficult to protect wild life especially outside the sanctuary area.

10.8 Problems faced by Wild Life outside Sanctuaries:

Wild life does not get the same priority and significance in areas outside sanctuaries and national parks as it does in the notified wild life areas. As a result they remain an invisible part of forest ecosystem and whenever forests are subjected to any activity the impact of such activities on them is either undermined or ignored altogether. Habitat loss, due to diversion of forests land for other purposes, frequent forest fires, excessive lopping and hacking etc. is one of the prime impacts and as a result, the animals are either pushed deep into the forests or are left with no option but to venture out into villages. In the latter case, the carnivores resort to cattle lifting and at times pose a threat to human life too. In this process they render themselves also vulnerable to being poached and killed. This interface has led to a genesis of man-animal conflict and has not served the cause of wild life protection. Poaching of animals for meat and sometimes as trophy in the division is not very common, if the numbers of cases registered are the criteria to go by. However, un-noticed cases of poaching cannot be ruled out.

10.9 WILD LIFE MANAGEMENT PROBLEMS OF THE DIVISION

The Jogindernagar Forest Division also faces the problems of animal depredation. Such incidents are consistently increasing and pose a great challenge in Wildlife management. The following four problems are the most pressing and demand immediate tackling.

10.9.1 Leopard problem: There have been many cases of damage to cattle by leopards in the division, who target these cattle in the forests or grazing lands. Instances of cattle lifting from cattle sheds are also not uncommon. Though injury and casualty in case of human beings has not been reported during the last 8-10 years, there have been a few instances when a leopard has created panic by venturing into the dwelling houses in villages and had to be captured by setting traps and cages.

10.9.2 Monkey Problem: Monkey population has increased manifold in the division and there are a lot of complaints of crop depredation by them. All along the Ghata State highway, monkeys can be seen in herds and pose a threat to tourists and passersby. They have left the interiors of the forests and are seen biding their time for “doles” from tourists, many of whom feed them generously with bread, chanas, bananas, food etc. There is a need to dissuade people from feeding the Monkeys as it further sharper the human Monkey conflict. Some steps to curb and cull the monkey population are urgently required and wildlife management practices need to be enforced.

10.9.3 Wild Boars: These animals also pose a nuisance both in agricultural fields as well as forests areas, especially plantations. In the forest areas, they dig out the plants, while in the fields they destroy standing crop and vegetables. Sometimes, Wild Boars attack human beings. A lot of complaints are received for the elimination of this animal.

10.9.4 Black/Brown Bears: These animals also pose threat to human beings as these animals attack human beings in the forests or even in the agriculture fields as they do come to agriculture fields for feeding on agriculture produce. These animals also destroy pole crops of Deodar as they suck deodar oil from the wounds of Deodar trees and often they girdle the tree in the process and tree virtually dry up.

10.10 ACTS AND RULES REGARDING WILD LIFE MANAGEMENT AND CONSERVATION

Wildlife protection has been included in Article 51-A as a fundamental duty of citizens of the country. In pursuance of this constitution directive, in 1983 the Government of India, through its Wildlife Action Plan, formulated by the Ministry of Environment, laid down several sets of actions by which wildlife should be conserved.

The new National Forest Policy of 1988 also contains a number of references on wildlife and on bio-diversity for conserving the natural heritage by preserving the natural forests that are storehouses of a variety of flora and fauna. The main legislative measure adopted for the protection of wildlife was the enactment of Wild Life (Protection) Act. 1972.

The Wild Life (Protection) Act 1972 is being enforced in Himachal Pradesh since its promulgation by the Government of India. It came into force in the State in the year 1973 vide Notification No. G.S.R. 190(E), dated 2.4.1973, Gazette of India, Extraordinary, Part II section 3(I) page 517. The H.P. Wild life (Protection) Rule of 1975 provides shooting and hunting rules, which are applicable to all the Reserved and Demarcated Forests in the State (Vide Notification No. 6-9/73-SF dated 24.2.75). Hunting of any wild animal specified in schedule II, III and IV is prohibited. However there is a complete ban on hunting in the state since 1983 notified vide No. 6-2/73-SF-II dated 24.5.83. About a year later, the State Govt. vide its notification No. 6-2/73-SF-IV dated 21.6.84, has allowed hunting of a few identified species, which have been declared vermin or cause damage to crops in cultivate fields, in accordance with the provisions of the Wild Life (Protection) Act, 1972.

10.11 TRADE IN WILD ANIMALS, ANIMAL ARTICLES

Every person is bound to declare in his control, custody or possession any animal, article or trophy to the Chief Wild Life Warden or an officer authorized on his behalf, who in turn will issue a certificate of ownership after proper enquiry. The DFOs have been declared authorized officers for this purpose.

10.12 COMPOUNDING OF OFFENCE

The Chief Wild Life Wardens and all the wild life wardens and DFO in the rank of DCF are authorized to compound the offences and rates of compensation are fixed or revised every year by the competent authority. Incidents of poaching and other wild life offences are not very common in the area.

10.13 GRANT OF RELIEF FOR DAMAGE

The loss of cattle due to attacks by wild animals was drawing attention of the government for some time in view of public entreaties. The Government has decided to grant relief for losses of domestic animals and human beings done by wild animals vide notification No. Ft. (F) 6-7/82 dated 25.2.1988 and revised vide notification No. Ft. (F) 6-7/82-Loose dated 9.4.1996, 27.08.2001, 20.07.2006 and 04.03.2014 which has been recently re-revised vide notification No. FFE-B-A (10)-1/2009 dated 18 Aug. 2018 in which rates of relief for injuries/loss of life in case of human beings significantly rose.

Table No. 10.1- The detail of relief paid for losses to animals and human beings done by Wild Animals for the period 2013-14 to 2021-2022 is given below: -

S.N.	Year	Human Injured/ killed	Animals Killed	Compensation and give to victim	Attack by wild animal	Name of forest Range
1	2013-14	17 Nos injured	2	1,15,500	Leopard/Wild Bear/Monkey/ fox	Lad Bharol,
		7	4	69,563/-	Leopard/Monkey	J/Nagar
		6	2	32,125/-	Leopard/Monkey	Dharampur
		-	2	1,562/-	Leopard/Monkey	Kamlah
	Total	30	10	2,18,750/-		
2.	2014-15	7	5	44,344/-	Leopard/Monkey	L/Bharol
		2	1	12,500/-	Leopard/Monkey	J/Nagar
		1	2	88,250/-	Leopard/Wild Bear	Urla
		5	2	20,099/-	Leopard/Monkey	Dharampur
		1	6	31,087/-	Leopard/Monkey	Kamlah
	Total	16	16	1,96,280/-		
3.	2015-16	-	1	6000/-	Leopard/Monkey	Lad Bharol
		2	2	1,01690/-	Leopard/Monkey	J/Nagar
		1	1	7,702/-	Leopard/Monkey	D/Pur
		1	10	52,520/-	Leopard/Monkey	Kamlah
		1	5	62,651/-	Leopard/Wild Bear	Urla
		-	1	10,000/-	Leopard/Monkey	Tikkan
	Total	5	20	2,40,563/-		
4.	2016-17	-	3	26,000/-	Leopard/Monkey	Lad Bharol
		1	3	93000/-	Leopard/Monkey	J/Nagar
		1	1	20,000/-	Leopard/Monkey	D/Pur
		1	1	81,000/-	Leopard/Monkey	Kamlah
	Total	3	8	2,20,000/-		
5.	2017-	-	1	7500/-	Leopard/Monkey	Lad Bharol

	18					
		-	2	16,000/-	Leopard/Monkey	J/Nagar
		-	3	22,000/-	Leopard/Monkey	D/Pur
		3	2	1,90,656/-	Leopard/Monkey	Tikkan
		1	1	16,887/-	Leopard/Wild Bear	Urla
	Total	4	9	2,53,043/-		
6.	2018-19	-	3	27,000/-	Leopard/Monkey	Lad Bharol
		-	1	6,000/-	Leopard/Monkey	J/Nagar
		1	1	11,133/-	Leopard/Monkey	D/Pur
		-	1	15,000/-	Leopard/Monkey	Tikkan
		2	2	4,42,757/-	Leopard/Wild Bear	Urla
	Total	3	8	5,01,890/-		
7.	2019-20	-	1	18,000/-	Leopard/Monkey	Lad Bharol
		-	1	6,000/-	Leopard/Monkey	J/Nagar
		1	1	792/-	Leopard/Monkey	D/Pur
		-	1	6000/-	Leopard/Monkey	Kamlah
		1	2	2,30,000/-	Leopard/Monkey	Urla
	Total	2	6	2,60,792		
8	2020-21	-	4	30,000/-	Leopard/Monkey	Lad Bharol
		-	1	3,000/-	Leopard/Monkey	D/Pur
		-	3	48,000/-	Leopard/Monkey	Kamlah
		1	-	75,000/-	Leopard/Wild Bear	Urla
		1	-	75,000/-	Leopard/Monkey	Tikkan
	Total	2	8	2,31,000/-		
9.	2021-22	-	2	18,000/-	Leopard/Monkey	Lad Bharol
		-	2	60,000/-	Leopard/Monkey	J/Nagar
		-	1	15,000/-	Leopard/Monkey	D/Pur

		-	3	75,00/-	Leopard/Monkey	Kamlah
		-	2	21,000/-	Leopard/Monkey	Urla
	Total	-	10	1,21,500/-		

To ensure and encourage the reporting of offences under the Wild Life Protection Act, provision has been made in the H.P. Wild Life Protection Rule, 1972 to give rewards to informers, giving bonafide information about the offences. Such rewards may extend up to the amount of fine imposed by the Court. Government servants are not debarred from receiving such rewards.

10.14 STUDY MEASURES AND DATA COLLECTION

With a view to facilitate identification of various parameters for basing future management, the following study and data collection measures are being prescribed to be carried out by the wild life wing of the department: -

Leopards: -

The existing number of each and other predator species along with their prey population should be assessed. Cases of damage to the captive animals if any should also be listed. Prey-Predator ratios for these animals should be worked out periodically and steps should be taken out to keep it to the optimum level.

Most of the animals and birds move to the lower elevation during winter. Seasonal migration of these animals and birds should be studied and recorded.

Breeding seasons of animals and period of hatching in case of pheasants should be observed and recorded.

10.15 SCOPE FOR SCIENTIFIC STUDY AND RESEARCH

The idea of population study and game management is relatively new for Himachal Pradesh. Population study has to be done on the basis of the peculiar habitat of the animals or birds and the existing extent of the habitat available for the particular animals or the birds. After studying their habitat, the population can be assessed by devising suitable sampling technique, which takes care of the habitat. As in case of pheasant, the calling at particular time and season of the year and then sex ratio can be studied and used for computing the population in the available habitat for pheasants. Similarly for animals the population can be computed by scientific study of their habitat. Efforts should be made to make study for the disease occurring to the wild animals and bird population for helping the future management of the wild life.

10.16 HUMAN WILDLIFE CONFLICT RESOLUTION

Human-wildlife conflict (HWC) is fast becoming a critical threat to the survival of many globally endangered species. The numerous cases from countries all over the world demonstrate the severity of human-wildlife conflict and suggest that an in depth analysis is essential to understand the problem and support the conservation prospects of threatened and potentially endangered species. According to the World Conservation Union, HWC occurs when wildlife's requirements overlap with those of human populations, creating costs to residents and wild animals. Direct contact with wildlife occurs in both urban and rural areas, but it is generally more common inside and around protected areas, where wildlife population density is higher and animals often stray into adjacent cultivated fields or grazing areas. HWC has far reaching environmental impacts. Species most exposed to conflict are also shown to be more prone to extinction because of injury and death caused by human, these can be either accidental, such as road traffic and railway accidents, capture in snares set for other species or from falling into farm wells, or intentional, caused by retaliatory shooting, poison or capture. Such human-induced mortality affects not only the population viability of some of the most endangered species, but also has broader environmental impacts on ecosystem equilibrium and biodiversity preservation.

Human-wildlife conflicts also undermine human welfare, health and safety, and have economic and social costs. Nuisance encounters with small animals, exposure to zoonotic diseases, physical injury or even death caused by large predators' attacks have high financial costs for individuals and society in the form of medical treatments to cure and prevent infections transmitted from animals through human contact.

Humans can be economically affected through destruction and damage to property and infrastructure (e.g. agricultural crops, orchards, grain stores, water installation, fencing, and pipes), livestock depredation, transmission of domestic animal diseases, such as foot and mouth. Negative social impacts include missed school and work, additional labour costs, loss of sleep, fear, restriction of travel or loss of pets. Such broad environmental, human health and safety, economic and social impacts suggest that governments, wildlife managers, scientists and local communities need to recognize the problem and adopt measures to resolve it in the interest of human and environmental well being.

10.17 Typology of HWC

10.17.1 *Human deaths and injuries*

Human deaths and injuries, although less common than crop damage, are the most severe manifestations of HWC and are universally regarded as intolerable. Leopard and Black Bear are responsible for numerous fatal attacks on

human. Langurs and monkeys are seldom, if ever, dangerous to humans, though being capable of inflicting serious wounds to dogs. On the other hand, they will intimidate mainly women to get to food where they co-inhabit urban areas. Finally, human death and injury can be the result of road accidents caused by wildlife.

10.17.2 *Destruction of crops and predation on domestic animals*

i) Destruction of crops: -

Crop damage is the most prevalent form of Human-Wildlife Conflict across the Dalhousie Division. The occurrence and frequency of crop raiding is dependent upon a multitude of conditions such as the availability, variability and type of food sources in the forests, the level of human activity on a farm and the type and maturation time of crops as compared to natural food sources. A wide variety of vertebrate pests come into conflict with farming activities in division including birds, rodents, primates, antelopes, bats, and wild boars. Himalayan Black Bears are able to destroy a field in a single night raid. The important damage made in the departmental plantations by monkey, Langurs and porcupines through uprooting of newly planted saplings and tender sprouts is another form of crop depredation. Langurs, Porcupines and monkeys, being opportunists, can also exploit food crops, fruit and even young horticultural crops or wheat, maize stems chewing it for the juice extracted, and spitting out the spent fibre, as people would do chewing on sugar cane.

ii) Predation on domestic animals: -

Another adverse effect of HWC is the killing of domestic animals by wildlife. The number and type of domestic animals killed by wildlife varies, depending on the species, time of year, and availability of natural preys. In the savannah and grasslands where pastoralism remains the livelihood and main asset of many people, predation on livestock becomes an issue. At a national level the losses are hardly significant but to the individual stock owner, they can be catastrophic. To a small scale stock owner, losses to predation can mean the difference between economic independence and dire poverty. Leopards are the principal culprits in the Forest Division Dalhousie which attacked mainly cattle and did so at night.

10.17.3 Transmission of diseases to livestock and/or man:

Important diseases are known to be transmitted by wildlife to domestic livestock or possibly man (i.e. rabies). Scavengers and predators, such as spotted hyenas, jackals, leopards and vultures, play a role in the dissemination of pathogens by the opening up and dismembering and dispersal of infected carcasses. That is notably the case for anthrax the spores of which they ingest together with the tissues of the carcasses and then widely disseminate in their faeces.

10.17.4 Others: -Monkeys and Langurs raid gardens, agricultural fields and food in houses and camping areas and can be an immense nuisance in small urban

settlements if left unchecked. In urban areas where they are not actively controlled, monkeys and Langurs are a major menace pulling and intimidating people to take food items directly from the hands, bags and tables.

10.17.5 Causes of HWC:-A set of global trends has contributed to the escalation of HWC worldwide. These can be grouped into human population growth, land use transformation, species habitat loss, degradation and fragmentation, growing interest in ecotourism and increasing access to nature reserves, increasing livestock populations and competitive exclusion of wild herbivores, abundance and distribution of wild prey, increasing wildlife population as a result of conservation programmes, climatic factors and stochastic events.

10.17.6 Human population growth:-

Demographic and social changes place more people in direct contact with wildlife: as human populations grow, settlements expand into and around protected areas as well as in urban and sub-urban areas. Human population growth has lead to encroachment into wildlife habitats, constriction of species into marginal habitat patches and direct competition with local communities.

10.17.7 Land use transformation:-

This driving force is very much associated with the previous one, as the transformation of forests and other ecosystems into agrarian areas or urban agglomerates is a consequence of the increasing demand for land, food production, energy and raw materials. In many areas with abundant wildlife conflict is intensified by land use fragmentation and the development of small-scale farming. These crops create favourable habitats for predators and play a major role in influencing the natural distribution and abundance of wildlife communities.

10.17.8 Species habitat loss, degradation and fragmentation:-

Species habitat loss, degradation and fragmentation are also interconnected with population growth and land use change.

10.17.9 Growing interest in ecotourism and increasing access to Forest:-

Recreational activities and growing public interest in wildlife have increased the human presence in protected areas and raised concern about capacities to manage and regulate public access and large-scale use of protected areas. Associated with the four global trends is a fifth cluster connected to alteration of natural food and water availability.

10.17.10 Increasing livestock populations and competitive exclusion of wild herbivores:-

Growing densities in livestock populations can create an overlap of diets and forage competition with wild herbivores, resulting in overgrazing and decline or local extinction in wild herbivore populations. Under these circumstances, livestock becomes an important source of prey for predators.

10.17.11 Abundance and distribution of wild prey:-

Many experts recognize that when native prey is abundant, wild predators consume it in preference to livestock and that impoverishment of prey populations is one of the major causes of carnivores shifting their diets to livestock. Clearly, this is due to the ease of capture and limited escape abilities of livestock.

10.18 Increasing wildlife population as a result of conservation programmes and effective implementation of Wildlife Protection Act: -

Effective protection and habitat management in the forests wildlife population has been increased tremendously and the social organization, habitat and prey requirements of the species are difficult to accommodate within the human-defined home range, and resulted in many wildlife straying out of the forests into local villages.

10.18.1 Climatic factors:- Although not often mentioned, perhaps because they cannot be controlled, climatic trends are an important cause of HWC. Seasonal changes are directly correlated with predation-intensity. High snowfall in upper reaches compels wildlife to move to plains which resulted into poaching and hunting by the villagers. Attacks of black bear are common in rainy seasons when they frequently visit the maize fields in cloudy weather.

10.18.2 Management of conflict situations and different approaches:- Considering the actual population growth rate of humans, increasing demand for natural resources and the growing pressure for access to land, it is clear that the human wildlife conflict will not be minimized in the near future, however it needs to be managed urgently. A wide range of different management tools has been developed worldwide to address HWC, but most of these are strongly site and species/genera specific and are not widely or easily accessible.

An overview of some of the most common management practises, describing their applications, examining how the methods were tested, highlighting lessons learned and successful local solutions, which could be replicated under similar conditions.

10.19 PREVENTIVE STRATEGY

10.19.1 Artificial and natural barriers (physical and biological):-

Barriers have the function of preventing spatial overlapping among wild animals and local communities; they are usually man-made, but natural barriers such as rivers, mountain ranges may occur along a forest boundary. Spatial separation has been proved to be a successful strategy when physical barriers enclose a large area.

10.19.2 Fencing:-

If they are properly designed, constructed and maintained, fences can be almost completely effective in preventing conflict between people and wild animals. Several types of fences are used for various purposes.

Some types of fences used to protect crops:-

10.19.3 Traditional barriers:-

Plant hedges of various spiny species like Agave, Yucca, Berberis, Muskrose, Raspberry etc. have the positive aspects of being a low cost solution effective with both carnivores and ungulates. Fences made of dead thorny branches and bushes are erected as *Bara*, are good for keeping away wild animals from cattle and crops. Trenches covered or not, can be used as an effective measure to deter wildlife from fields. Stone walls have been used to exclude wildlife from invading cultivated areas. Farmers can simply run bark or climber ropes from tree to tree or using long poles placed apart and hang bushes and branches in intervals. Even cloths can be placed in conjunction with grease and other irritating material, which, when applied to can cause irritation to any animal making contact with the fence.

10.19.4 Wildlife fences:-

Wildlife fences using strong (artificial) material like barbed wire can be set up when possible.

10.19.5 Electric fencing:-

Electric fencing can be considered as a more sophisticated and efficient solution: (i) it is more durable, due to the reduced physical pressure from animals; (ii) it deters a wider range of species and (iii) it is more aesthetically appealing. However, the cost of installation is higher compared to the simple fences. There are a few crops that are less palatable to wildlife and notably that animals appear not to eat. Alternative crops such as, lady's finger, ginger and chilli may be encouraged around the field which is generally not eaten by monkeys and porcupines. Other agricultural practices like changing the timing when a crop is planted or harvested can also result in a decrease in crop-raiding. This can be done through the use of special varieties like open pollinated maize varieties which can be harvested

earlier than other food crops and consequently be less vulnerable to crop damage which tends to occur late in the growing season.

In addition, by intensifying agriculture, increasing inputs and boosting yields, farmers could maximize their returns from smaller plots of land which would also be much easier to defend against crop-raiding animals. Intensification would be facilitated through the introduction of practical, environmentally sensitive practices such as mulching, organic fertilizers and liquid dung.

10.19.6 Guarding:-

Monitoring herds and active defence are essential features of animal husbandry, where human herders are effective and fearless in warding off predators. The utilization of domestic guard dogs appears to be a successful strategy for managing monkey, Langurs and porcupine attack on fields and even predation risks from Black bear, Leopards and jackals etc.

10.19.7 Alternative high-cost livestock husbandry practices:-

Movement activated guard (MAG) devices and electronic training collars (EC) are deterrent systems based on aversive stimuli, they are very high-cost and cutting edge techniques. The first one relies on disrupting a predator's attack through stimuli that disturb the animal's normal behaviour; these stimuli can be gustatory (chemical), visual (light), olfactory or auditory (siren) and are activated by the animal approaching protected resources. Local arrangements like beating of drum, tins, plates etc could be a possible alternative.

10.19.8 Relocation: voluntary human population resettlement:-

Where alternative land and incentives are available, relocation of local communities to areas offering better access to natural resources and socio-economic opportunities can be an adequate solution to HWC.

10.19.9 Waste management systems that restrict wildlife access to refuse:-

Good standards of waste management are important to avoid attracting wild animals to human settlements and to prevent wild populations being augmented and artificially sustained by human induced food availability. Each stage of waste handling should be addressed, from collection to transportation to disposal.

10.19.10 Restriction on feeding to Wildlife:-

There should be restriction on feeding to wild animals especially Monkeys and Langurs in urban areas and temples by tourists and local people.

10.19.11 Deterrent methods:-

Deterrent methods aim at repelling the animals from the targeted resource. They can be grouped into several categories according to the sense they regard: hearing, sight, smell, taste, touch. Some deterrents which can be used are:- They are based on noises which are able to deter wildlife, either by the shock value of an unexpected loud noise, or by specific sounds that are known to scare wildlife. Traditional methods are widely used by the farmers are mainly (i) beating drums, tins and trees; (ii) whips in addition to shouting, yelling and whistling; (iii) explosive devices like “bamboo blasters” using calcium carbide or fertilizers, “pipe bombs”. Etc. Disturbance shooting (firing of gunshots over the heads of crop-raiding animals) has been a long standing deterrent.

Alarm systems established at the boundary of the farms and set off by a tripwire (e.g. electric sirens) or set up directly on fences (e.g. cowbells) alert farmers to the presence of wild animals, but also have some deterrent effect.

At last, some more sophisticated techniques using tape recordings can scared off animals. To scare monkeys and Langurs, the use of shots, cannon noise or predator sounds can be used.

10.19.12 Visual deterrents: -

Visual deterrents are traditionally used. Brightly colored cloths and plastic may be hung from a simple fence at the edge of the fields. Scarecrows could have a potentially deterrent effect. Fires lit on the boundaries of fields or carried as burning sticks by the farmers can deter wildlife by the flames and the smoke. Burning tyres produces a very lasting and noxious smoke which affecting both visual and olfactory senses, increases the deterrent effect.

10.19.13 Olfactory deterrents:-

Chemical compound(s) with potential deterrent capabilities may prove an effective way to deter animals, either as an unpleasant or painful smell, or as a targeted compound such as a hormone, which creates fear. In the first group, the capsaicin, resin extracted from chilli peppers (*Capsicum* sp.) causing an extremely unpleasant irritation and burning is the most efficient and widespread. Actually, repellents based on this resin have been used to alter animal behavior for a variety of species, including bears, ungulates, dogs, and humans.

Tobacco is also efficient as a deterrent either in conjunction with chilli or alone.

10.19.14 Taste deterrents:-

The use of unpalatable crops like Chilli, ginger lady's finger is also an effective deterrent.

10.19.15 Contact deterrents:-

Traditional methods can be quoted in this category which regards the sense of touch. Farmers throw rocks, burning sticks and, occasionally, spears at crop-raiding animals. Beehives can be placed on the edge of the fields and the bees are conditioned to react to approaching animals.

10.20 MITIGATIVE STRATEGIES

10.20.1 Compensation systems:-

HWC carries significant economic costs to humans and compensation is a measure which aims to alleviate conflict by reimbursing people for their losses. Compensation systems rely on giving out monetary payments or licenses to exploit natural resources, allowing the hunting of game, exploitation and collection of fuel wood, timber and fodder of natural resources are not permissible inside protected areas.

10.20.2 Insurance programmes:

Livestock and crop insurance is often proposed as an innovative solution to mitigating the impact of HWC, but it is yet to be experimented broadly. It covers crops and livestock from the risk of wildlife attacks and involves the villagers and local governing bodies paying a premium share of the insurance and allows rural inhabitants to make a minimum annual cost and to be refunded in the event of crop or livestock losses.

10.20.3 Incentive programmes:-

Incentive programmes are based on subsidies. They offset the cost of conservation and demand the adoption of conservation-friendly practices, creating tolerance towards wildlife through the exchange of benefits.

10.20.4 Community based natural resource management schemes (CBNRMS):-

A CBNRMS can be established, where the eco-tourism industry and hunting concessions are potentially valuable for developing a local economy based on wildlife related revenues. This scheme entails a system of returning benefits to rural communities in order to motivate them to protect wildlife outside protected areas and to discourage poaching.

10.20.5 Regulated harvest:-

In many regions, HWC is managed by hunting. This is a low cost technique and has the potential to raise public tolerance towards wildlife. The money raised from the sale of licenses can fund Conservation activities and the protection of human settlements. To be viewed as a legitimate management practice, hunting needs to be based on scientific monitoring that ensures sustainable harvests and it needs to be regulated by policies that address the timing, location and methods of hunting, as well as the distribution of benefits to all stakeholders.

10.20.6 Wildlife translocation:-

Translocation consists of moving a certain number of animals from a problematic zone to a new site. In spite of seeming to be the least sensible of the solutions listed above and the risk of exporting the problem to another site, it may be a practical and acceptable approach in some cases and where there is the availability of a suitable habitat with territorial vacancies. Translocation works well when isolated individuals are unable to survive or reproduce because they are too distant from the main population and need to be moved back to their own group; or when a high density population needs to be reduced through the relocation of the individuals.

10.20.7 Conclusion:-

Although, the management practices described above is by no means exhaustive, it nevertheless encompasses a wide range of taxa and management options, which have been applied in diverse economic and cultural contexts. Some invaluable lessons can be learnt from each of the cases described in the previous chapter and practical recommendations can be inferred in order to design better interventions and to improve existing conflict management practices. Therefore, following points suggest and discuss potential areas.

10.21 EDUCATION FOR LOCAL POPULATIONS

Education and training activities at different levels, for instance in schools or in adult education arenas such as farmer field schools, would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of HWC. Educating rural villagers in practical skills would help them to deal with dangerous wild Animal species and to acquire and develop new tools for defending their crops and livestock. Over time it would result in a change of behavior amongst local populations and would contribute to reduced risks, improvements in local livelihoods and a reduction in their vulnerability. In an optimistic scenario, education and training would promote commitment towards conservation, raise awareness on the essential role of wildlife in the ecosystem functioning and its ethical and economic value, as well as its recreational and aesthetic importance.

10.21.1 Better definitions and prediction of hot spots, data collection and evaluation of the impact:-

There are currently no national summary statistics defining the magnitude of the damage caused by different wildlife species. Good-quality and high-value information could be gathered through archival records, questionnaires, and interviews with women, community groups, village leaders, household heads, local government officials and other seasonal forest users. The challenge would be to develop and maintain an updated database containing the broadest array of records

documenting the type and location of the incidents. Such a database would provide a detailed overview of the impact on local populations, better identify which geographical zones are more vulnerable to HWC and which species are commonly involved in the conflict. As a result, it would ensure adequate use of resources, help identify high-risk areas and allow effective responses to emergencies.

10.21.2 Better sharing of information:-

The development of a web-based portal including conflict databases, remedial technologies, good management practices, innovative solutions and their outcomes would be beneficial. The portal should also provide educational material, information on high-risk areas and links to other relevant and useful web sites. It would provide valuable support to different partners dealing with the problem, granting access to information, recommendations and effective management principles.

10.21.3 Promotion of dialogue and cooperation among different stakeholders:-

The success of wildlife conservation and HWC reduction largely depends on the ability of managers to recognize, embrace and incorporate differing stakeholder values, attitudes and beliefs. The commitment and coordination of different stakeholders, local government, wildlife Services or Forestry Departments, non-governmental organization (NGOs), conservation organizations, wildlife managers, the scientific community, tour operators and the tourism industry, rural villagers and other participants, is expected to enhance the participation, contribution and support of each counterpart. Encouraging the creation of partnerships and diverse stakeholders' compliance and collaboration will make any strategy more successful, will foster mutual assistance and strengthen the possibility of resolving the HWC issue.

10.21.4 Better commitment by governments to address the problem:

Improved policy:-

In many situations, strategies or methods for addressing the HWC issue are often constrained by local, national or international regulations, laws or treaties. Moreover the ineffectiveness of some of the management practices is directly dependent on the establishment and application of policies and guidelines on a wide range of human activities. In various countries, existing wildlife policies are outdated, contradictory and require clarification, in particular those regarding land development planning and its impact on wildlife habitats. Policies on land tenure, controlled utilization of wildlife through hunting and the trade of wildlife products, game farming, tourism development and compensation schemes should be strengthened and made to conform to the present national state of affairs and population requirements.

10.21.5 Better control of hunting: limitation of persecution and poaching:-

Hunting is undertaken as a means to supplement household food consumption, for financial gain through the sale of animal products (meat skin, furs, ivory etc.) or for retaliatory killing. The latter is a real problem where HWC occurs. Persecution by humans in response to a problematic coexistence with large carnivores has been the cause of the elimination of several species from a large part of their former home ranges, this is true for species such as the tiger (*Panthera tigris*), lion (*Panthera leo*) and the snow leopard (*Uncia uncia*). A satisfactory solution would involve the protection of the principal prey that wild carnivores depend, by preventing poaching and the commercial harvest of natural prey and hunting concession are not permissible. This would maintain adequate populations and restore the natural balance between predator and prey thus preventing carnivores from relying on a diverse diet that includes domestic livestock. In addition, hunting concessions could be sold to operators organizing game safaris and the money invested in protected areas.

10.21.6 Better sharing of income from tourism:-

Wildlife is a generator of income through tourism and in many developing countries it is one of the most significant sources of national revenue generation. The tourism industry can increase employment within local communities by creating additional job opportunities. This approach would compensate the cost of maintaining wildlife and contribute to changing local people's negative perceptions of conservation.

10.22 RESCUE AND RELEASE OF WILDLIFE

Besides these human wildlife conflict resolution proposals Government of Himachal Pradesh has issued guidelines for rescue and release of wild animals vide notification No FFE-B-F (1)-3/2010 dated 02-06-2010, which is reproduced below:-

10.23 Rescue and Release Guidelines for Wild animal in HP Forest Department Introduction:-

Himachal Pradesh, a north western Himalayan state falls within one of the biodiversity Hotspots is also an important Western Himalayas endemic bird area. The state has immense importance in terms of conserving wildlife. Because of the high forest cover in the state and interdispersal of forest and human habitation human wildlife interactions are inevitable. Commonly wildlife species like black bear, leopard, and rhesus macaque come into conflict with people requiring Forest Department's intervention. Every year there are numerous cases of animals and bird species that are found orphaned, sick, injured, displaced, trapped, abandoned and/ or lying in illegal possessions.

In the absence of any state level guide lines for rescue and release of such animals that are often healthy and fit, they remain in the Zoo/rescue centers for their rest of the life. In captivity the general well being of these animals is compromised and created an unnecessary drain on financial resources of the government. The objective of these guidelines is to provide a good assessment on the requirement of wild animals which are in need of medical/supportive care and those involved in conflict situations and devise appropriate strategies to deal with them.

10.23.1 Rescue:-

i) Definition:-

Rescue of wild animals is only take in to control and animals that cannot survive on its own in the wild. This includes injured, snared animals and those trapped in the people's habitation in cases of conflict. Wild animals that are only encountered or seen "do not fall under the purview of this definition. For example a black bear encountered in an abandoned shed does not need rescue. It should be allowed to escape after making sure that no person can cause harm to it.

ii) Legal provisions:-

Amendment to section 11 of the wildlife Protection Act states "Provided Amendment that no such captured animals be kept in captivity unless the Chief Wild Life warden is satisfied that such animals cannot be rehabilitated in the wild and the reasons for the same are recorded in writing." In Himachal Pradesh, all Divisional Forest Officers of Wildlife & Territorial Divisions have been declared Wildlife wardens under section of wildlife (Protection) Act, 1972. The responsibility of rescue & release of wild animals rests with wildlife wardens in their respective jurisdiction.

iii) Guidelines:-

The following guidelines are framed to provide to field functions direction for adopting rescue procedures in Himachal Pradesh. These guidelines are formulated using presently available knowledge and shall be periodically reviewed for further improvement. The guidelines shall be applicable for all wildlife species encountered in the state.

iv) Rescue Teams:-

- i) There shall be one rescue team comprising of four forest guards, constituted in each Wildlife and Territorial Forest Division.
- ii) Each rescue team shall be imparted initial rigorous training by the wildlife veterinarian, experienced managers from the State and NGO personal involved in rescue.
- iii) Each rescue team shall also be given six monthly periodic training.

- iv) The training curriculum shall be drawn up with the help of local wildlife scan veterinarian and NGO. The syllabus shall become part of these guidelines ones completed.
- v) ***Duties of rescue teams:-***
 - i) The rescue teams shall be provided with phone numbers that are displayed in the panchayat offices and police chowkis of their divisions.
 - ii) The rescue team shall receive or gather any information related to the wildlife species which are in dire need of help.
 - iii) The rescue team shall keep proper records of information received or so gathered.
 - iv) The rescue team shall also render advice with regard to safety precaution to be taken for handing the rescue wild animals.
 - v) The rescue team shall immediately transfer the received or gathered information to the respective Wildlife Warden.

vi) *Conducting rescue:-*

The rescue team shall first assess, if the wild animal in need of help is sick injured orphaned, trapped, abandoned, displayed and or in illegal possession as defined in the wildlife Protection Act, 1972. In case of young animals which are found without the parent, the team shall make sure that it is not just a case of the mother leaving the young in order to get food. Only after due monitoring and ensuring that the young one has been abandoned, the young animals shall be rescued/ collected. In case, young animals are found by any villager, all attempts shall be made to leave the young back where found so that they can be re-united with then mother. If it is a feathered bird fallen out of nest, it shall be picked up carefully and out back in the nest.

Every rescue team will have proper emergency kit-equipment and medicine etc. Each rescue team in the Forest or Wildlife Divisions shall have blow pipes other equipment's and medicines for chemical immobilization. The tranquilizing guns being few shall be kept at strategic locations in the state all such time their availability is ensured with each rescue team so that it can be moved quickly to the zone where rescue operations are to be carried out.

The recue team shall take adequate precautions while rescuing large carnivores e.g. leopard, horned mammals like adult antelope etc. as adult animals can cause harm to the rescuers, observers and public, therefore, the recue team should adopt chemical immobilization procedure on such animals from a safe distance using blow pipes/tranquilizing guns particularly with leopards in snares. A leopard visiting a

village/town frequently, and causing nuisance cannot be caught by chemical means. A cage trap would be the workable choice in such situations.

Standard pre-defined species prescriptions for administering chemical dosage shall be followed. This shall be made available to each rescue teams. The rescue team shall also take opinion of the Department wildlife Veterinarian telephonically or any other local Veterinarian if needed. The Department shall also take all possible steps to enable wildlife Veterinarian to render their advice in such circumstances telephonically.

Immobilization procedure shall be adopted after ensuring that the spot and its surrounding are free of public and crowd. The local Forest Department staff and police may be requested to control the crowd while rescuing large carnivores locally available barriers like ropes or colored tapes etc may be used to cordon the area.

The wildlife wardens shall make efforts to develop rapport with the local police to solicit their support to control crowd during rescue operations of carnivores particularly leopards to ensure safety of both the public and the animal. The crowd management be emphasized as the most important point in addressing the welfare of an animal in distress in a conflict situation. Handling large wild animals without training and equipment shall be strictly prohibited as the same may be fated to both the rescuing team as well as to the animals.

10.23.2 Treatment, Recording, Morphometry and Safe Transportation:-

Once the animals is immobilized, it should be thoroughly examined by a veterinarian for any external injuries, wounds, recording morphometry, body measurements including weight etc, and even undertaking treatment, it needed. The animals may also be marked for identification by way of implanting transponder microchip making and ear notch etc. if resources permit. In case of birds, they may be ringed for their identification. In exveptional circumstances, when it is realized that animals are beyond recovery e.g. seriously injured and permanently disable euthanasia shall be recommended euthanasia is the act or practice of ending the life of and individual suffering from a terminal illness or and incurable condition by lethal injection. The wildlife warden shall take this decision waith the consultation/recommendations of the rescue and local veterinarian. In serious cases only, the animal or the bird shall first be transported nearest recognized rehabilitation centre/zoo of the State i.e. Rescue & Rehabilitation Centre Tutikandi / Himalayan Nature Park Kufri/Gopalpur/Shr Renukaji Zoo. The respective wildlife warden shall consult with the concerned Zoo Directors in this behalf. The rescued animals which are in dire need of care should not be allowed to suffer in a cage owing to procedural delays. The welfare of the animal should be the TOP PRIORITY.

For safe transportation the animal or bird shall be placed in an appropriately sized box with padding inside (padding not recommended for large carnivores) it possible having proper air holes for ventilation. The box/eage should be kept in a warm dark and quiet place until ready to transport. Transportation of rescued animal/birds is recommended in dark hours. If it is essential to transport in day light the cage shall be covered with a dark cloth having holes.

10.23.3 *Housing of the Rescued Animals: -*

Appropriate housing/enclosures should be made keeping in mind the biological requirements of the species. The wildlife wardens shall need to distinguish rescued animals that will be held temporarily in captivity and animals that shall require long-term care. The former shall be called “temporarily displaced” and the latter “permanently displaced” or disadvantaged wildlife.

Breeding of rescued animals shall not be permitted. Only endangered species having approved conservation breeding programme in place or included in approved collection plans can become part of the founder stock after subjected to proper quarantine and detailed health screening.

10.23.4 *Rescue of Non-Native Species:-*

Any non-native/alien species, if found in the jurisdiction of any wildlife warden of the State, for any reasons like illegal custody, straying free rearing etc shall be rescued. In no circumstances such animals should be released in the wild in the State such animals shall be sent to the nearest. Rescued and Rehabilitation center for checup and transit stay. However, the wildlife warden and Zoo Directors with make efforts to send such animal/bird, etc, to relevant rescue zoo in the country in consult ration withthe Central Zoo Authority.

10.24 *Capturing and dealing with Man-Eater Leopards: -*

The wildlife wardens shall follow following criteria to deal with capture of naturally free ranging leopards and eliminating man eaters.

- a) Mere sighting of leopards in the vicinity of a village or in an inhabited area and ensuing political pressure, media attention shall not qualify for its capture/elimination.
- b) When a human killing is reported, the concerned wildlife warden must visit the site immediately. Leopard attacks on humans are of two types. (i) Accident attacks where the person and animal by mistake bump into each other and the leopard injuries the person and runs away. (ii) Intentional Attacks the leopard intentionally attacks the person and drags/kills/ feeds in the body. Attempts should be made to establish the type of attack so that appropriate management action can be carried out. In the cases of intentional attacks, all attempts should be made to remove the animal

preferably be by trapping and tranquilisation and shooting only as a last resort. In a human dominated handscape, the decision should be taken as soon as possible because any delay in this regard by the Department may lead to antagonisra, towards the administration in case of a human death. In case of accidental attacks, the situation should, however, be monitored.

c) Leopards captured as man-eaters shall not be released back into the wild and also shall not be kept on display in a zoo. It can be kept in off-display facility in the zoo or recue centre.

d) There is no way to identify the killer animal unless it has been seen while killing. Observations by scientists indicate that many animals use the same area and even if a leopard kills, another could come to feed later, Studies also show that many individuals use the same paths and areas on the same night. They are also not as solitary as it is thought and are often found sitting near each other and would be aware of what has happened to the other. Following measures are suggested to handle the situation of a human killing by a leopard.

e) Instead of shooting the leopard, efforts shall be to catch the animals or immobilize it by tranquilizing. The immobilized animal shall be moved to a rescue centre preferably after it has been tranquilized. The caught animal shall not be released after a human attack but permission from the CWLW to euthanize the animals if recommended will be sought immediately. It shall be ensured that the villagers of the affected village/ Panchayat are present during the capturing operation.

f) Following an intentional attack on a person shooting of the leopard shall be the last resort as it has the following problems associated with it: (I) if animal is injured then it could become even more dangerous to the lives of the people around,(II) it may not necessarily be the culprit, (III) trapping and subsequent euthanasia of a leopard that was most likely the man eater (all attacks stopped after its trapping) implies that the management action would be in control of the Forest Department. However, it is important that some member of the village where the human was killed are present during any euthanasia procedure.

g) The local people shall be made aware of the problems that illegal poaching of leopards can create for them (there are many cases in Uttarakhand where illegal trade in leopard skins and bones has been detected). They are to be told that random removal of individual leopard can create potential conflict e.g. a mother killed and has a sub adult who is not very capable of hunting could result in the young animals going to the village for food.

h) The wildlife wing of Forest Department shall commence a research project for comparing leopard ecology in relation to conflict, in an area with history of human attacks and another similar area with no such attack. For this, many leopards shall

have to be collared. Within a couple of years, a lot of information shall be available to better deal with the man-leopard conflict situations. The local people should be involved at all stages of this research activity and preferably a few of them from each of the local villages should be part of the project. This shall make the villagers also more open to the ideas and recommendations that will come out of the project/study.

10.25 Release GUIDELINES: -

Rationale

It is imperative to clearly understand that zoo or rehabilitation centers are not the proper places for keeping the rescued wild animals for the rest of their lives until or unless it is so warranted from the conservation standpoint. Wild animals live much diminished lives in captivity in spite of tremendous efforts to keep them healthy and happy. Therefore the priority shall be to release these rescued wild animals in the wild. The H.P. Forest Department shall plan a release of the rescued animal if the exercise shall also be released when the species is not required to form a part of the founder stock of wild origin in any approved ongoing or proposed conservation breeding programme of CZA in the State.

10.26 Release Criteria: -

i) Fitness of Candidate Animal: -

The animal shall be subjected to proper quarantine before transporting to a release site. An animal found to be infected or tested positive for pathogens shall not be considered for release until placed in strict quarantine for a stable period and is cleared for release.

The concerned wildlife wardens, Zoo Veterinarian and zoo Director shall jointly ensure before release that the candidate animal is behaviorally competent and does not suffer from any aberrant behavior or human imprinting. They shall also ensure that the animal to be released has the potential and ability to survive in the wild.

ii) Choice of Release Site: -

The release of the animal shall take place essentially within the home range of the species and preferably within near surrounding of the rescue site if it falls within home range. The near surrounding shall comprise of the areas within 2 & 3 km radius of the rescue site in case of large mammals and for the smaller mammals it can be much less say within a km radius of rescue site., the release site shall be inspected beforehand and it shall be ensured that there is enough habitat and food resources for the animal to survive. The rescued animal/bird shall never be released in an inhabited area. The most temporarily displaced wildlife would be “hard” released (directly released back into wild) and most permanently displaced wildlife would be “soft-released” (released into large temporary enclosures within the

release site with supplementary feeding etc and eventually released back into wild after the animal has acquired necessary skills and adopted to the surroundings.

iii) Attitudes of Local People: -

The attitude of the local people needs to be taken into account towards release of animal. If the attitude of the local people is found unfavorable awareness-cum education programme should be undertaken to improve their attitude.

iv) Marking of the Candidate Animal:-

The candidate animal should be properly marked through implanting transponder microchip or metallic rings in case of birds before release, if resources permit.

10.27 Releasing animals:-

Release site should have enough area free from habitation have ample vegetative cover to provide immediate refuge to the animal to be released. The release of the animals is recommended in dark hour. Early or late hours are the best depending on the ecology of the animals for large carnivores like leopard the night hours shall be the most appropriate. At the time of rescue the animal/birds which are fit and healthy and found to be well enough to take care of themselves shall be released back within the surroundings of rescue site by the rescue team and shall submit report of the circumstances and need of rescue to the wildlife warden later on. The decision of the rescue team to release the animal entirely in the interest and for benefit of the animal/birds and local people. It shall be ensured that the rescue site is within the natural home range of the animal/birds in question. It is once again emphasized that if the rescue site is within the inhabit area the animal/bird shall be released in the nearby surroundings having enough cover to provide immediate refuge. The leopards which are accidentally trapped while chasing livestock or dogs inside the houses or cowshed in the village situated in the vicinity of the forest shall be allowed to escape during dark hours. If the rescue team is of the opinion that it is site to do so in the interest of the animal and the local people. The Himalayan Ungulates (fawn & juveniles) are sometimes reported to meander with sheep/goat herds and fall in custody of shepherds. These shall be released back in to the wild to unite with their co-specifics, once it is established that the animals' question is well enough to take care for itself and shall be able to survive on its own without any supportive care. The shepherds need to be educated of the need to release these young ungulates.

10.28 Monitoring of released animals: -

The wildlife warden shall consider putting radio collars on leopards which are captured near human habitations and then released, if resources

permit and availability of expertise. This shall help to better understand the behaviour of the animals and study whether it turns into a habitual strayer.

The released animals shall be monitored by the local staff to assess the success or failure of the release. The post release monitoring can be direct (radio collars etc.) depending on resources and expertise availability or indirectly (e.g. evidence like faeces, kills etc.). A proper record of the monitoring shall be kept by the local forest staff in respect of each released animal.

10.29 GENERAL:

This division has a varied topography, climate and forest cover and is as such endowed with a variety of fauna. The main among the mammals and birds found in the tract are the following.

MAMMALS: -

i) GORAL (*Nemorhaedus goral*):

It is found in the area East of Ghogardhar. Goral is not uniformly distributed throughout this area but is mostly concentrated in Chohar valley. This goat antelope is found on rugged grassy and rocky hill sides covered with open tree growth. This animal is reported to be occurring in fair abundance in the tract about 90 years back. It has suffered very much at the hands of poachers because of its great value and has consequently receded to more interior and difficult areas. The general colour of Goral is yellowish grey diffused with black. They generally associate in small parties of 4-8 feeding on rugged grassy slopes. They usually come out in the morning and evening but are seen throughout the day in cloudy weather. The ringed or ridged horns which curve slightly backwards, are 10-12 cms long. The Youngs are born in May-June. This is the critical time when they need cover and plenty of food.

ii) KAKKAR (MUNTJAK OR BARKING DEER) (*Muntiacus muntjak*):

This is small deer mostly found in thickly wooded areas and coming out for grazing in open grassy blanks. It feeds on grass, leaves and wild fruits. The colour of the animal is rufous grey to brown. The antlers in male are small, consisting of short brow line and in unbranched beam. They are set on bony hair covered pedicels which extend down each side of the face as bony ridges.

Munt-jak frequents in thickly wooded hills. They are seen singly or in pairs or in small family parties. The typical call from a distance sounds much like the bark of a dog. It is given out at intervals usually in the morning or evening, some times after nightfall.

iii) KASTURA (*Moschus moschiferus*):

It is found sporadically in area above 2500 meters below Nargu peak and along Hathipur Dhar. It is very much prized for its musk and has consequently suffered large scale destruction at the hands of local people and the poachers. Musk deer is nearing extinction in the area and requires immediate and complete protection. It has now been declared as protected species and its shooting and capturing is prohibited.

It is a little creature not more than 20” at the shoulder unlike the other deers, the musk has no antlers. It has long canine teeth, attached to lower jaw. The colour of the animal is usually dark brown pale beneath and the hairs are long needle like.

Musk deer lives singly or in pairs and are generally met within birch forest above the zone of pines. They come out for feeding during morning and evening. The food consists of grass, leaves and flowers.

iv)SAMBHAR (*Cervus unicolor*):

This largest deer is also occasionally met with in the lower areas. It is not very common and only a few animals are reported to be found. On account of its being found in comparatively easy and accessible areas, it has met the fate of large scale destruction. The remaining few animals can also not escape for long unless very strict protection measures are taken.

This large deer has more nocturnal habit and it retreats into heavy forest cover at dawn. It feeds on grass, leaves and wild fruits. Its coat is coarse and brown in colour with yellowish tinge. Its height at shoulders may be upto 140 Cms and may weight upto 300 Kg. It is capable of moving very silently in even the dense forests.

v)WILD PIG (*Sus scrofa*):-

Wild pig is found in the lower areas. During the past few years, the wild pigs have been indiscriminately killed by local people and outside poachers and their number is now very small.

This notorious and omnivorous animal lives in grassy, bushy and also thickly wooded areas. It feeds on field crops, roots and tubers of wild plants and even insects. It feeds during morning and evenings. It is black in colour; the skin is covered by a sparse growth of bristles which form a conspicuous mane.

vi)INDIAN PORCUPINE (*Hystrix indica*):

This destructive rodent is found in all areas of this division upto the elevation of about 2500 meters. It adopts itself to any type of land but favours

rocky hill sides where it lives in burrows dug by itself. The burrows consist of an entrance gallery and a few emergency exits. The burrows of galleries some times are 15-18 meters in length. The porcupines are characterized by the spines borne on the neck, back and hind quarters. The spines or quills on the shoulder are 15 to 30 cms long and those on the back are shorter and stout, when provoked porcupines erect their quills and rattle their hollow tail quills. It's mode of attacking the enemy is peculiar. It launches itself backward with incredible high speed and strike its hind quarters against the enemy driving its strong spines deep into it.

They are very much destructive to field crops, and gardens when adequate food is not available in the forest. The porcupine feeds on field crop, fruits, roots and tubers.

vii) FLYING SQUIRREL:

It is found from an elevation of about 1000 to 3000 meters. It is nocturnal in habit. They eat fruits of various tree species and also eat the insects, hiding under the bark. Damage they do to forest crops thus compensated by the help they render by eating injurious insects.

viii) THE INDIAN HARE (*Lepus ruficaudatus*):

This reftailed hare is found in lower areas of this division. It likes bushy forest growth and generally lives in the neighbourhood of cultivations and villages. During summer when the grass is scarce, it enters even the house compound for fresh leaves of grass. It is in general, nocturnal in habit. By day it comfortably sleeps in a bush. This animal, though small is hunted for its flesh.

ix) KALA BHALU OR RICHH OR HIMALAYAN BLACK BEAR (*Selenarctos thibetanus*):

Black bear is found through out the tract generally between an elevation of 1500 and 3000 meters. In winter months, when the higher areas are under snow, it descends down to lower elevations.

It is a solitary animal living in caves, hollow trees trunks or in areas infested with heavy bush growth. Being omnivorous, it lives on a variety of foods ranging from wild flowers, fruits, roots tubers, berries, insects of all sorts and honey. It has to know, where and when and how to procure all these things. It has also been stated that they occasionally eat eggs and carrion, in their search for food black bears have to climb trees for fruits & to nab bee-nests. During rains it migrates to the vicinity of villages where it damages the maize crops & fruit trees. It also debarks young deodar and Kail to lick exuded sap & resin.

x) BAGHERA OR LEOPARD (*Panthera pardus*):

Baghera is found through out the tract upto an elevation of 2500 meters. It is very recluse creature and generally remains close to habitation & often carries away, sheep, goats and dogs. It prefers scrub forest or open country. It does not normally attack human beings unless provoked.

In addition to the animals mentioned above, all other animals viz. Himalayan Langur, common monkey, jackals, foxes are also commonly found.

xi) BIRDS & PHEASANTS:

Among game birds found in the tract the following are the important ones:

xii) MONAL (*Lophophorus impejanus*):

Of all the Himalayan pheasants, this is one of the most beautiful. It is found in abundance above 2450 meters elevation in spruce, fir, Kharsu and birch forests. Monal is rarely found above the tree line though for feeding purposes, it may some time prey in the grassy slopes above the snow line also. During winter months it descends down to an elevation of about 2000 meters.

The male bird is characterised by brilliant metallic green head, glistening purple upper part and velvety black breast and a crest of beautiful feathers. The female is a plain looking brown bird. In Autumn, the monal feeds chiefly on grubs & maggots which it finds under the decayed leaves. In winter it often feeds in the wheat and barley fields.

The male is very much sought for plume and the female is killed for its meat. Monal breeds in May & June.

xiii) THE RED JUNGLE FOWL (*Gallus gallus*):

It is found in the scrub forests upto an elevation of about 1500 meters but during summer months it ascends to an elevation about 2000 meters. Though it is met with through-out the tract within the above altitudinal zones, the lower areas of Kataula range have comparatively more population of Red jungle fowl than the other areas.

It is spotted on the fringes of cultivations and forests clearing in the morning & evenings. It is very shy and cunning bird, scuttles into cover on slightest disturbance or suspicion.

xiv) KALESHA OR WHITE CRESTED KALEEJ PHEASANT (*Lophura leucomelanos*):

It is found throughout upto an elevation of 3000 meters. It generally likes thick forest and is usually found in pairs or small flocks of 5 or 6 birds. Though found in forests yet it prefers thick clumps of bushes or thorny thickets near cultivations.

The scale is black above, glossed with steel blue, with a whitish rump, brownish grey under parts and long tail of glossy black sickle shaped pointed feathers. Female is chiefly reddish with place scale markings brown crest & scarlet eye patch.

xv)KOKLASH PHEASANT (*Cerionis macrolophus*):

It is very common pheasant and is met with throughout the tract on steep forested hill sides at elevations above 1800 meters and is of almost the same size as the domestic fowl, the male is grey above, streaked blackish, chestnut below. A brown lying down crest, between two long metallic green horn blue tufts fanning out behind its metallic green head, its characteristic feature. The female is black and brown with buff streaks above, buff with black streaks below & prominent white through.

10.30 Monkey- Human Interaction

The monkeys have become a problematic animal for last 10 to 15 years in Himachal. Whether it is the townships or the rural areas now monkey menace is quite common. Not many efforts were made to address this problem in the past as this problem was never considered a public problem. The get going approach has led the problem to get aggravated and the situation at present is that whether it is farmers or the people living in the townships, everyone is facing the monkey menace helplessly. The efforts made for last 6-7 years at Forest department level are too meager that it has no visible impact as such.

10.30.1 The Monkey Sterilization Programme

Before we go for the mitigation of the monkey problem we need to understand the root causes of the monkey population increase and the abrupt behavior of the monkeys. This programme needs to be expedite to control monkey population.

10.30.2 Causes of increase in Monkey POPULATION: -

- i) **Change in Land use pattern –**
 - a. Shift from traditional cropping pattern.
 - b. Off season cropping and high nutritional value cropping.
- ii) **Shift from wild to co-mensal –**

- a. Due to increase in the human population even wild monkeys are now used to human habitations.
- b. Monkeys are used to the human beings as well.
- c. No struggle for food increases the life span
(Average lifespan in the wild it is around 13 to 15 years when they have to compete for food in the wild, where as when easy food is available in the form of garbage/manual feeding in the townships, they can live up to 20-25 years in town ships.)
- d. Non availability of food base in the wild (WL Habitats have degraded both qualitatively as well as quantitatively).
- iii) **No garbage management in townships-**
 - a. Easy food availability leads to multiplicity.
 - b. Increases the life span.
- iv) **Bifurcation of the groups due to the Fragmentation of Habitat or other reasons.**
 - a. The bifurcated group tend to regain the minimum same size (Group behavior)
 - b. Abnormal behavior when get separated from the group.
- v) **Manual Feeding-**
 - a. Due to religious reasons.
 - b. Increased tourism and increased number of the temples.
 - c. Disposal of the waste food.
- vi) **No predators of the Monkeys in the wild**
Monkeys are not the preferred food of leopard. Earlier large Eagles/Vultures used to pick up the infants of monkeys but now their population has gone down drastically.

10.30.3 Some of the Facts about Monkeys are:

- i) Mating is not confined to a specific season. Females mature by three years of age, and males at four years.
- ii) Females cycle similar to humans with menstrual cycles of around 28 days.
- iii) The monkey's average gestation period is about five and half months (166 days average) and most of the females in the group give birth to one baby in a year.
- iv) Males are the dominant sex, but they do not remain with troops permanently, so female monkeys lead these communities.
- v) Because troops include multiple mature males and females, their members are sexually promiscuous.

- vi) Females usually produce one young each year, which will be raised by its mother within the very social environment of the troop.
- vii) The typical lifespan of a rhesus monkey in captivity is approximately 15-20 years for males and 20-25 years for females.
- viii) The life span in the semi urban and urban areas can vary between 20-25 years where as in the wild 13 to 15 years.
- ix) The monkeys also exhibit typical 'group living' behavior like maintaining minimum population of the group (group size).

10.30.4 Mitigation Measures

We have to address all the above causes if we want to have the effective results. Before doing so actually we need to study all the above causes in detail and then we can come to the conclusion of making recommendation of some measure to control the population of Monkeys. However some of the recommendations are as under:

- i) If less than 70% animals of a particular group are not sterilized within 6 months (period of gestation) the impact of the sterilization will be minimal.
- ii) Right from capturing the monkeys, sterilization to release back at the same area the group identity has to be maintained and not to be mixed with the other group of the monkeys.
- iii) Though the females should be preferred for the sterilization but for the practical purpose both the sexes are to be sterilized to have maximum impact.
- iv) The post operative behavior of the monkeys needs to be studied especially after release.
- v) The success of the sterilization programme depends upon the percentage of the catches in a group in the first go.
- vi) The monkeys confined to the townships need a different treatment than the rural/forested areas.
- vii) The monkeys of the rural areas can be pushed back to the forest areas by making them scare and by increasing the natural food base in the wild.
- viii) The groups in rural areas which are habituated and feeds on the agricultural crop only may need to be scientifically culled. (the sterilization will not have considerable impact as it is very difficult to capture more than 70% of the group at a time in rural areas as the monkeys being semi co-mensal)
- ix) In the first go we should confine to the townships for the sterilization and release back.
- x) Modern technologies like drop nets need to be used for capturing the monkeys and to increase the catches.
- xi) Training of the staff for monkey capturing.

- xii) Focus should be the GROUP rather than number from different groups.
- xiii) Stop manual feeding (Donations be put in containers).
- xiv) Creating a mass awareness about garbage disposal, no manual feeding, how to avoid monkeys' attacks and post care etc.
- xv) Exploring the options for Export.
- xvi) As pointed out earlier, the major animals responsible for Human- Wildlife interface are Leopards, Monkeys, Wild Boars and the Black Bears.
- xvii) Some of the suggested measures for the reduction in the conflict between man and animals.

10.30.5 Proactive

- i) The villagers are already using deterrents such as making sounds at night, beating drums, lighting a fire, or putting up a scarecrow in their fields. The alternative access to crop fields can be of some use.
- ii) The Forest Officials need to take some proactive measures such as proper identification of the rogue animals, their tracking, and if needed “culling” or elimination.
- iii) Feasibility of setting up of cages/radio collaring of the problem animals may be explored. The Forest Officials and the local villagers need to put up a combined defence against such animals.
- iv) There is a need of regular census of ungulates and carnivores in the forests. The prey-predator relationship needs to be studied and worked out for the mountain animals along with the carrying capacity of their habitats.
- v) The issue of crop insurance has a lot of promise to resolve the man-animal conflict in the Joginder Nagar Forest Division. Possibility of paying a portion of the insurance premium by the Forests Officials for poor villagers should be explored which cannot be paid by the Forest Department being private land.

10.30.6 Reactive

However, once the damage is done, the provisions of relief should be an easy and straightforward process so that the poor villagers are able to receive the relief easily and without delay. It is also important that the forest department functionaries ensure that the poor people not only attend Panchayat or Gram Sabha meetings in good number but also participate actively so that their voice is heard. Proper checks and balances can be evolved and the govt. can place the funds for compensation at the disposal of a Panchayat. The removal of problem animals may be considered in case such animals have been properly identified.

In fact, the main solutions lie in awareness about the large-bodied animals, their ecology and behavior; at the same time recognition of the fact that these are the poor

villagers showing tolerance to the existence to the crop damaging bear or livestock lifting Leopard. This enhances the limits of human existence with the large carnivores. The future of man-animal conflict resolution lies as much in the involvement of the local communities in the wildlife habitat management, as in the measure that are taken to leave the wild habitats to the wild herbivores.

10.31 Forest Rules

i) Never approach dangerous animals like black bear (particularly with the cubs) very close when they are in a flat terrain. With caution it is possible to approach them in a hilly or rocky terrain where the chances of escaping these animals are much greater.

ii) If there is a fresh blood trail on the path one should proceed carefully. A wounded animal (e.g. a bear wounded by a poacher) may be ahead of us and should turn aggressive if approached very close. The same is applicable to other potentially dangerous animals like the leopard.

iii) A leopard carrying its fresh kill may cause the fresh blood trail. Approaching a leopard on its fresh kill could be dangerous.

iv) be an indication of the predator going ahead. Go with caution.

v) While on a blood trail if there are alarm calls of monkeys, and birds ahead of us it could be. If you are returning to your camp alone on foot late in the evening and if you see a dangerous animal (e.g. a bear with cubs), stop immediately. Stay at a safe distance. Hide behind a tree or rock, observe the animal and then by talking, by tapping on the tree with a stone or wood, or even by allowing the wind to carry your smell let the animal know that a human being is somewhere in the vicinity. The presence of the unseen human being makes most animals nervous and they make a slow but steady retreat away from your direction. Who will enter in to a patch of tall dense grass where you hear the hissing of a cobra but don't see the snake? We will move away from the area. The great naturalist Dr. George B. Schaller has successfully used the above technique of remaining unseen and scaring away the Himalayan black bears in Dachigam National Park, Kashmir, India.

vi) Do not stumble through the forest without carefully looking at the path.

vii) Climbing a steep hill slope by clinging on to trees, climbers and rocks. Particularly in a tropical habitat, needs to be done with great caution. Before placing the palms, which like the feet are not protected, to hold on to something, watch carefully. There could be a scorpion, a nettle plant or a wasp nest nearby.

viii) People often fail to differentiate between chasing and charging by a bear. Charging may stop with a forward aggressive rush for 20-50 m but chasing can go much beyond that even for a few hundred meters which could be very dangerous. When chased by an animal throw a conspicuous object (e.g. a white hand-kerchief) on a bush and run down a slope or run zig-zagging among the bushes. Put up as much distance as possible between you and animal. While chased, do not crouch inside a bush hopping to hide.

ix) When chased by an animal, never try to climb a tree. A jungle - living tribal can do that but not a guard if he is recruited from a town or a Manager who is not used to tree-climbing. The fear would drain all the energy needed to climb.

x) Sometimes you will be forced to walk through the forest at night. If you are in a group, stay together. As you walk along make some noise (talk, sing, or tap on a tree or rock at regular intervals). Don't surprise animals by walking in to them. Tap the ground periodically, as you walk along, either with your foot or a stick. The vibrations will keep the snakes away and most animals will also move away when they are warned from a distance.-

10.32 WILD LIFE SANCTURY:

With the increased number of crop protection guns and also increase in human population, the pressure on the wild animals and birds, has increased tremendously. Poaching also has become very rampant. It was felt very necessary to give relief to the fast disappearing fauna of the tract, the Nargu wild life sanctuary was created in the year 2013 vide H.P. Govt. Notification No. FFE_B-F(6)-16/1999 dated Simla-2 the 29th November 2013.

10.33 WILD LIFE PRESERVATION AND MANAGEMENT:

In the fore-going paras, the miserable condition of wild animals and birds and their annihilation even from the sanctuary area, has been described. Indiscriminate killing of birds and animals by poachers, granting of too many crop protection licenses for fire arms and also increase in human population have been responsible for this apathetic state of wild birds and animals. Some of the important measures which should be adopted for the preservation and propagation of wild life are:

i) Crop protection gun licenses be granted only in areas where there is a real danger from the wild animals to the fields. In case of any misuse of guns, the licenses be cancelled and guns confiscated.

ii) The License of a poachers be cancelled and gun confiscated for this offence.

- iii) The vigilance to check poaching and shooting be increased and whenever, an offender is apprehended, his gun be confiscated. The civil administration and forest department should cooperate in apprehending the offenders and putting down this crime.
- iv) Prizes and certificates be instituted to be awarded to the subordinates of forest department, police and also the villagers who help in detecting the offence and apprehending the offenders.
- v) Public, village leaders and all other be educated to preserve the wild life. Its importance from economic, aesthetic and biological balance in nature, points of view be brought home to all by showing pictures, giving short talks and putting up suitable posters at prominent places.
- vi) Posting of wild life guards to check any poaching particularly in winter when the animals and birds migrate to lower elevations.
- vii) Provision of salt lick and water holes for the wild life, be made at suitable places.
- viii) Elimination of all grazing from the sanctuary areas so that enough food for the wild life to live on and to prevent spread of disease in the area through grazing animals.
- ix) Hay be stacked at various places in the sanctuary area for the use of wild life during the winter.
- x) Suitable shrubs and bushes which provide food and shelter to the animals and birds should be propagated in the area. All shrubs on the fruits of which wild birds feed like Prinsepia, Rosa, Viburnum, Spirea and Ficus merit special mention. Where exotic fodder plants such as Clover can be safely introduced in not far distant parts of the same tract, the cultivation of these crops could be added to the local grazing supplies.

10.34 BRUSH PILES AND SLASH DISPOSAL:

Brush piles supply valuable safety cover for wild life in the forests, especially in the open woods. Slash disposal should be left piled rather than burnt unless hazards dictate its destruction.

10.35 ECOLOGY OF WILD LIFE:

Study of animal ecology evolving the knowledge of interdependence of plant and animal population fluctuate, food chains propagation and succession is very necessary for proper management of wild life. Hardly any information has so far been collected on this aspect for this tract. The field staff both of wild life wing and territorial wing should collect data about wild life ecology so that it may be of help in planning proper wild life management. Enlightened and

improved methods of management of wild animals and birds, proposes adequate inventories and without such surveys and censuses, estimates of population of wildlife in any areas, will continue to be a matter of guess.

The tract has attraction or lack of attraction to a species according to how well it supplies, the essential. It is known to all that these essentials are food, cover and such other requirements as the species may need. Obviously the critical time of the year will be most important and in this area, the pinch period is usually winter. The number for which an area can provide essentials and thus carry through pinch period is designated as carrying capacity. It stands to reason that an area will not be able to maintain more than its carrying capacity in safety and that all above this capacity is subject to loss. But measuring the cover, determination of forage and range capacity, proper use factor for big game is not so easy as it may seem. In fact determination of density and composition of the vegetation is baffling at time.

It is a fact that no sincere efforts were made in the past to save range and habitat conditions for the sake of wild animals of this tract and so, heavy incidence of grazing was recorded. Over grazing and damage to the forest as well as to the wild life has generally been underemphasized because of the economic factor involved. Reduction in grazing intensity is urgently needed in the sanctuary area at least not only for the sake of wild animals but also as a measure of protection of the range and animals in their rehabilitation. Though the principle of multiple use calls for grazing as one of the methods of utilizing forest resources, yet grazing requires rigid regulation not only from the stand point of forest reproduction but also from the stand point of wild life.

CHAPTER-XI

11 JFM (OVERLAPPING) WORKING CIRCLE

11.1 GENERAL:

By definition Joint Management would mean involving people in the decision making process in the management of forests. The participatory forest management started in 1972 in India from west Bengal. A need for participatory forest management arose in Himachal, and the PFM started in H.P in 1985 through National Social Forestry (Umbrella) project. The project achieved its objectives by covering more than 1, 00,000 ha. area under plantations. During the implementation of this project more emphasis was given on achievement of physical and financial targets than social i.e. participatory and equity issues.

In the 1980s, the World Bank supported Social Forestry project (1984-92) and the Indo-German Integrated Dhauladhar project (1982-92) were implemented in H.P. In these projects the draw backs of Umbrella projects were well addressed. Therefore in 1990s, World Bank funded IWDP Kandi project started in the Shivalik hills in which participatory approach was emphasized, later came the mid Himalayan watershed development project and at present IDP project, JICA Forestry project and KFW Project where all three issues i.e. physical targets of Forest Department, social and equity were taken all together as per guidelines of world bank and funding agencies.

The framework for JFM in H.P is provided by the Govt. of H.P order of 12.5.1993, which followed the Govt. of India (JFM) circular of 1st June 1990 from the then Secretary (Environment and Forests) enabling the spread of JFM to the Village Forest Development Committees (VFDC's) for Joint Forest Management in the Villages of Himachal Pradesh.

This working circle will be overlapping working circle and includes both degraded forests as well as healthy forests, which needs immediate treatment through protection, afforestation, pasture development, soil and water conservation etc. Treatment plan and memorandum of understanding will be different for degraded and healthy forests. As in other parts of Himachal Pradesh, most of the rural populace in Jogindernagar Forest Division uses significant quantities of forest benefits both tangible and intangible from the forest areas. There is lot of pressure on the forests, apart from the usual demand for fuel, fodder and timber. The other rights enjoyed by the right holders as per the provisions of the Settlements, also are a major stake in the forests besides the livelihood issues.

11.2 THE NEED FOR JOINT FOREST MANAGEMENT:

To address the long standing problems of deforestation and land degradation,

the approach of involving local communities in an effective and meaningful manner, is gaining acceptance significantly. Even the present National Forest Policy 1988, emphasizes on participatory management and common property management. It also specifically mentions that to achieve the objectives of the policy, a massive people's movement should be created, especially involving women. Consistent with the NFP of 1988, the Government of India, on 1st June 1990, issued policy instruction to all state governments supporting greater participation of village communities and NGOs in regeneration, management and protection of the forests. In keeping with the above notification, the Government of Himachal Pradesh has formulated a policy vide No. Forest(C) 3-4/80-V dated 12.5.1993, supporting Joint management arrangements. Ever since village communities are being involved by the Forest Department to further the aim of protection and management of forests and continuation of forest cover. The recognition of the link between socio-economic incentives and forest development has been singularly responsible in eliciting community participation. A new resolution of the Ministry of Environment and Forests dated February 21, 2000 has further strengthened the JFM programme and this circular interalia contemplates:

- (a) Legal back up to the JFM committees;
- (b) 50% members of the General Body should be women.
- (c) Extension of JFM in good forests areas, with sharper focus on activities concentrating on NTFP/NWFP management

This resolution is an attempt to evolve a proactiver and people friendly framework for meaningful implementation of the programme, though the detailed operational modalities to translate these concerns have not been spelt out.

There are various schemes and projects, initiated by the H.P. Government and some financed through External agencies e.g. externally aided projects that lay emphasis on people's involvement in forestry. The Sanjhi Van Yojana is a H.P. Government and Forest Development Agency, Mandi, Govt. of India backed initiatives. Recently the Government of Himachal Pradesh has issued a notification No. Fts-II(B)15-10/87 dated 23rd August 2001, called the Himachal Pradesh Participatory Forest Management Regulations, 2001. These rules shall be applicable to such government forests and lands, including common lands, where participatory management is envisaged.

11.3 JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH:

In 1985, social forestry was given impetus by National Social Forestry (Umbrella) Project. The project achieved its objective of planting, but physical targets took precedence over participatory objectives, and social and equity issues could not be addressed. In the 1980s, the World Bank supported Social Forestry

Project (1984-92) and the Indo-German Integrated Dhauladhar Project (1982-92) were taken up in HP. Now, they were more participatory than previous Forest Department Projects. A new scheme “Van Lagao, Rozi Kamao” was launched in 1992 in which plantation over 2 ha land was awarded to a person belonging to Antodaya category and in lieu of protection and care of this area, the beneficiary was to be given remuneration depending upon the survival percentage of the plantation. The framework for JFM in HP is provided by the Government of HP order of 12 May 1993, which followed the June 1990 Government of India (JFM) Circular enabling the spread of JFM. The HP order was compiled following study of JFM resolutions issued by other states. The JFM order coincided with the development of a donor-led (DFID) project for Mandi and Kullu districts, in which JFM was a key element. This Himachal Pradesh Forestry Project (HPFP) may be seen to have facilitated the introduction of JFM statewide. Donor support of Mandi and Kullu districts continued until March 2001. Until 1998, JFM in HP was confined to donor-supported pilot activities (DFID, GTZ, World Bank). The participation was the buzzword from Delhi, a group of four FD staff were tasked with developing plans for the new scheme. The Chief Minister was persuaded to launch Sanjhi Van Yojna (SVY). Entry point activities’- such as making pots, water taps, mending temples, small infrastructure developments; all designed to attract people to the project-were given a budget so that DFOs could be seen to be dispensing something worthwhile. To support the state JFM Order, Participatory Forest Management (PFM) Rules were support the state JFM Order, Participatory Forest Management (PFM) Rules were developed for HP, and notified on 23rd August 2001. These Rules make provision for increasing the institutional autonomy of Village Forest Development Committees (VFDCs) by registering them as Village Forest Development Societies (VFDSs) under the Societies Registration Act. Importantly, the PFM Rules encourage VFDS formation panchayat wardwise thereby attempting to link these bodies directly with the structure with each elected panch being on the executive committee of the VFDS, ex officio. However, the role of the VFDSs continues to be viewed narrowly, focusing mainly on helping the HPFD to police forests and on wage-based micro-plan activities. The resulted in the ‘New SVY,’ rules and guidelines being announced by the GoHP in August 2001. They contains provisions for VFDSs to become, in legal terms ‘the forest officer’(not notified as on July 2011) for levying fines etc, and for 100 percent share in intermediate usufructs while on final harvest 75 percent would go to the VFDS and 25 percent to the Panchayat. The GoHP agreed to completely forgo any share from JFM areas. Under ‘New SVY’ entry point activities are abandoned but “Income-generating activities” introduced; forest guard will not be the member secretary of the Executive Committee; but local organizers-usually led by a literate woman linked to a local community-based organization, helps mobilize towards a properly representative VFDS based on a panchayat ward. Several meetings are held before a microplan is

initiated- this shows VFDS maturity. The FD sends a cheque to a local bank account. The VFDS agrees with the FD for furnish a ‘utilisation certificate’ which can be monitored and checked.

At the policy level the PFM Rules and SVY Rules and SVY Rules and Guidelines of August 2001 are seen as a major step forward, laying the basis of uniformity in approach to community based forest management. It also makes JFM poverty focused and is targeted to the resource dependent. In 2003, MoEF started the Forest Development Agencies (FDAs) at district level-with DFOs getting direct access to central funding- for forest and plantation work for employment generation objectives. This is an 100 percent central sachem, created to reduce the multiplicity of schemes with similar objectives (it merges four existing central schemes), ensure uniformity in funding pattern and implementation mechanism, avoid delays in availability of funds to the field level and institutionalize peoples, participation in project formulation and implementation. FDAs will be constituted at the territorial/wildlife forest division level, and JFM committees will be implementing agencies at grassroots level. FDAs are to work through forest guards/Deputy Rangers and thus appear to conflict with SVY rules, which allow for the member secretary to be elected by the JFMC/VFDS. The growth of FDAs and therefore of JFMCs since 2003 appears to be fluctuating as figures culled out from various departmental reports indicate. In March, 2003, 678 JFMCs were reported covering a forest area of about 1640 Km² distributed in RFS, DPFs & UPFs. In March, 2005, 1690 JFMCs are reported covering a forest area of over 4200 Kms. As of December 2008, 1381 JFMCs stand listed. However, as per field reports only 986 of these are said to be active. In March, 2010, a total of 1109 JFMCs have been reported covering again an area of about 4200 Kms.

11.4 SPECIAL OBJECTS OF MANAGEMENT:

The main objectives of the participatory approach to forests production and management are:

1. To give the local village communities a stake in the well being of the forest by giving a share of the produce.
2. To develop institutions at the local level to provide a forum for developing the participatory approach and to manage the sharing of responsibilities and benefits.
3. To enlist the help of committed non-governmental organizations, collages and schools, local women and youth clubs and other groups with a proven track record to start the dialogue between the Forest Department and the villagers.

4. To provide an effective treatment for waste lands degraded forests and forest lands situated near villages through protection, afforestation, pasture development and soil conservation by active participation of local people.
5. To augment fuel wood, fodder and small timber production for use by local people.

The Govt. of H.P has notified Himachal Pradesh Participatory Forest Management Regulations 2001 and the Sanjhi Van Yojna Scheme, 2001 which have strengthened JFM approach to a great extent. These regulations are reproduced in Appendix-VIII (Vol.II).

To achieve these objectives it is suggested that all activities, as far as possible, should be carried out after involving local people. However, the general prescriptions of the working plan be adhered to. It is also suggested that species of local importance be preferred in afforestation activities. Such species should have economic value and should be fast growing, high yielding and of multiple use. Species that provide raw material for local industry, craftsmanship should be encouraged. Quick growing and high yielding grasses and legumes e.g. Hybrid Napier, provide immediate alternatives to fodder demand and should be introduced along with tree species to sustain people's interest in the closed areas. Bamboos should be planted in gullies, nalas and moist pockets as these would serve the dual purpose of soil conservation and fuel and fodder replenishment as these are relatively quick growing. An all out effort should be made to evolve a "Community-State Partnership".

11.5 STEPS INVOLVED IN JOINT FOREST MANAGEMENT:

Community participation is an important aspect of any joint management plan. The process of community involvement starts from identification of the village to problem analysis and in monitoring and evaluation of the programme. The sustainability of any such practice or activity depends on the level of participation. Participation fosters ownership of the people over the resources being managed by such joint activity and ensures better results.

Participatory planning helps in

- building the "we" feeling;
- involve and ensure the community's participation
- transparency
- brings clarity; and sustainability

j) Future Scope

There is some scope for the JFM activities in the division. The forest areas where plantation and protection is the main focus are suitable/ potential sites for afforestation, soil conservation, grassland improvement, NTFP development besides other forests.

iii) Potential Activities of JFM Committees

The JFM/PFM committees can be the future agencies of forest development, conservation and expansion. The potential activities to be executed through JFMCs can be:

- i) Afforestation activity (both departmental and MNREGA)
- ii) Soil & water conservation through treatment of micro watersheds in a catchment.
- iii) Recharging of water bodies like bouldies, ponds and underground water.
- iv) Minor construction work of road, paths and buildings.
- v) Awareness programme for forest protection, fire protection, propagation of medicinal herbs on a largescale.
- vi) Livelihood options like bee keeping mushroom cultivation, vermicomposting, cutting & pruning etc. through effective training.
- vii) Collection, value addition and marketing of NTFP.

iii) Selection of JFM Working Areas

The following broad guidelines have been devised for selection of potential (pilot) areas:

- i) Interest of local forest staff in involvement in joint forest planning and management;
- ii) Interest of local people in involvement in joint forest planning and management;
- iii) Existence of ongoing 'successful' collective land management systems;
- iv) Resource poor areas where there are constraints on the forest and farming system in term of access to grazing and forest products;
- v) Relatively homogenous local communities.

The information will be gathered from village-level PRA studies; workshops held with range officers and forest guards, in conjunction with village visits and meetings to determine local people's perception of problems and possible

intervention. User's definition of problems and approaches will provide the principal guide to action. Complex social environments will not be tackled in the initial stages. It is not expected that there will be 100% success rates in the establishment of Village Forest Development Committees. In some cases the field staff may have to withdraw from certain villages, because conflicts are too great. This should not be seen as a failure of the process, rather it is part of the process of adapting to and accepting village-level realities, where there is sometimes irreconcilable difference between groups. In order to reduce the risk of failure, planning exercises will focus on assessing the current and future needs of all the users of the forest resources (including women, poorer villagers and migratory graziers), and reaching consensus through negotiation in order to establish sustainable ways of managing resources for those who most need them.

iv) Participatory Rural Appraisal (PRA):

Participatory Rural Appraisal (PRA) will be used as a way to facilitate Communication between users and the Forest Department and to determine problems and priorities. At this initial discussion stage it is likely that only partial information will be obtained from the village, so it will be necessary to repeat the PRA exercise. Repeated PRAs would be used to continue the dialogue and build on the information base. PRA will be used to identify particular area needing more detailed socio-economic research.

v) Specifically PRAs will be used to:

- i) Finalize village selection
- ii) Build up baseline information
- iii) Identify forest users and their priorities
- iv) Provide the context for experimental learning for the staff and to create the basis for effective interaction between the department and forest users.
- v) Identify local option for institution building
- vi) Draw up village level agreements.

vi) The key objectives of this PRA would be:

- i) To identify local resource use system; access rules; differential control; legal and customary status of land of land; past and current tenurial status of land.
- ii) To document existing land use practices and management as a basis of their development.

- iii) To document current interaction between forest, farm and pasture; type of usage; division of labour.
- iv) To build a detailed picture of the socio-economic context of villages; identify different categories of household (i.e. household profiles); to identify and assess effectiveness of village institutions and leaders; to identify different levels of decision making in resource use and their relative importance, i.e. village council. Men, women, rich, poor.
- v) To identify user's priorities and means of reaching consensus.
- vi) To identify different users' constraints to participation, for example women's labour time, poorer people's lack of access to decision making.
- vii) To identify and assess effectiveness of existing village level institutions, cooperative action between villages as a means to build more effective village or user group organizations.

vii) PRA Process

The PRA process will be initiated to provide a growing dialogue between the department and forest users. Initially, information may be coloured by misunderstanding and mistrust on both sides. It is only as familiarity and participation in the benefits of joint management become apparent to forest users that a relationship of understanding and trust will be built between the staff of

viii) PRA Technique

The PRA technique to be used in joint forest planning and management will include:

- i) Review of secondary data and existing information.
- ii) Direct observation.
- iii) Semi-structured interviews.
- iv) Group interviews (casual, focused, village).
- v) Use of key information's, local experts.
- vi) Use of local researchers.
- vii) Ranking: wealth ranking, pair-wise ranking, direct matrix ranking.
- viii) Livelihood analysis.
- ix) Seasonal diagramming (firewood, fodder, NTFPs, labour etc.)
- x) Transects (systematically walking through an area with a group

- of local people).
- xi) Participatory mapping, modeling; people's mapping and modeling.
- xii) Linkage chart (showing links between village organizations, between villages, and forest resources).
- xiii) Case studies and stories.
- xiv) Ethno-histories.
- xv) Brainstorming (especially joint sessions with villagers).

ix) Role of FRONT-LINE Staff

Forest Guards will coordinate all inputs to the village and will act as the interface between villager and the department. They will be conduit for the flow of information both up and down the system. They will establish links with other village-level organizations and government extension agents where appropriate. The departments most likely to be involved are Animal Husbandry, Agriculture and Rural Development.

Forest Guards will have the following responsibilities:

- i) To establish effective and representative Village Forest Development Committees;
- ii) To maintain contact with joint forest management groups (VFDCs);
- iii) To provide technical advice as required;
- iv) To arbitrate between groups if conflict arises and requested ;
- v) To collect information through PRAs;
- vi) To provide feedback to the department;
- vii) To facilitate the full participation of women and poorer people;
- viii) To liaise between villagers and the department.

Although these activities are all additional to the current work of forest guard; the experience elsewhere indicates that as the JFPM process strengthens the more onerous protection workload of the guard will reduce.

x) Field level Training

Field level training will be carried out through participatory workshops which encourage an experience based learning approach. At outset these workshops may be facilitated by some JFPM Training specialist. Each person participating in the workshop should share his experience and knowledge with other participants

including the facilitators. A series of workshops should be organized at different levels, such as:

- i) Circle-level workshops
- ii) Divisional-level workshops
- iii) range-level workshops
- iv) Beat-level workshops

xi) Villagers Reorientation

Reorientation is not essential for the staff only, villagers will also need to be reoriented in their approach to the management of local natural resources, and in their perception of the role of the staff. The joint forest planning and management system forms a major part of this reorientation. Workshops should be organized for local leaders (local politicians, ehaviors leaders, teachers, other key persons); and VFDCs. This will provide a forum where VFDCs can share experiences, learn from each other, and develop combined strategies and approaches to JFPM.

xii) Micro Plan

Before a VFDC can manage a forest, it will be required to prepare a micro plan. The micro plan will be prepared jointly by Executive Body of the VFDC and the Range staff, and will be discussed with the General House. It will be finally approved by the concerned DFO. The information's gathered during the PRA exercise will be helpful in preparation of the micro plan. Locally drawn maps of the area may be useful to ensure that everyone understands what areas are to be managed.

xiii) The micro plan should:-

- i) Detail which households and villages have access and right to the forest lands and forest products;
- ii) Include detail on protection and decision-making mechanisms;
- iii) Detail forest management prescription;
- iv) Detail soil conservation measures if considered necessary by the VFDC
- v) Detail grassland management measures if considered necessary by the VFDC
- vi) Demarcate the responsibilities of the department and the villagers (forest users);
- vii) Detail unambiguous rights to the usufruct and harvesting of common plantation, grassland and forest area;
- viii) Detail clear rules and mechanisms for the distribution of

benefits: intermediate and the final harvest, among users.

xiv) Duties and Responsibilities of JFM Committees

To make the JFMCs active and functional, each member of JFMC should shoulder certain duties and responsibilities.

xv) Duties of JFM Committees

- i) To persuade the villagers to give available areas for plantation.
- ii) To assist the Forest Department in planning, protection, afforestation.
- iii) To help the F.D. in judicious use, of all existing rights and behavior sharing of usufructs, eco-development of the area as per approved management plan.

xvi) Responsibilities of JFM Committees

It will be the responsibility of committee to ensure:

- i) Just and fair distribution of the usufructs derived.
- ii) Ensure its management as per prescribed norms.
- iii) Settlement of all disputes between villagers
- iv) To honor all commitments.

xvii) Power to JFMCs

The committee should make its own bye-law with the concurrence DFO. The concerned DFO should carry out necessary procedure for granting powers of a forest officer as mentioned in HPPFM regulations, 2001.

- i) Power to register Damage report.
- ii) Power to summon the accused to the general house of JFMC.
- iii) Make recommendations to Range officer regarding Compounding of damage in respect of offences committed on JFMC areas.

xviii) MOU between Forest Department and JFMCs

In the participatory mode, the scheme is being implemented by setting up Forest department agency (FDA) at Forest division level and JFMC at village level. As per the notified regulation titled HPPFM regulations, 2001 notified vide no. Fts. IIB/15-10/87 dated 23.8.2001, MOUs were signed between State Govt. represented by DFO of Forest Division in which FDA is being implemented and JFMC through its president during November 2009. Govt. of H.P has approved this MOU after getting vetted from the law Department the copy of which is annexed as

Appendix-VIII. This MOU shall be valid for a period of five years from the date of signing as per terms and conditions detailed in the MOU for proper protection, maintenance, regeneration and management of plantation created under FDA and other forestry schemes within the jurisdiction of the JFMC.

In addition, a MOU has been signed between Forest Department and JFMCs for fire protection. No fire watcher is engaged in the area of JFMC. Further, a provision of honorarium/ assistance has been made to be paid to JFMCs for doing excellent works in fire fighting.

xix) NTFPs

JFMCs can play an important role, in collection, marketing and propagation of NTFPs. Many villagers are dependent on collection of NTFPs to sustain their livelihood. So there is need to introduce such medicinal plants in the locality of JFM.

The JFM activities would concentrate on NTFP management and no alteration should be permitted in the basic silvicultural prescription but to promote regeneration, development and sustainable harvesting of following NTFPs:

- i) Medicinal and aromatic plants
- ii) Grasses
- iii) Fiber and flosses
- iv) Tans and dyes
- v) Gums and resin etc.

xx) Development of Technology for Value Added Products

There is a lot of scope for development of technology for value added products. Various NTFPs are growing in the vicinity of JFMCs area. The value of original products collected directly from the forest is very less but if it is processed the value goes 2-4 time more than the original one. For example, Anardana, Amla Pickles, Murabba, Jam, Squash etc.

xxi) Eco-Tourism

There is need to develop specific sites for eco-tourism in JFM localities. Through various projects like stay home scheme, traditional food/ Ethnic food serving etc. through eco-tourism the villagers not only get employment but self-business will raise their income and it will become a source of livelihood.

xxii) Vermi Compost

Almost each JFMCs member has domestic animals. So they are dependent on forest for grazing of animals, collection of grass and fodder from forests. By collecting leaves and grasses for preparing vermicompost the villagers can manufacture vermicompost at their door steps. Thus through training for preparation of vermicompost to the JFMCs members' large amount of vermi

compost can be prepared and sold in market in view of its large demand. This activity will definitely increase the agricultural and horticultural production. Moreover, this will help to save and protect the micro and macro natural nutrients of the soil which will subside the adverse effects of use of artificial fertilizers, and therefore will go in the long run to boost the economy of local people and raising their living standard.

xxiii) APPROACH TO BE ADOPTED IN IMPLEMENTING JFM SCHEMES

- Educate people on the aim and objectives of the programme/scheme before launching the programme/ scheme;
- Make extensive and intensive use of PRA techniques to formulate the plan and share the derived information with the people;
- Draw up a working scheme/ Microplan with the active involvement of the local people, ensuring representation of the heterogeneity of the group;
- Execute works and use PRA techniques for monitoring as well;
- Exemplify spirit of participation by well defined, lucid usufruct sharing mechanisms and transparency in accounting the expenditure on the works.

11.6 PAST EXPERIENCES IN PARTICIPATORY APPROACHES

The Social Forestry Umbrella project was a pioneering effort in perhaps, for the first time people were associated with forestry works and forestry was taken outside forest areas to village lands. This Project ended in 1993. A new scheme “Van Lagao, Rozi Kamao” was launched in 1992 in which plantation over 2 ha land was awarded to a person belonging to Antodaya category and in lieu of protection and care of this area, the beneficiary was to be given remuneration depending upon the survival percentage of the plantation.

11.6.1 CONSTRAINTS TO PARTICIPATORY MANAGEMENT

There is a general lack of enthusiasm in embracing the idea of shared management in the forestry sector by the people and though some inroads have been made with the communities, a lot more thrust needs to be given to popularise the concept among the masses. The main causes for this lack of encouraging response among people are:

- (a) There is a general apathy of the youth to participatory programmes related to rural sector because with acquiring college education all youth strive for white collared jobs and anything that keeps them back in villages does not enthuse them.
- (b) Lack of proper education of the government programmes and insufficient extension activities of the department.
- (c) Long gestation period of forestry activities.
- (d) Too much dependence of the public on government and subsidy, cost sharing in such activities is generally not accepted.

- (e) Reluctance of government functionaries to hand over control of resources to people or even partially share their “power” with the people.
- (f) Lack of proper legislation on participatory management and usufruct sharing.
- (g) Need to promote income generating activities under JFM programmes.
- (h) Frequent changes in schemes and discontinuation of old schemes which leads to mistrust of people in government.

11.6.2 MONITORING AND EVALUATION

The monitoring of the progress and performance of the activities taken under this working circle under different schemes should be done at the Divisional level. Evaluation of the schemes should be planned at an interval of three years.

CHAPTER XII

12. NON-TIMBER FOREST PRODUCE (OVER-LAPPING) WORKING CIRCLE

12.1 GENERAL:

This will be an overlapping working circle. All the aspects pertaining to NTFP's will be discussed. The NTFP species found in the tract will be listed out. Programme of planting and establishment of nurseries for NTFP along with extraction cycle will be discussed and suggested

Earlier, the management of forests was based on production of timber and earning of revenue. The non-timber forest products were considered to be much lesser importance. After 1980, the earning of revenue from forests and there management for commercial production of timber has been removed from the policy framework and objects of management. The 1988 National Forest Policy emphasizes on in situ conservation of natural eco-systems. Conservation and propagation of non-timber forest products and their contribution towards local/tribal economy has also been given importance in the policy.

This would be an overlapping working circle covering all the working circle and is constituted to ensure systematic development and exploitation of non-timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, grass. The main emphasis/focus would be on medicinal plants and Resin.

12.2 Blocks and Compartments

The entire tract of the division will be covered by taking beat as a unit.

12.3 Area Statement

The working circle is overlapping, no area statement is required.

12.4 SPECIAL OBJECTS OF MANAGEMENT

The State has formulated Himachal Pradesh Forestry Sector Medicinal Plants Policy, 2006 which is aimed at conserving and strengthening medicinal plant resource base in forest areas as well as outside for use towards enhancing health and livelihood security of the people of the State on sustainable basis. The special objects of management would be:-

- i) To conserve and augment existing non timber forest produce including medicinal plants resource in its natural habitat.
- ii) To encourage cultivation of commercially important species of medicinal plants on private lands
- iii) To develop a system of pricing the wild harvest so as to reflect both the conservation costs and the community benefits.
- iv) To encourage public-private-community partnership for building capacity for cultivation, value addition and processing of raw material before export from the state.
- v) To promote the use of commercially viable medicinal plants by the state owned and private pharmaceutical units and subsidiaries engaged in value addition.
- vi) To maximize yield of medicinal plants through sustainable natural and artificial regeneration and scientific exploitation.

12.4.1 ANALYSIS AND VALUATION OF THE CROP

The entire tract is rich in many useful shrubs, herbs, fungi which have been exploited from time to time. The area produces large quantities of Banafsha, Kakar singhi, Anardana, Guchhi, Rakhal, Lichens, Berberis roots etc. A list of commonly used or economically extracted medicinal herbs, plants occurring naturally are as under:-

Table -12.1
Medicinal Plants of Jogindernagar Forest Division

Botanical Name	Common Name	Habit	Occurrence Zone	Parts Used
<u><i>Aconitum heterophyllum</i></u>	Mithi Patish	Herb	Sub alpine	Root
<u><i>Acorus calamus</i></u>	Barian	Herb	900 to 2000m	Rhizome
<u><i>Angelica glauca</i></u>	Chora	Herb	Above 2200m	Whole plant
<u><i>Artimisia nilagirica</i></u>	Siski	Herb	1500-2500m	-do-
<u><i>Asparagus adscendens</i></u>	Sufed Musli	Shrub	Upto 1800m	Root

<u>Berberis spp.</u>	Rasaunt	Shrub	1800-3200m	Root
<u>Cannabis sativa</u>	Bhang	Herb	Up to 1600m	Leaves
<u>Cinnamomum tamala</u>	Tej patta	Shrub/Tree	Up to 2200m	Leaves
<u>Dioscorea detoidea</u>	Shingli mingli	Climber	Upto 2200m	Tuber
<u>Ephedra spp.</u>	Bhutshur		Above 2200m	Roots
<u>Heracleum candicans</u>	Patlain	Herb	2000-2500m	Roots
<u>Mallotus phillipinensis</u>	Kemal	Tree	Up to 1000m	Roots
<u>Morchella esculenta</u>	Guchhi	Fungus	1500-2500m	Fruiting body
<u>Myrica nagi</u>	Kaphal	Tree	1000-2100 m	Fruit
<u>Dactylorhiza hatagirea</u>	Salam Panja	Herb	Above 3000 m	Roots
<u>Picrorhiza kurrooa</u>	Karoo	Herb	Above 3000m	Roots
<u>Pistacia integerrima</u>	Kakarsinghi	Tree	Up to 1500m	Fruit
<u>Podophyllum emodi</u>	Bankakri	Herb	Above 2200m	Rhizome
<u>Polygonatum verticilatum</u>	Salam Mishri	Herb	2300-3000m	Leaves
<u>Potentilla fulges</u>	Bajardanti	Herb	1500-3000m	Roots
<u>Rhododendron arboreum</u>	Cheo	Tree	1200-2400m	Leaves
<u>Rhododendron companulatum</u>	Saranger	Tree	Sub alpine	Flower
<u>Bergenia ligulata</u>	Pathar Tor	Shrub	1800m & above	Whole plant
<u>Swertia chirata</u>	Chiryata	Herb	Sub alpine	Flower
<u>Taxus wallichiana</u>	Rakhal	Tree	2400-3000m	Leaves
<u>Thymus surphyllum</u>	Banajwain	Herb	1200-1800m	Seeds, leaves

<i>Tinospora cardifolia</i>	Gall	Herb	1500-2200m	Leaves
<i>Viola serpens</i>	Banafsha	Herb	1000-3000m	Flower
<i>Valeriana wallichii</i>	Mushbala	Herb	2100-3000m	Root stock
<i>Valeriana hardwickii</i>	Nihani	Herb	1200-3600m	-do-

Stock Maps:-As the medicinal plants are mostly herbs and shrubs found on annual or perennial basis, stock mapping is not possible.

12.5 CALCULATION OF YIELD

No yield can be prescribed as the most NTFPs are extracted through right holders. However, proper record of all the NTFPs exported through Panchayats and the department, should be maintained annually and entered in respective compartment history files.

12.6 SUBSIDIARY SILVICULTURAL OPERATIONS

As no silvicultural system is prescribed, no specific operations are proposed. However, when the medicinal plants are raised in the nurseries or plantations, the regular operations like closure, weeding, bush cutting, protection from fire, grazing etc. are to be carried as in case of tree species

12.7 ARTIFICIAL PROPAGATION AND CONSERVATION

Keeping in view the economic importance and demand of medicinal herbs, it is desirable to encourage naturally occurring medicinal plants in suitable localities. The demand of medicinal plants has picked up with setting up of pharmaceutical industries in the state. The existing germplasm of different herbs needs to be conserved. Following measures are suggested for the conservation, protection and propagation of medicinal plants:-

- Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration.
- The raising of nurseries/herbal gardens, drug farms should be developed through various research institutes like HFRI, UHF, Nauni, HPKV Palampur, CSIR Palampur, Ayurveda department who are engaged in medicinal and aromatic plants .
- Medicinal plant collectors should be educated and provided proper information or guidelines so that there is continuous regeneration of medicinal herbs.
- The community based organizations like Mahila Mandals, Yuvak Mandals, VFDCs and other rural co-operatives should be involved in the development, protection, propagation and conservation of medicinal plants.

Propagation Techniques:-The technique of propagation and harvesting of some important plants is as under:-

Table -12.2
Method of Propagation of Medicinal Plant

Name	Method of Propagation	Harvesting/Collection	Uses
<u>Artemisia nilagirica</u>	The seeds are minute. The sowing is done in Feb./March. Seedlings are transplanted in June-July in pits at a spacing of 0.5m×0.5m.	The crop is harvested in October when the plants flower.	The flowers are used in extraction of drug used as wormicide.
<u>Acorus calamus</u>	The species is propagated by sowing as well as planting rhizomes at 15m deep at 30cm×30cm spacing during Feb.-March. If direct sowing is decided, then the soil is worked up to a depth of 15 cm. Sowing is done in patches which may be spaced at 30 cm X 30 cm	Harvesting is done after one year during Nov.-Dec.	The dried rhizome is generally used in the form of infusion. It produces best results in case of dyspepsia and chronic diarrhoea.
<u>Aconitum heterophyllum</u>	The species is propagated by direct sowing in patches at 30cmX30cm during Feb.March	Roots are dug out in the month of Oct.-Nov.	Roots are used as astringent, tonic and in diarrhea, cough
<u>Angelica glauca</u>	The species is easily propagated by sowing	Collection/harvesting is	Roots, fruits used for flavouring. Used in

	in patches at spacing of 3'×3'. Sowing is carried out in Feb.-March.		medicines for digestion, heart burn, flatulence.
<u><i>Dioscorea deltoidea</i></u>	It is propagated by planting rhizomes in 15cm deep pit at the spacing of 60cm×45cm during March. About 15-18 Qtls. Of rhizomes are required for one hectare area.	Tubers are dug out in Nov.-Dec.	Tubers yield steroidal sapogenin which is a source for manufacture of oral contraceptive.
<u><i>Raclem candidans</i></u>	The species is propagated by seeds and root cuttings. Seeds @ 10-15 Kg/ha are required. The root cuttings 2.5cm to 4 cm long should be planted in 30 cm deep pits at a spacing of 75cm×50cm in March April.	After one year, the roots/tubers are dug in Oct.-Nov.	Roots are source of xanthotoxin, a furocoumarin which is used in treatment of leucoderma, fruits as aphrodisiac & nervetonic
<u><i>Podophyllum emodii</i></u>	The rhizomes are planted in 15cm deep pits in the zone of natural occurrence. The seeds germinate in about 3 years but if sowing is done in bores at low altitudes, it can germinate in 6 months, then the seedlings can be taken to sub alpine region and transplanted.	The rhizomes are collected when fully developed.	

<u>Picrorhiza kurrooa</u>	It is easily propagated by planting rhizomes in 15 cm deep pits at a spacing of 60cm×60cm during Nov.-Dec	Collection is done after 3-5 years when rhizomes are fully developed.	Roots are used as stomachic, tonic, improve appetite and stimulate gastric secretion.
<u>Swertia chirayita</u>	It is propagated by sowing of seeds in patches at a spacing of 30cm×30cm during Feb.-March.	Harvesting is done in following November-December.	The dried plant yields drug used as tonic, stomachic, bronchial asthma & liver disorders.
<u>Valerina wallichii</u>	The species is propagated by direct sowing or planting rhizomes in 15 cm deep pits at spacing of 30cm×30cm during Feb.-March. About 25-40 Qtls.of root stock is sufficient for one hectare.	Rhizomes are dug out after 3-5 years when full developed.	Dried rhizomes are employed for hair and perfumes, as incense and in drugs for hysteria and nervous problems.
<u>Viola serpens</u>	propagated by sowing or planting root suckers at a spacing of 15cm×15cm during June-July.	Feb.-March in low lying area and in April-May in higher reaches.	Trouble, eye and ear diseases. Also used as blood purifier.

12.8 DISCUSSION ON MEDICINAL PLANTS AND GRASS

The resin has already been dealt with under chil working circle and the remaining is discussed separately as under:

i) MEDICINAL PLANTS:

A large number of medicinal herbs are found growing all over the tract. The area below Nargoo peak and along Nargoo-Hathidhar in this division herbs met within the tract have been given in the appendix of the many medicinal herbs, growing in the area the following are some of the important ones.

ii) VIOLA SERPENS (Banafsha):

It occurs in almost all the forest between an elevation of about 2000 to 3000 meters except those areas which are very much overgrazed. It is collected by the local people and then exported through the local dealers. A large quantity of Banafsha is extracted and exported outside the state.

iii) VALERIANA WALLICHII (Mushak bala):

It is quite common in all the forests between an elevation of 2000 to 3000 meters. Sheltered localities and comparatively areas are richer in these medicinal herbs than the exposed spurs and overgrazed areas. Its roots are collected in small quantities by the local people and are exported. The quantities exported outside in different years in the past, are given in separate table.

iv) PODOPHYLUM HEXANDRUM (Ban kakri):

It grows scattered in fir forest between an elevation of about 2500 and 3000 meters. It has been exploited from the accessible areas and now only some scattered plants are found. In this division Ban Kakri is not found in quantities sufficient for commercial exploitation.

v) SWERTIA CHIRATA (Charaita):

It is found in Fir forests and alpine pastures between an elevation of about 2000 to 3500 meters. Deodar, JahkhwanGahar, Pachhaundgahar, GramanGahar, Daman Gahar, Bhuboonal forests of this division are comparatively richer in Chirata than other areas. Chirata is collected by villagers for their own use for export in small quantities.

vi) DIOSCORIA DELTOIDEA:

It is found scattered in forests between an elevation of about 1000 to 2500 meters. Lower areas of Malwara and Barot blocks are comparatively richer in this medicinal herb. Dioscorea has not been extracted on any commercial scale from this tract so far. Because of the importance in recent years and the attractive price being paid by some private firms, its extraction has been started from areas where this medicinal herb is available in large quantities. Details of quantities extracted during the last 10-15 years are given in the table which clearly indicates the increasing interests taken by the local people in this particular commodity. But timely and adequate

vii) TEJPATA (Cinnamomum tamala):

It occurs in some forests of Darang range. Though it does not occur extensively but it can be auctioned in small lots. Besides the above medicinal herbs *Berberis* spp (Rasaut) *Embllica officinalis* (Amala) *Pistacia intergerima* (Kakarsingi) *Myrica nagi*

(kaphal) and *Polygonatum vertillatum* (salamishri) are also extracted for medicinal purposes.

12.9 EXTRACTION:

Continued and excessive extraction of medicinal herbs and may at place result in the extinction of more valuable species. It is therefore, suggested that those medicinal herbs, whose roots or stems are used as medicine should be extracted from a particular area in alternate year not continuously. In view of the unrestricted rights of local people to collect medicinal herbs, it will not be possible to place this restriction on the local people but where the areas are to be auctioned for the extraction of medicinal herbs, this suggestion should be kept in view.

12.10 ARTIFICIAL PROPAGATION:

In view of the increasing demand and great economic importance of the medicinal herbs, it is considered desirable to cultivate important medicinal plants in suitable areas. In view of the fluctuating and changing market demand for different medicinal herbs, it is difficult to formulate a definite plan for the propagation of medicinal herbs. It is however, suggested that 5 acres should be planted or sown annually with medicinal plants having definite market demand.

12.11 TECHNIQUE OF PLANTATION:

The technique of propagation and collection of the medicinal herbs suggested for artificial propagation is discussed below for the guidance of the staff.

i) *Dioscorea deltoidea* (KINAS):

It prefers warm, temperate climate, Sandy loam soil which is better than either sandy or clayey soil. It requires sufficient soil moisture but can not with stand water logging.

Dioscorea deltoidea can be propagated either by sowing the seed or by planting of tubers. Tubers planting gives better results & quicker growth of plants and is therefore recommended. The tubers should be planted in the month of March, in well prepared pits. Planting distance should be kept about one meter x 40 cms.

Two and half years old plants are expected to yield exploitable tubers. To get the highest yield of alkaloid, the tubers should be dug in the month of September or October. The tuber should not be cut injured during digging and should be dried in the sun. It should be ensured that tubers are not attacked by fungus during digging. The yield from a well stocked crop is expected to be about 20 quintals per hectare.

ii) *Podophyllum hexandrum* (BAN KAKRI):

It thrives best on deep, rich, well drained soil with partial forest cover and

good supply of moisture. Cool depressions under the canopy of spruce or silver fir are the best sites for this plant. It can be propagated either by sowing seeds or by planting rhizomes.

12.11.1 FROM SEEDS:

Berries ripen towards the end of August and should be immediately collected thereafter otherwise are eaten by birds or rodents and sometimes removed by villagers. Seeds should be sown in nursery either in November- December before snowfall or in March soon after the snow melts. Before sowing the seeds should be put in hot water for 1 to 2 minutes to hasten germination. The seedlings should be planted at a spacing of about 40cmx 40cm in July.

12.11.2 FROM ROOTS:

Root portions about 4-5cms in length should be planted in the field in November-December before the snowfall. The spacing be about 15cmsx60cm. Weeding is necessary to save plants from being smothered by grasses and weed, irrespective of whether the plants have been raised from seed root cuttings.

Four years old plants are expected to produce to produce rhizomes fit for extraction. The rhizomes and roots should be dug out in Oct. before the soil become too hard for digging. These should be cleaned of soil and dried in sun. Long roots may be cut in convenient sizes. In well stocked and well grown crops the yield of roots is expected to be about 400 to 500 kg. per hectare.

i) Saussurea lappa (KUTH):

It grows in the area where the total annual precipitation in the form of snow is at least 1000mm. It prefers deep rich porous soil and light cover head shade. Kuth is easily propagated either by transplanting the seedling raised from seed or by planting out the root cuttings.

12.11.3 FROM SEEDS:

The seeds ripen in the month of September and are collected a little before they are fully ripe. The seeds should be sown in Oct& Nov. The seed will germinate in spring and there after nursery bed should be regularly weeded out. The seedling is planted out in the field in next July-August when they are about 15 months old. The plants attain height of about 12 to 15 cms when they are transplanted. The spacing should be about 1x1 meters. Timely weedings are necessary to ensure that the plants are not smotheredby weeds.

12.11.4 FROM ROOT CUTTINGS:

Root cutting, about 3 to 5 cms in length should be planted in the field in pits at a spacing of about 1x1 meter. Cuttings may either be planted in autumn before

the snowfall or in spring just after the snow melts. Spring planting gives better results.

The roots are dug in sixth year in the month of Aug-Sep, when the alkaloid content in these is maximum. Each plant produces several tubers varying in length from 15 to 20 cm. At the time of digging out the tubers, one of the tubers should be left for further reproduction. The yield is expected to be about 50 quintals of dry kuth roots per ha.

12.11.5 DIGITALIS PURPUREA:

It prefers sandy loam well drained and fertile soil. It grows in temperate climate and high atmospheric temperature kill the plants out right. It can withstand shade. It is propagated from seeds. The seeds are sown in nursery in March-April 10 to 200 ounces of seed will produce sufficient seedling for planting one ha. the seedlings are transplanted in the field in the month of July when they are about 6 to 8 cm in height. The spacing should be about 30 cm in between the plants and about 75 cm in between the lines.

Leaves should be plucked when the plants are in full bloom and about 2/3rd of the flowers on each spike have opened. Three fourth of the total number of leaves on each plant are removed at a time. The leaves are dried for 36 hours. When completely dry, they should be stored in air tight containers in a dry place. The yield is expected to be about 2 to 6 quintals of air dried leaves per ha.

12.12 GRASS AND GRAZING:

The local people have unrestricted rights of grazing in such demarcated forests in which their grazing rights have been recorded in the settlement and in all the un-demarcated protected forest, except those areas in which grazing is prohibited. In addition, large flocks of sheep and goats visit this tract during winter for grazing. The incidence of grazing and the evil effects of over grazing, which are apparent in any of these forests have been discussed in the para. The incidence of grazing is much more than what the forest areas of this tract can support without being destroyed beyond recovery. Almost all the areas are fairly heavily grazed. As already discussed in para 1:10 only a few areas are closed to grazing for three months during the rainy season. Only a few others are closed and auctioned as 'rutas' for grass cutting. Except the above two types of areas and the regeneration and through out the year. It has been observed that the closed areas produce good crop of grass which can support more number of cattle than what these areas would have supported if these had not been closed to grazing and would have been continuously grazed. It is therefore necessary that the villagers should be persuaded to close more areas during rains from which they can cut in Oct. To reduce the incidence of grazing and to improve the pasture land, the suggestions put forth in chapter of the protection Working circle should be implemented.

Table 12.3: Export Permits detail of Minor Forest Produce within the Division from 1999 -2000 to 2021-22.

Sr . No.	Year	Range	Minor Forest Produce	QuantityKg/ Qtls.
1.	1999-2000	J/Nagar	Tejpatta	90 Qtls.
		Urla	Tejpatta	100 Qtls.
			Nihnai	3 Qtls.
			Kapoor Kachari	15 Qtls.
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		208Qtls
2.	2000-01	J/Nagar	Tejpatta	5 Qtls.
		Urla	-	-
		Tikkan	Bhutkes	1 Qtl.
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		6Qtls
3.	2001-02	J/Nagar	Tejpatta	37 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		37Qtls
4.	2002-03	J/Nagar	Tejpatta	53 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		53Qtls

5.	2003-04	J/Nagar	Tejpatta	60 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		60Qtls
6.	2004-05	J/Nagar	Tejpatta	53 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		53Qtls
7.	2005-06	J/Nagar	-	
		Urla	Dandasa	16 Qtls.
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		16Qtls
8.	2006-07		Nil	
9.	2007-08	J/Nagar	Tejpatta	30 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		30Qtls
10.	2008-09		Nil	
11.	2009-10	J/Nagar	Tejpatta	136 Qtls.
			Dandasa	16.5 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		152.5Qtls

12.	2010-11	Nil		
13.	2011-12	J/Nagar	Tejpatta	275 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		275Qtls
14.	2012-13	J/Nagar	Tejpatta	215 Qtls.
		Urla	-	-
		Tikkan	Taxus Baccatt leaves	51.77 Qtls.
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		51.77 Qtls
15.	2013-14	J/Nagar	KakarSingi	1.70 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		1.70Qtls
16.	2014-15		Nil	
17.	2015-16	J/Nagar	Tejpatta	135 Qtls.
			Ambla	40 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah		-
		Total		175Qtls
18.	2016-17	J/Nagar	Tejpatta	130 Qtls.
		Urla	Kapoor kachri	10 Qtls.
			Bare	50 Qtls.
			Ghuchi	10 Qtls.
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	
		Total		60Qtls

19.	2017-18	J/Nagar	-	-
		Urla	-	-
		Tikkan	Ghuchi	40 Kg.
			Pathan Bail	37 Qtls.
			Chora	4 Qtls.
			Bare	6 Qtls.
			Muskbala	2 Qtls.
			Ghuchi	30 kg.
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		119Qtls
20.	2018-19		Nil	
21.	2019-20	J/Nagar	Tejpatta	20 Qtls.
		Urla	-	-
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		20Qtls
22.	2020-21	J/Nagar	-	-
		Urla	Tejpatta	50 Qtls.
			Gileo	5 Qtls.
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		55Qtls
23.	2021-22	J/Nagar	-	-
		Urla	Tejpatta	20 Qtls.
		Tikkan	-	-
		Lad-Bharol	-	-
		Dharampur	-	-
		Kamlah	-	-
		Total		20Qtls

The demand for these medicinal herbs is increasing day by day. Time has come, serious and effective measures are required to meet the challenge to formulate the strategy for the conservation of these species for supply as raw material to industries and above all to maintain ecological balance of these areas.

12.13 CONSERVATION AND PROPAGATION:

The commercial cultivation of medicinal plants is still not given due

importance. These herbs mostly consist of rhizomes and roots which remain dormant more than six months under heavy snow. Therefore, there is need to save these plants for their multiplication by growing them on mass scale in temperate region for internal consumption of pharmaceutical enterprises such as Ayurvedic, Unani, Homeopathic, Sidha and Allopathic system of medicines. Following measures are suggested for conservation, Protection, Propagation and development of these medicinal plants.

1. Systematic rotational collection should be done in different forests.
2. Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form for regeneration.
3. If grazing cannot be avoided the rotational deferred grazing may be introduced to these areas/forests, which can be opened for grazing from one year/one season and can be closed for another season and vice-versa.
4. Raising of nurseries and drug farms should be developed by the various research institutes, Universities engaged in medicinal and aromatic plants in collaboration with Forest department.
5. The medicinal herbs collectors should be educated and provided with proper guidelines. So that there is a continuous regeneration of medicinal herbs. It is also important that we should not disturb the local forest flora which is greatly susceptible to environment changes, which may lead to extinction of natural species.
6. Cultivation of medicinal plants should be encouraged in Agro-forestry. Technology for raising, Harvesting of medicinal plants should be made available to farmers.
7. Domestication of medicinal plants should be encouraged.
8. Medicinal herbs yielding forests should be fenced against grazing and soil conservation measures be adopted.
9. For the development, Protection, Propagation and conservation of medicinal herbs individuals, Mahilamandals, voluntary organisation should be avoided.
10. D.F.O. should impose lopping conditions while giving permission for the Extraction of *Taxus baccata* and *Cinamomum tamala*.

Table 12.4 : List of medicinal plants/herbs found growing in Joginder Nagar Division.

1.	<i>Valarina wallichii</i>	<i>Musakbala</i>
2.	<i>Picorhiza kuroo</i>	<i>Karru</i>
3.	<i>Cinamomum tamala</i>	<i>TejPattaaraxus baccata Rakhal</i>

4.	<i>Dioscoria deltoidea</i>	Shingali-Minglu
5.	<i>Pistacai integima</i>	KakarShingli
6.	<i>Angilica glauca</i>	Chiora
7.	<i>Belinium vagimstrum</i>	Bhut keshi
8.	<i>Berberis Spps.</i>	Rasaunt
9.	<i>Jurinea macrocephala</i>	Dhoop
10.	<i>Salvalia monorottiana</i>	Jhuth
11.	<i>Podophyllum emodii</i>	Bankliau
12.	<i>Aconitum hetrophyllum</i>	Putish (Mithi)
13.	<i>Tinospora cordifolia</i>	Galoo
14.	<i>Valerina hardwickii</i>	NakhNihani
15.	<i>Marigold grass</i>	Merrigold
16.	<i>Licheus</i>	
17.	<i>Viola odorata</i>	Bnaspa
18.	<i>Artimisia brevifolia</i>	Saski
19.	<i>Thymus Sarphyllum</i>	Banjawan
20.	<i>Morchela esculanta</i>	Guchhies
21.	<i>Polygonatum verticillatum</i>	Salam Mishari
22.	<i>Orchis latifolia</i>	Salam panja
23.	<i>Swertia chirata</i>	Chiryta
24.	<i>Gerardiana hyterophylla</i>	Bichho Buti
25.	<i>Viscum album</i>	Safed Dudhia
26.	<i>Saxifraga ligulata</i>	Patharto
27.	<i>Culmes roots</i>	Bairam

D.F.O. will prepare extraction programme of above medicinal plants/herbs keeping in view of the life cycle of these herbs with the help of local extractor/people.

CHAPTER XIII

13. FINACIAL FORECAST AND COST OF THE PLAN

13.1 GENERAL:

In view of the rising price trend of timber and other forest produce and because of the fact that this tract is being opened by more motorable roads, it is difficult to make any accurate estimate of the price which the forest is likely to fetch during the period of the plan.

Similarly, it is equally difficult to correctly asses the expenditure likely to be incurred in carrying out the prescriptions of this working plan. An attempt has however been made to estimate the future surplus on the basis of the current prices of the forest produce and keeping in view its rising trend. Similarly, the expenditure in carrying out various prescriptions of this working plan has been projected. The price of timber expected has been calculated at current rate i.e for 2021-22.

13.2 PAST YIELD:

The details of past yield removed have been given in chapter III.

13.3 PAST REVENUE AND EXPDT.

The details of past revenue and expenditures are given in chapter III.

13.4 FUTURE YIELD:

The prescribed annual yield in cubic under various working circles is as follow:

Working Circle	PB	Species					
		Deodar	Kail	Fir	Spruce	Chil	Total
Deodar & Kail	I	2050	1700	0	200	0	3950
	IV	650	1800	0	550	0	3000
	Total	2700	3500	0	750	0	6950
Chil	I	0	0	0	0	2150	2150
	IV	0	0	0	0	4400	4400
	Total	0	0	0	0	6550	6550
Fir/Spruce		250	1050	0	1950	0	3250
Grant Total		2950	4550	0	2700	6550	16750

13.5 FUTURE REVENUE:

It is difficult to make any definite financial Forecast sinc the prices keep in fluctuating. However, there has been general trend of hike in the timber

prices. Taking into consideration the market price of standing trees for the year 2021-2022, the annual future expected revenue is thus estimated as under:-

Spp	Volume (m3)	Rate/ m3	Anticipated Amount in rupees
Deodar	2950	84,683/-	24,98,14,850/-
Kail	4550	61,669	28,05,93,950/-
Chil	6550	41,976	27,49,42,800/-
Fir/Spruce	2700	35,892	9,69,08,400/-
Grass Cutting		L/S	2,000/-
Medicinal Plants		L/S	10,00,000/-
Resin Blazes	150171	45	67,57,695/-
Other Misc Revenue		L/S	13,00,000/-
		Total	91,13,19,695/-

Thus, the estimated future revenue during the plan period (10Years) will be as under:-

91,13,19,695 X 10 =91,13,19,6950 (or say rupees 910 crores)

13.6 FUTURE ANNUAL ANTICIPATED EXPENDITURE

Sr. No.	Particulars	Amount in Crores
1.	Felling and extraction by Govt. agency	1.50
2.	Marking and numbering of trees to purchasers	0.17
3.	Purchase of stors, tools and plants	0.13
4.	Demarcation and construction and repair of BPs	2.50
5.	Const of roads and Paths	1.70
6.	Construction and repair of building	1.90
7.	Maintenance of compound and Water supply	0.70
8.	Regneration and cultural works	0.60
9.	Cost of raising new plantations and maintenance	4.50
10.	Forest Protection	1.50
11.	Research and experiments	0.30
12.	Compensation for acquiring land etc.	0.30
	Total	15.8
	Estblishment	
1	Estblishment charges	6.02
2	Contigencies and Sundries	0.7
	Total	6.72

Total expenditure during the plan period (10 years) will be as under :-

(15.8 +6.72) X 10 =Rs. 225.2/- Crores.

13.7 FUTURE ESTIMATED SURPLUS :- Based on the above figures of estimate revenue and expenditure, the surplus works out as under:

Sr. No.	Particulars	Amount in Crores
1.	Estimated Revenue	910.00
2.	Estimated Expenditure	225.20
3.	Estimated Surplus	684.8

13.8 COST OF THE PLAN: - The expenditure incurred on the preparation of this working plan is summarized below:-

Sr. No	Particulars	Amount in Lacs	Remrks
1.	Pay and allowances of WPO.	Nil	No extra salary and allowances was paid.
2.	Pay and allowances of executive staff and Ministerial staff.	Nil	-do-
3.	Enumeraion and other filed works including technical assistance.	40,97,000/-	-----
4.	Preparation/ composition and Geo Marking-digitization of stock maps of all compartments.	3,50,000/-	-----
5.	Pequerment of matrial.	2,00,000/-	-----
6.	Office expenditure inclunding printing of documents and CH files.	3,02,019/-	-----
	Total	49,49,019/-	

The cost of this working Plan is insignificant keeping in view the efforts involved in the preparation of this document.

CHAPTER XIV

14. FIRE CONSERVATION PLAN

14.1 GENERAL:

Forest fires are quite common in Chil zone of Joginder Nagar Division and large areas are affected every year near habitation. These fires cause lot of damage to trees growth and young regeneration. Chil is fire resistant but still needs protection in the seedling stage and is destroyed by fire in hot weather. On the other hand, Deodar, Kail, Spruce and Silver Fir are fire resistant. There is less danger of fire in mixed crops.

The main causes of fire are:

- a) Accidental fires are generally due to carelessness on the part of smokers, labourers, villagers who burn their ghasnies (grassland), fields before rains and leave the fire unattended which spreads to the adjoining forests.
- b) Main reasons of accidental fires in these divisions are that villagers set fires to get growth of grass in the rainy season.
- c) Sometimes fires are also set intentionally by villagers when they are not happy with the dealings of forest staff on account of closure of areas for plantation.
- d) Anti social elements also set fire to divert attention.

14.2 FIRE SEASON:

The fire generally occurs during the months of April, May and June and until the monsoons breaks in early July. During autumn there is less danger from fire but forests are not safe until after the first snowfall.

14.3 PREVENTIVE MEASURES:

The following fire measures be taken as under:

- a) Control burning: Control burning be carried out in chil established re-generation areas on the three years cycle bans.
- b) Maintenance of fire lines: All the fire lines be maintained and cleared of bushes and control burnt before ensuing the fire season.
- c) Cleaning of Inspection Paths and Roads: All the Inspection paths, bridle paths and roads passing through the forests should be kept clean of all fire hazard during fire season.

- d) Extension and Training Programme: Frequent meeting with local people, Gram Panchayat Pradhan Mahila Mandals be organized to educate them and obtain their participation in preventing the forest fires.
- e) The young regeneration of chil be pruned where there is congestion of crop
- f) Displaying of Sign Boards: The fire sign boards shall be displayed at strategic places.

14.4 DETECTION OF FIRES:

1. Fire look out stations be identified on highest elevations in each beat, block and range to notice the occurrence of fires.
2. Some contact points such as telephones be identified in each beat, block and range to give information of fires.
3. Binoculars and wireless Walkie-talkie sets be given to each Forest Guard to detect fire occurrence and to give information of fire.

14.5 FIRE FIGHTING SQUADS:

As soon as fire occurrence is detected in any area the in-charge of detection point will inform the fire fighting squads at Range/Block level. The fire fighting squads will rush to fire occurrence place by any transport means available to extinguish the fire.

14.6 EQUIPMENT OF FIRE FIGHTING SQUADS:

The fire fighting squads be equipped with fire fighting tools and sufficient labour as under:

- i) Fire Rackers
- ii) Small Axes
- iii) Drats
- iv) Spades
- v) Fire Beaters
- vi) Water Bottles
- vii) Fire Shoes
- viii) First Aid

For immediate mobility fire bushes be provided for fire fighting squads which should remain stationed at Range headquarters during the fire season.

14.7 GROUND PATROLLING:

Fire watchers be engaged in fire prone areas and they should be given specific duties to patrol the definite areas. They should attend the work of detecting fires, cleaning of inspection paths, bridle paths, fire lines and PWD roads passing through their areas. They should also be available for fire suppression duty during odd hours.

14.8 FIRE SUPPRESSION:

- a) As soon as the fire information is received in fire fighting centre the incharge of centre Range Officer/ Deputy ranger will rush to the plane of fire alongwith labour with available means of transport in the locality.
- b) As soon as Incharge leaves the place for extinguishing fire, the second person in centre will take over the charge and inform local people, Pradhans through telephone, messages and request them to join the fire fighting operation.
- c) Range officer/Deputy Ranger Incharge fire fighting operation will plan properly to check the spread of fire and extinguish all the burning material with the help of local people and labour engaged for the fire fighting work.
- d) Forest Guard will prepare list of right holders of the forest, who took part in the fire suppression, those who refused to help and absentees.
- e) Proper management of first aid and drinking water will be made at the site of the fire occurrence.
- f) The Range headquarters will keep the Divisional headquarters informed about the progress made in extinguishing each fire.

14.9 AWARDS:

The incentive should be given to people, Panchayats Mahilamandals and staff so that they involve themselves in fire protection in fire protection work.

The details of Forest fires which occurred in Joginder Nagar Forest Division is given as under.

Table 14.1 : The details of Forest fire which occurred in Joginder Nagar Forest Division is given as under:

Year of occurrence	No. of Fire Incident	Area effected in (hac)	Estimated loss	FIR No.
1999-2000	53	1342.97	6,47,950/-	7No.
2000-2001	12	22.90	84,150/-	3 No.
2001-2002	3	11.50	--	--
2002-2003	51	827.20	8,31,271/-	---
2003-2004	45	893	5,68,748/-	--
2004-2005	3	5	--	--
2005-2006	21	58.50	67,950/-	6 No.
2006-2007	22	32	--	-
2007-2008	29	95	1,25,600/-	-
2008-2009	20	76.5	2,28,000/-	7 No.
2009-2010	64	332.60	3,01,050/-	2 No.
2010-2011	19	55.25	37,200/-	--
2011-2012	3	17	--	--
2012-2013	39	177	2,08,000/-	--
2013-2014	6	21.5	30,000/-	2 No.
2014-2015	40	135.80	47,000/-	4 No.
2015-2016	18	39	--	--
2016-2017	79	346.35	1,16,200/-	4 No.
2017-2018	38	128.50	1,10,000/-	2 No.
2018-2019	87	780.05	10,13,640/-	7 No.
2019-2020	84	280.50	1,44,500/-	--
2020-2021	4	26	--	--
2021-2022	61	808.9	3,97,700/-	3 No.

Table 14.2 : The detail of exiting Fire lines in the Division area as under:

Details of Fire Line already Constructed in Joginder Nagar Forest Division			
s.no	Name of Range	Name of Fire line	Lenth
1	Urla	Thorat to Patyuri	10km
		Galu to pandoo	5km
		Har to Thorat Galu	3km
		Kadhar to Chiladhar	3km
		Dibkan to Farah	10km
		Radahan to Gawali via satidhar	10km
		Chukku to Kadoond	6km

		ChabhBhararu to uperkhajri	7km
		Kandyar to satnog	5km
		Jilhan to Dalusa	4km
		Sarchnal to Tindunal	5km
		SihriPhat to Kalhog	5km
2	Lad Bharol	Gokhu totrembali	5km
		Tansal to Bakar	2km
		Golwan to Draman	1km
		Bhabhoridhar	1km
		Tameshwaridhar to garh	2km
3	J/Nagar	Fire line Cum Road to Village Salhen	750mtr
		Fire line Cum Road to village Tinidhar	750mtr
		DPF Khprotu	4.5km
		Gharongala to Thachi	5km
		Uperkhojri to Chhamb Bhararu	7km
		Ghatta to Mohanghati	4km
		Shiv Temple to Ghamiruphat	1.5km
		Ahju to Ghatta	3km
		Siyuri Temple to Gharongala	2km
4	Kamlah	Garlito Ghorigarh	2km
		Masot to Baradhar	2km
		Raksui to Ghorigarh	2km
		Pavodhar to kamlah	2km
5	Tikkan	Thuji to Rawa nala	500mtr
		Chelang to Sarwan	3km
		Rakahan Nall to Likti	3km
		Badi Bajgain to Dharyan	2km
6	Dharampur	Janitary to Gurdwara	1km
		Janitary to Sihan	3km
		Sundal to Murahdhar	6km
		Padka to Banog Galu	2km

Table 14.3 The detail of Fire lines proposed to be constructed during the plan period in the Division area as under:

Details of Fire Line proposed to be Constructed in Joginder Nagar Forest Division			
sno	Name of Range	Name of Fire line	Lenth
1	Urla	Nagan to Nausha via Thorat Galuand Baddli	8km
		Kadhar to Nagwan via siyru nala	4km
		Naman to Tarwan	2km
		kufuri to kalhog	2km
2	Lad Bharol	Simas to Makan	3km
		Tain to Gawala	2km
		Nageshwar Mahadav to Jol	1.5km
		Dadhon to Bagora	2km
		Sanehar to Chhanchher	2.5km
		khajur to Bhaboridhar	3km
		Khadar to Antola	2km
		Chagehar to Chakrahan	2km
		khuddi to Bhaboridhar	4km
		khada bah to Karlon	1.5km
3	J.Nagar	Singapur to Kainth gala	1.5km
		NagChalapul to Panjagna	1km
		Masongala to patalRihra	2km
		Purana Thana to Kainth Gala	2km
		Trimunda to Digli	2km
		Digli to Badon	4km
		Fire line from DPF Ghatta C-2	150mtr
		Sarabaglato Tattabatal	2km
		Gharvsara to Bhaborimata Mandir	3.5km
		Bahkuti Nalla to Lahri	1.5km
		Ghrongala to Siyuri Temple	5km
		Galuto Gharon Gall via Patal	3.5km
		G/galla to Banehar	3km
4	Kamlah	DPF Tandu	2km
		DPF Masot	2km
		DPF Manglata	1km
		DPF Sadoti	2km
5	Tikken	Rangan to Bardhan	4km

		Kashambal to Sachan	2km
		Lapastop to GPS Kadhiyan School via Sachangahar	11km
		Bajot DPF	2km
		Cheling to Bajot	2km
		Lachyan DPF	2km
		Panihaarto tikkendhar	2km
		Krintanu to Gungle Tilla top	5km
		Bharyan to dasiun	4km
		Rest house to Kungarinalla	2km
		Tikker Galla to bralang	2km
		Sudharto Bralang	1.5km
		Dhanwan to Kampana	3km
		kortang(Bulang) to Dangar	1.5km
		Farehar Road to silhbudhani to wangan	3km
		Hurang DPF Boundary to Path to Farehar	3km
		T/Hut Ridge to the Ridge of KahslaGal	2km
		Trikednal to Padhru	3km
6	Dharampur	Urna to Murahdhar	3 km
		Banerdhi to Ludhiana	1.5km
		Giunto Dhawali	1km
		Haylog to Narwhal	2km

CHAPTER XV

15.FOREST AREAS DIVERTED FOR DEVELOPMENT WORKS UNDER FOREST CONSERVATION ACT, 1980

15.1 GENERAL:

The Forest Conservation Act, 1980 came into force on 25.10.1980. Under Section-2 of above act no forest land/area can be diverted/transferred for non- forestry purpose without prior permission of Govt. of India. The Forest land/area can only be transferred for development works if proper case of individual project is prepared as per guidelines issued under above act for the same and approval is obtained from the Govt. of India, Ministry of Environment, Forest and Climate Change.

The following forest land/areas have been diverted for non-forestry developmental works under above act in Joginder Nagar Forest Division and compensatory plantations raised in the lieu thereof as under;-

Table 15.1: DETAIL OF Diverted LAND UNDER FCA, 1980

DETAIL OF DIVERTED LAND UNDER FCA , 1980 IN JOGINDER NAGAR FOREST DIVISION SINCE 1980					
S.N	Proposal Name	File no.	Year of appr oval	Date approval	Total area diverted under the proposal (in ha)
1.	132 KV S/C T/Line from Bassi(Palampur) to Rajpura	8-154/89-FC	1989	09-08-1989	4.69
2.	Construction of Machhial-Kuther-Banwar road	9-78/93-ROC	1993	20-10-1994	0.346
3.	Widening/ Improvement of NH-20 Ghatta	9-934-20000-ROC	2001	24-05-2001	0.5705
4.	Construction of Ahjoo Basahi road	9-958/2000-ROC	2002	02/2002	1.96
5.	Construction of Community Hall at Rawara (Sandhole)	9-1835/2003-ROC	2003	12-12-2003	0.02
6.	Construction of Uhl Stage-III HEP	9-1496/2004-ROC	2004	26-08-2004	19.4478
7.	Construction of Padhar-Bhararu road via Nohali	9-HPB1837/2003-CHA	2005	11-08-2005	2.253
8.	132 KV S/C T/Line from Uhl-III HEP to Bassi	9-1577/2002-ROC	2006	03-03-2006	9.04
9.	132 KV D/C Line from Uhl-III (Chulla) to Mattansidh Hamirpur	9-1576/2002-ROC	2006	02-03-2006	3.12
10.	Construction of Golden Mahasher Fishary Farm	9-HPB-258/2005CHA	2006	17-08-2006	2.5
11.	C/o Sub Market yard	9- NPB	2007	17-04-2007	0.71

	(Subzi Mandi)	486/06CHA			
12.	Construction of link road to village Chhanchher	9-HPB 409/ 2005-CHA	2007	26-09-2007	0.45
13.	Quarry site approach road tail race & job facility	9- HPC 410/200CHA	2007	02-11-2007	18.1840
14.	Construction of Dharampur to Saraskan road	9- HPB 1271/ 2006-CHA	2007	20-12-2007	0.7162
15.	Construction of Haylog to Pehad road	9-HPB 1272/ 2006-CHA	2008	25-03-2008	2.77
16.	C/o ITI Joginder Nagar	9-HPB 228/ 2007CHA	2008	04-06-2008	0.92
17.	Collection of sand, Bazri and Stone (Ruma Stone Crusher)	9- HPB 791/ 2005-CHA	2008	24-10-2008	2.00
18.	Diversion of forest land for the already installed Stone Crusher (Rajat Stone Crusher)	9-2392/2004-CHA	2009	15-09-2009	0.0810
19.	Construction of water treatment plant/ pump house at census village Banoun	9-HPB 162/2009-CHA	2009	29-12-2009	0.16
20.	Construction of Police Chowki at Dharampur	9-HPB 2535/04-CHA	2010	15-02-2010	0.0920
21.	Installation of stone crusher and mining lease in f/o M/s Ganpati Stone Crusher, Taryambla	9-HPB 176/2009-CHA	2010	23-02-2010	1.3707
22.	Construction of 33/11 KV Sub Station at Mandap	9- HPB 414/ 2009-CHA	2010	29-04-2010	0.3328
23.	132 KV T/Line from Barot (Lumbadug) to Bassi	9-HPC 094/2010-CHA	2010	28-07-2010	11.3974
24.	Construction of Ahjoo-Basahi-Ropri- Khazoor road	9-HPB 268/ 2008-CHA	2010	31-08-2010	4.18
25.	Construction of I/Hut and Water treatment plant to census village Radhan.	9-HPB 204/2009-CHA	2010	23-11-2010	0.68
26.	C/o 33/11 KV Sub-Station at Bhararoo by HPSEB	Ft-48-2060/ 2010 (FCA)	2011	08-02-2011	0.1582
27.	C/o Bus stand at Dharampur	9- HPB 617/ 2010-CHA	2011	30-05-2011	0.9050
28.	C/o 38KV Tiline from Balh Padhar HEP (4.00MW) to Gawali Sub-Station	9-HPB 519/2010-CHA	2011	09-06-2011	0.96
29.	C/o Water Treatment Plant at Muhal Khalai	Ft.48-2325/ 2001 (FCA)	2012	01-01-2012	0.43
30.	C/o PHC Building at Sajauplu	Ft.48-2146/2010 (FCA)	2012	23-02-2012	0.26
31.	C/o PHC building at Mandap	Ft.48- 2147/ 2010 (FCA)	2012	01-03-2012	0.31
32.	C/o Ghatta to Bhag road	9- HPB 497/ 2011 (FCA)	2011	29-03-2012	2.353
33.	C/o Improvement and widening of J/Nagar-Ghumarwin road	9- HPB 775/ 2001-CHA	2012	16-05-2012	3.76

34.	C/o Makriri-KhilChatriraod	9- HPB 395/2011-CHA	2012	25-05-2012	0.67
35.	C/o HSC at Sainthi	Ft.48- 230/2012(FC)	2012	28-05-2012	0.0081
36.	C/o Bus stand at Sandhole	9- HPB 859/20110CHA	2012	11-06-2012	0.2556
37.	C/o Devi Nallah-JounJarl road	9-HPB 386/ 2011-CHA	2012	12-06-2012	0.55
38.	C/o Society Godwan village KothuwanSandhole	9- HPB 216/2009CHA	2012	23-07-212	0.0060
39.	C/o Lift water supply scheme iuhai Chandni	Ft.48-2438/ 2012 (FCA)	2012	14-08-2012	0.2585
40.	C/o Majharnoo-Kunduni-Kufruraod	9-HPB 897/2011-CHA	2012	13-08-2012	2.41
41.	T/Line 400 KV D/L Banala to Amritsar	8-40/2010-FC	2012	11-09-2012	8.556
42.	C/o Waer treatment plant and pump house at MuhalSatahan	Ft.48- 2581/2012(FCA)	2013	17-01-2013	0.20
43.	C/o Treatment plnat at KuhalKhalehi	Ft. 48-2481/2012(FCA)	2013	17-01-2013	0.12
44.	C/o Treatment plant at MuhalBhayara	Ft.48-2485/ 2012 (FCA)	2013	28-01-2013	0.05
45.	Mining inMuhal Chapanu in f/o M/s Vipin Kumar Hazri, Hazri Stone Crusher, Dharampur	9- HPB 242/2011-CHA	2013	03-05-2013	1.2636
46.	C/o Toilet at Ghatta inf/o HP Tourism	FEE-B-F(2)-3/2013	2013	09-09-2013	0.093
47.	Stcking of Raw/ furnished material of already estabshed stone crusher in f/o M/s Rajat Stone Crusher Bakkar Khad Sandhole	FFE-B-F(2)-2/2016	2016	30-04-2016	0.5117
48.	C/o Rana SHEP in f/o Manak Power Systems, Tikkrur, J/Nagar	FFE-B-F(2)-2/2017	2017	16-05-2017	0.9899
49.	C/o Govt. Degree College Lad Bharol	8B/HPB/09/68/2016	2017	18-07-2017	2.02
50.	C/o treatment plnat at MuhalKufuru	Ft.48-2587 /2012 (FCA)	2018	08-12-2018	0.04
51.	C/o PHC Building at village Seoh	FFEE_B_F(2)-6/2017	2018	13-03-2018	0.27
52.	C/o Pretection work for storage reservoir at Khudder UHL-III HEP	FFE-B-F(2)-6/2017	2018	20-07-2018	0.53
53.	Stacking of raw meterail in respect of already established stone crusher in f/o Smt. Ruma Stone Crusher	FFE-B-F(2)-6/2017	2018	08-08-2018	0.3923

54.	132 KV T/line Chulla to Kanghain	8B/HP/04/09/17/FC	2018	05-07-2018	2.3591
55.	C/o Dhaloun to Rakh road	FFE-B-F(2)-1/2019	2019	15-03-2019	0.8586
56.	C/o Har-Kass-Bhateluroad	9-HPB-107/2012CHA/061	2020	06-08-2020	2.50
57.	C/o Galu to Bhatwar road	8-B/ HP/ 06/04/2019/FC/08	2020	07-10-2020	4.49
58.	C/o link road from Urlato Nousa	8-B/HP/06/02/2019/FC/20	2020	19-10-2020	3.26
59.	C/o link road from Gumma to Kharsa	8B/HP/06/10/2/2019/FC/22	2020	19-10-2020	2.79
60.	C/o Helipad and terminal building at Richhali (Khopwan) Dharampur	8B/HP/09/13/4/2019/FC/21	2020	19-10-2020	0.2502
61.	C/o 100 beded civil Hospital at Sandhole	Ft.48- 4055 /2020(FCA)	2020	29-10-2020	0.2502
62.	Providing LIS Bahari-Dhawali-Marhi	Ft.48-2687/2013(FCA)	2020	28-10-2020	0.7080
63.	C/o Neri SHEP	8B/HP/01/10/0/2019 FC/	2020	30-10-2020	1.9728
64.	C/o Bridge on 40 mr span in Dayal to Lasaniroad	Ft.48 4097 / 2019 (FCA)	2020	06-08-2020	0.3185
65.	C/o GoratChaneharFukdohal Kaltriraod	Ft.48-5010/ 2020 (FCA)	2020	29-10-2020	0.7831
66.	C/o SherpurMorla via RishhliKathailiraod	8B/HP/08/33/2020/FC	2020	04-09-2020	2.1033
67.	Providing/ Aug. of WSS & PC Habitation of Census village FootkhalHiun etc.	Ft.48-3868/2019 FCA	2020	31-12-2020	0.9174
68.	C/o Kutt-Khetru Chandani road (km0/00 to 4/300)	FFR-B-F(2)-2/21	2021	06-03-2021	1.60
69.	C/o UHL Brah SHEP	8B/HPB/61/3/7/2016	2021	09-03-2021	2.9971
70.	C/o Touri Nala to Parchuvia Bheri	8B/HP/06/04/2021FC	2021	09-04-2021	0.8977
71.	C/o HRTC Workshop Joginder Nagar at Bharyara	8B/HP/09/43/2020/FC-25	2021	15-04-2021	1.2143
72.	Up Gradation of two lane of Hamirpur MandiNH-07 (new NH-03)	8B/HP/06/98/2020/FC/175	2021	19-07-2021	19.2467
73.	C/o lift irrigation schemeto Baroti Mandap and Jodhan area in Dharampur Tehsil	8B/HP/06/34/2021FC/97	2022	25-01-2022	0.9747
74.	C/o link road from Guini to Prain	8B/HP/06/34/2021/FC/97	2022	16-02-2022	1.59

Chapter XVI Climate Change

16.1 Introduction:

A long term weather pattern in an Area is called Climate, which means that the Climate change is the global phenomenon of long-term climate transformation i.e., Temperature, Wind, Precipitation and Rain pattern. Now days Climate Change has emerged as a big problem. It is creating disbalance in entire biodiversity with increase in global temperature in fast rate. Earth has history of many climate changes. It is generally considered a natural phenomenon but what makes it of bigger concern is its fast rate. Temperature is just one component of it. It is very broader term. This situation has arisen due to the undesirable and unwanted over exploitation of natural resources. Considering the rapid increase in global temperature the 196 countries (fully developed and under developed) of the world has decided to take this matter seriously. For that, they did an agreement which is called Paris Agreement.

It is a legally binding international treaty on climate change, adopted by 196 countries at COP-21 in Paris on dated 12-12-2015 entered in to force on 4-11-2016. It was aimed on that agreement that all the parties of the agreement would work together to curtail the rise of global temperature well below 2° C, preferably to 1.5°C compared to pre industrial level. All would increase the ability to adapt the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production. This agreement talks about 20/20/20 targets i.e.

1. Carbon dioxide emission reduction by 20%
2. Increasing the renewable energy market share by 20%
3. Target to increase energy efficiency by 20%

Among the 196 countries of world, India was also the part of that agreement. India also set their targets at COP 21 to limit the global rise in temperature which is following: -

1. India put out a statement that we need to grow rapidly to meet the aspiration of 1.25 billion population, and out of this 300 million people are without access to energy.
2. Yet despite the growing demands, India has pledged to reduce emissions intensity per unit GDP by 33-35% of 2005 levels.
3. Aiming to reach 40% of installed capacity from non-fossil fuels.
4. Targeting 175 GW of renewable energy generation by 2022.
5. Planning to enlarge forest cover to 2.5 billion tons worth of carbon dioxide.

6. Reducing dependence on fossil fuels through levies and reduction in subsidies
7. India exhorted on the principles of equity and differentiated responsibilities
8. As per India, Equity means national commitments that must be consistent with the carbon space nations occupy.
9. India expects developed countries to mobilize 100 billion US dollars annually by 2020 for mitigation and adaptation in developing countries.

16.2 Danger of Climate change:

With change in climate the temperature is rising and it will cause to shift the habitat of many floral species upward from their current situation. With shift in upward the upward species of alpine ecosystem will get extinct because of having no space. The same applies to the faunal species.

16.3 Challenges of Climate Change:

- Alpine biodiversity will get affected badly with increase in overall temperature of earth. The species habitat will shift upward and the higher altitude species will face the threat of extinction.
- With shift in biodiversity upward the local communities will also have to shift upward for yield of same agricultural and fodder species which they were extracting on downward areas.
- With change in climate the weather pattern will also change and thus the change in monsoon season will be noticed. This will disrupt the food production and availability.
- With rise in temperature of earth the glaciers of Himachal will melt rapidly and the discharge of water will increase. This will cause rise in sea level due to it, the coastal areas will face a greater threat even of submerging.

16.4 Climate Change impact on the Forests of Himachal Pradesh:

India has rich biodiversity of the bio geographically distinct regions because of varying environmental conditions in different parts of the country. Geologically the Himalayas are one of the youngest mountain systems of the world. Himachal Pradesh is hilly state of India situated in western Himalayan region between 30°22'N to 33°12' N and 75°45'E to 79°04' E. It covers 55673 sq. km area and is covered by different type of forests, which constitute about 27.33% of the total geographical area. Physio graphically the state comprises of three distinct regions i.e. Shivalik, Mid hills, outer Himalaya and greater Himalaya or high altitude zone .About 3500 species of plant has been reported from the Himachal Pradesh. The Joginder Nagar Forest Division is located between latitudes 31°-42' to 32°-02' N and longitudes 76°-40' and 76°- 58' E. in Mandi District of Himachal Pradesh. It lies at an altitude between 900 to 2800 mtr i.e. between Shivalik hills and Dhauldhar hills. It is great repository of floral diversity due to variable climatic

condition. Most of the people in rural areas in the state depend directly or indirectly on forests for their livelihood and other household uses.

The change in climate with rapid rate is causing the shifting of tree line to higher altitude and movement of Conifer species to higher elevation. The higher area of Joginder Nagar Forest Division comprises the area of Tikkan and Urla range. With increase in global temperature the warmer area is getting upward. The clear evidence of which is that some tree Species of warmer area is now growing in the higher area. It is a well noticed change reported by local villagers. The available data on Climate suggested that by 2100 .The global temperature of the state is likely to increase by 3^o C and precipitation will be reduced by 20%. The affect will be more alarming in that situation.

16.5 Climate Change impacts on wildlife and Agriculture of Himachal Pradesh:

Unseasonal rain and snowfall are the main reason for agriculture failing in Himachal Pradesh. This can be understood by an example of incident During 2018 when the unseasonal snowfall took place in HP. Snowfall in late September was disastrous for the summer crop of potatoes, cauliflower, cabbage as well as apples, pears, plums and cherries. Due to it the farmers of LahaulSpiti has to suffered collective loss of Rs 300 million. Last time such untimely snowfall occurred was in 1995.

At the same time the late September was the time that pastoralists from the nomadic Gaddi tribe were to Descend from the Higher Dhauladhar Mountains in Kangra and Chuhar Valley with their flocks of goats and sheep to begin their journey towards Punjab region. Due to unseasonal snowfall, all the shepherds got stuck. There were Losses of life to cattles and horses were reported in the hundreds .There were reports of loss to many avifaunal Birds life in Lahaul spiti because these species got no time to descend in safe places.

16.6 Climate Change: Joginder Nagar Division

As per different references climate change is reality and as far as forest in Mandi District and Joginder Nagar Forest Division concerned. Following points indicates the vulnerability of Mandi district and especially the Joginder Nagar Forest Division to the changing climate.

1. Dwindling population of honeybees in wild fauna.
2. Decline in snowfall: due to it some higher area of Tikkan and Urla range which always get snow during winter is not getting any snowfall from last few years.
3. Scarcity of water in spring water: With gradual increase in earth temperature and deforestation the many ground water and surface water stream has got

dry during summer. These were once the source of water for 12 months a year.

4. Rise Forest Fire incidents.
5. As the division ranged between Shivalik to Dhauladhar Mountain Therefore with change in climate the Tree line is getting upward and pasture area is getting Shrink.
6. Incidents of Cloudburst in Chuhar Valley.
7. With increase in temperature the river water temperature also getting higher. The cold-water species such as Trout is in threat due to it.
8. The Tikkan Forest range of this division is in eco sensitive zone.
9. Failure of Number of plantations.
10. Unseasonal Snowfall: Unseasonal snowfall in happening recent incident of it is in year 2018. When the snowfall took place during September.
11. Entry of invasive species such as lantana and NeelaPhulnu in such higher beats of Division where it was nil before.

16.7 Strategies to cop up with Climate Change:

For improving the scientific knowledge and evidence base on climate change and its impacts the following will be taken up for immediate research under the Forest Department

1. Monitoring the carbon fluxes of forests in various ecological and altitudinal zones.
2. Ex-situ conservation of the genetic diversity of both the flora and fauna.
3. Documentation and monitoring of the biodiversity of various eco-systems.
4. Evaluation of total carbon stock and annual increment for Himachal Pradesh.
5. RS-GIS analysis of the whole state to evaluate/monitor the carbon stock
6. Research on the eradication of invasive alien species.
7. Management of forest Fires.
8. Monitoring the population dynamics and movement of wildlife.
9. Documentation of traditional knowledge related to biodiversity
10. Studying the impacts on high altitudes wetlands, Alpine meadows and moraines

16.8 Proposed Action plan

1. **Management in alpine forests.**

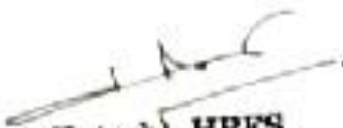
- Plantation of climate- resilient species , which are beneficial to local communities also
- Assisted natural regeneration in moderately dense forests.
- Enhancing natural resources and livelihood options of the vulnerable sections

2. Soil and water conservation

- Identifying vulnerable areas with the help of experts
- Minimizing the human interference in the ecology of the glaciers.
- Strategies and scientific planning for road cutting that result in minimal loss of oil and water resources.
- Construction of large-scale rainwater harvesting structures to reduce the water stress in moisture- deficient areas.
- Enhancement of soil and moisture conservation regime by introduction of multitier forest plantation

3. Fire Management

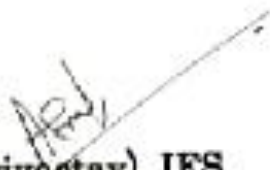
- Making Quick response team for fire fighting
- Utilization of pine needles for further valuable non timber forest produce product or energy-efficient eco-friendly energy source.
- Daily monitoring of fire threats with the help of satellite imagery and IT.


 (Rakesh Katoch), HPFS,
 Working Plan Officer-cum-
 Divisional Forest Officer,
 Joginder Nagar Forest Division, HP.


 (S.K. Musafir), IFS,
 Chief Conservator of Forests,
 Mandi Forest Circle, HP.


 (Arindam Chaudhary), IAS,
 Deputy Commissioner,
 District Mandi, HP.


 (Harsh Vardhan Kathuria), IFS,
 Chief Conservator of Forests,
 Working Plan & Settlement Officer,
 Mandi, HP.


 (Ajay Srivastav), IFS,
 Pr. Chief Conservator of Forests, (HoFF),
 Himachal Pradesh, Shimla-1



भारत सरकार / GOVERNMENT OF INDIA
एकीकृत क्षेत्रीय कार्यालय
Integrated Regional Office
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
सी.जी.ओ. कॉम्प्लेक्स, शिवालिक खण्ड, लॉंगवुड
CGO Complex, Shivalik Khand, Longwood
शिमला, हिमाचल प्रदेश-171001
Shimla, Himachal Pradesh - 171001



ईमेल / Email: forest.mca@nic.in
दूरभाष / Tel.: 0177-2658285
0177-2652541
फैक्स / Fax: 0177-2657317

क्रमांक:- 13-4(5)/2022/HP-WP/RO/46

दिनांक-31.01.2023

सेवा में,

अतिरिक्त मुख्य सचिव (वन)
हिमाचल प्रदेश सरकार
आर्मसडेल बिल्डिंग, शिमला
हिमाचल प्रदेश-171002

विषय:- जोगिन्द्रनगर वन मण्डल की कार्य योजना आलेख के संबंध में।

- संदर्भ:-
- (1) मुख्य अरण्यपाल (कार्य योजना एवं बंदोबस्त), हिमाचल प्रदेश के पत्रांक WP/38/J. Nagar F.D./170 दिनांक 27.04.2022
 - (2) इस कार्यालय के पत्रांक 13-4(5)/2022/एच.पी.-डब्ल्यू.पी./आई. आर.ओ./315 दिनांक 10.06.2022
 - (3) मुख्य अरण्यपाल (कार्य योजना एवं बंदोबस्त), हिमाचल प्रदेश के पत्रांक WP/38/J. Nagar F.D./1757 दिनांक 21.10.2022
 - (4) 27.12.2022 को आयोजित स्थायी सलाहकार समिति की बैठक का कार्यवृत्त क्रमांक WP/67/SCC Meetings/2422(a)-22(c) दिनांक 02.01.2023
 - (5) मुख्य अरण्यपाल (कार्य योजना एवं बंदोबस्त), हिमाचल प्रदेश के पत्रांक WP/38/J. Nagar F.D./2493 दिनांक 12.01.2023

महोदय,

इस कार्यालय को मुख्य अरण्यपाल (Working Plan and Settlement) मण्डी, हिमाचल प्रदेश द्वारा संदर्भित पत्रों के साथ वन (संरक्षण) अधिनियम, 1980 के तहत केन्द्र सरकार के अनुमोदन हेतु जोगिन्द्रनगर वन मण्डल (अवधि 2022-23 से 2031-32) की कार्य योजना का अंतिम आलेख प्रेषित किया गया था।

उक्त कार्य योजना का वन (संरक्षण) अधिनियम, 1980 एवं उसमें किए गए संशोधनों, राष्ट्रीय वन नीति 1988, राष्ट्रीय कार्य योजना संहिता-2004, माननीय उच्चतम न्यायालय द्वारा रिट याचिका (सिविल) संख्या 202/1995 सम्पत्ति रिट याचिका 171/1996 तथा पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली द्वारा समय-समय पर जारी किए गए दिशानिर्देशों के आलोक में इस कार्यालय द्वारा परीक्षण किया गया।

उक्त कार्ययोजना (अवधि 2022-23 से 2031-32) को भारत सरकार, वन (संरक्षण) अधिनियम, 1980 के तहत सम्यक् विचारोपरान्त लागू करने की स्वीकृति निम्नलिखित शर्तों पर प्रदान करती है:-

1. अनुमोदन इस पत्र के जारी होने की दिनांक से प्रभावी होगा।
2. उक्त स्वीकृति इस पत्र के जारी किए जाने की तिथि से 31 मार्च, 2032 तक प्रभावी रहेगी।
3. कार्य योजना काल के दौरान प्रबन्धित वन क्षेत्र का भौतिक रूप से सर्वे एवं प्रचलित मानक के सीमा खम्भों के माध्यम से सीमांकन का प्रयास किया जाना चाहिए, जिन पर अक्षांश एवं देशांतर अवस्थिति, तथा forward and backward bearing इंगित हो।

4

4. विभिन्न न्यायालयों में अतिक्रमण से संबंधित दाखिलवादों, यदि कोई हो, पर निगरानी रखी जाएगी तथा समयबद्ध तरीके से वन क्षेत्र में किए गए अतिक्रमण को खाली कराया जाए।
5. वन (संरक्षण) अधिनियम, 1980 के प्रावधानों एवं इसके अंतर्गत समय-समय पर जारी किए गए नियमों, दिशानिर्देशों का कठोरता से पालन किया जाएगा।
6. रिट याचिका (सिविल) संख्या 202/1995 में माननीय उच्चतम न्यायालय द्वारा पारित आदेश दिनांक 12.12.1996 के अनुपालन में ग्रीन फैलिंग (हरे वृक्षों के पातन) पर तब तक पाबन्दी रहेगी, जब तक कि माननीय उच्चतम न्यायालय तथा/अथवा केन्द्र सरकार से इसकी स्वीकृति न प्राप्त हो जाए।
7. रिट याचिका (सिविल) संख्या 202/95 गोदावर्मन थिरुमलपाद बनाम भारत संघ में दाखिल अंतर्वर्ती आवेदनों के विषय में माननीय सर्वोच्च न्यायालय के आदेशों को कड़ाई से पालन किया जाएगा, जब तक कि आदेश लागू है या अन्यथा उपान्तरित न हुआ हो, माननीय सर्वोच्च न्यायालय के आदेश से भिन्न कोई भी उपचार या संकिया स्थगन में रखी जाएगी। वन (संरक्षण) अधिनियम, 1980 तथा इसके अंतर्गत जारी सभी संबंधित दिशानिर्देशों का पालन किया जाएगा।
8. इसके अतिरिक्त, माननीय सर्वोच्च न्यायालय के आदेश दिनांक 22.09.2000 के अनुपालन में राज्य सरकार यह सुनिश्चित करेगी कि वन पुनरुत्पादन, इस कार्य योजना के अंतर्गत निष्पादित किए गए वन पातन के अनुपात में हो।
9. किसी भी प्रकार का निषेध पातन पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, केन्द्र सरकार के दिशानिर्देशों के अनुसार बिना सक्षम स्वीकृति के अनुमत नहीं होगी। ऐसी किसी भी स्वीकृति के लिए राज्य सरकार को नियत समय पूर्व ही इस कार्यालय में आवेदन प्रस्तुत करना होगा।
10. माननीय सर्वोच्च न्यायालय के आदेश दिनांक 22.09.2000 एवं पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, नई दिल्ली के आदेश क्रमांक 9-7/2012आर.ओ.एच.क्यू. दिनांक 23.02.2018 के निर्देशों के अनुसरण में अतिरिक्त प्रधान मुख्य वन संरक्षक (के) की अध्यक्षता में एक क्षेत्रीय अधिकृत कमेटी (R.E.C.) का गठन किया गया है जो वन पातन के अनुपात में पुनरुत्पादन को सुनिश्चित करने के लिए विदोहन की उस मात्रा का निर्णय करेगी जिसकी अनुमोदित कार्य योजना के अधीन अनुमति दी जा सके। भविष्य में इस संबंध में जारी केन्द्र सरकार के अनुदेशों/निर्देशों को कड़ाई से पालन किया जाएगा। पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, नई दिल्ली द्वारा गठित कमेटी से अनुमति लेने के बाद ही राज्य सरकार द्वारा पातन किया जाना है। प्रति वर्ष के वन उपज के आंकड़े इस कार्यालय को प्रेषित किए जायेंगे।
11. पुनरुत्पादन को पातन के अनुपात में रखने हेतु वन पुनरुत्पादन संकिया के कार्यान्वयन के लिए आवश्यक निधि का आबंटन किए

-3-

बिना कोई भी वन पातन निष्पादित नहीं किया जाएगा। वन पुनरुत्पादन की विफलता या पुनरुत्पादन संक्रिया के निष्पादन में किसी कमी की स्थिति में आगे कोई भी वन पातन आरम्भ नहीं किया जाएगा, जब तक कि विफलता या कमी की पूर्ति न कर ली जाये।

12. 30 डिग्री अथवा उससे अधिक ढाल पर वृक्षों का पातन नहीं किया जाएगा। इसी प्रकार यथासंभव नदी के किनारों तथा अपरदन/भू-स्खलन संभावित क्षेत्रों में भी वृक्षों का पातन न किया जाये।
13. वन संरक्षण के समस्त आयामों का नियमित रूप से पालन किया जाएगा।
14. कार्य योजना में उद्धृत समस्त उपचारों का पूर्ण रूप से पालन किया जाएगा एवं विचलन को न्यून रखने का प्रयास किया जाएगा तथा ऐसे विचलनों को इस कार्यालय द्वारा शीघ्र अनुमोदन हेतु प्रस्तुत किया जाएगा।
15. इस कार्ययोजना में उद्धृत समस्त उपचारों को पूर्ण करने हेतु वांछित वित्तीय एवं अन्य संसाधनों की उपलब्धता सुनिश्चित की जाएगी।
16. Control Form के माध्यम से कार्ययोजना के उपचारों के अनुसार किए गए पातन तथा वन (संरक्षण) अधिनियम, 1980 के तहत किए गए पातन को पृथक-पृथक अभिलेखों में संधारित किया जाएगा।
17. प्रत्येक वानिकी वर्ष में किए गए पातन एवं पुनरुत्थान के समस्त आंकड़ों को राज्य सरकार 30 नवम्बर तक इस कार्यालय को प्रस्तुत करेगी।
18. इस कार्ययोजना का अनुमोदन स्वतः ही वन क्षेत्रों में किसी प्रकार के गैर वानिकी गतिविधि की स्वीकृति नहीं मानी जा सकेगी।
19. वन क्षेत्रों से वन (संरक्षण) अधिनियम, 1980 के तहत सक्षम स्वीकृति के बिना रेत, बजरी, चट्टान, मृदा आदि का दोहन वर्जित रहेगा।
20. इस कार्य योजना की मध्यावधि समीक्षा 2027-28 में की जानी चाहिए।
21. कार्ययोजना में अब तक प्रत्यावर्तित वन क्षेत्रों का समस्त विवरण अंकित किया जाना चाहिए जिसमें प्रत्यावर्तित वन क्षेत्र, क्षतिपूरक प्राप्त एवं वृक्षारोपित गैर वन क्षेत्र, शेष क्षतिपूरक वन/गैर वन क्षेत्र का समस्त विवरण प्रस्तुत हो। प्रत्यावर्तन के सापेक्ष प्राप्त गैर वन क्षेत्रों को आरक्षित वन क्षेत्र घोषित कराने की प्रगति का भी उल्लेख किया जाए।

सामान्य शर्तें:-

1. संयुक्त वन प्रबंध/जे.एफ.एम. (JFM) हेतु सूक्ष्म योजनाओं के प्रावधान/उपचार कार्ययोजना के विस्तृत ढांचे/दिशा-निर्देशों से विचलित नहीं होने चाहिए एवं माननीय सर्वोच्च न्यायालय के विभिन्न आदेशों के अनुरूप होंगे।



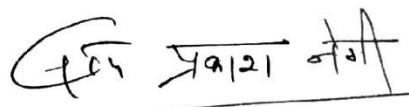
2. एतद् द्वारा लगाई गई शर्तों के साथ पठनीय कार्य योजना के प्रावधानों से कोई विचलन वन (संरक्षण) अधिनियम 1980 के अंतर्गत, केन्द्र सरकार की पूर्व अनुमति के बिना नहीं किया जाएगा।
3. पुनरुत्पादन के वृद्धि संबंधी आंकड़े (Growth Statistics) उत्तरजीविता का रिकार्ड, कार्ययोजना में समय-समय पर जोड़ा जाएगा।
4. मृत, मृतप्राय और रोगग्रस्त वृक्षों तथा अधिकारों एवं रियायतों को प्रदान करने के साथ-साथ समस्त अवैध पातन को सम्मिलित करते हुए, सभी प्रकार के पातन का संग्रहण (Compilation) उनके स्टैंड वाल्यूम के आंकलन के साथ, उसी Volume Table के अनुसार करना चाहिए, जो संवृद्धि (Growth Stock) के मूल्यांकन के लिए उपयोग की जाती है। यह रिपोर्ट प्रतिवर्ष कार्यवृत्तवार और कक्षवार क्षेत्रीय वन मण्डलाधिकारी द्वारा तैयार की जाएगी और नियंत्रण वर्ष की समाप्ति के दो माह के भीतर अरण्यपाल, कार्य योजना द्वारा इस उद्देश्य के लिए तैयार किये गये प्रपत्र में अरण्यपाल कार्य योजना को प्रस्तुत की जाएगी। इस प्रकार के अपसारण (removal) का सुसंगत वर्ष (Relevant year) की निर्धारित पातन उपज में समायोजित कर दिया जाएगा।
5. गैर काष्ठीय (Non-Timber) वनोपज के सतत् प्रबंध (Sustainable Management) को सुनिश्चित करने के लिए उनके अपसारण (removal) के पहले, अनुमानित मात्रा (Estimated Quantity) का कार्य योजना के अनुसार वैज्ञानिक मूल्यांकन किया जाएगा।
6. दुर्लभ, लुप्तप्राय: तथा संकटापन्न प्रजातियों की निकटता से निगरानी (Monitoring) की जाएगी एवं उनके संरक्षण (Protection and Conservation) के लिए पर्याप्त उपाय किए जाएंगे।
7. अतिक्रमण हटाने के लिए एक निश्चित योजना बनायी जाएगी एवं रिक्त क्षेत्र में उपयुक्त स्थानीय प्रजातियों का वृक्षारोपण किया जाएगा।
8. मानक संवर्धन संक्रियाओं (Standard Silvicultural Operations) को छोड़कर कोई भी पातन (Felling) अन्य कार्यवृत्तों में नहीं किया जाएगा।
9. युवा-वय समूह (Young age group) के वृक्षों को उनका पर्याप्त पुनरुत्पादन एवं संरक्षण सुनिश्चित करने के लिए प्रयत्न किये जाएंगे।
10. चूंकि ग्रीष्मकाल के दौरान, अग्नि सबसे ज्यादा विनाशकारी कारकों में से एक है, अतः अग्नि योजना की तैयारी को शामिल करते हुए, पर्याप्त व्यवस्थाएं की जाएगी।
11. स्थानीय प्रजातियों का कृत्रिम पुनरुत्पादन करने के लिए प्रयास इस प्रकार किए जाने चाहिए कि इससे जैव-विविधता संरक्षण एवं काष्ठ ईंधन, चारा व ईमारती लकड़ी की मांग की पूर्ति, दोनों उद्देश्यों को पूरा किया जा सके।

-5-

12. संवृद्धि स्टॉक (Growing Stock) की सेहत को सुधारने हेतु, मानक संवर्धन संक्रियाओं की अनुमति, वन मण्डलाधिकारी या उसके ऊपर के पदाधिकारी के कड़े निरीक्षण के अधीन दी जाएगी, किसी विशेष प्रजाति को प्रथमिकता नहीं दी जाएगी एवं वनों का स्वरूप यथावत (maintained) रखा जाएगा। सुधार पातन हेतु छपान करते समय सुनिश्चित किया जाएगा कि सुधार पातन के पश्चात शेष बचा Growing Stock की उस क्षेत्र के लिए Yield Table के अनुसार होने वाले Growing Stock से कम न रहे।
13. कार्य योजना क्षेत्र में विदेशी प्रजातियों का वृक्षारोपण नहीं किया जाएगा।
14. राष्ट्रीय कार्य योजना संहिता में आदेशाधीन दस्तावेजों व परिशिष्टों का कार्य योजना में समावेश किया जाएगा।
15. कार्य योजना में अधिरोपित उपरोक्त सभी शर्तों का वार्षिक पालन प्रतिवेदन (Yearly Compliance Report) 31, मार्च की स्थिति में प्रत्येक वर्ष जून माह में भारत सरकार को प्रेषित किया जायेगा।

उल्लेखनीय है कि यह क्षेत्रीय कार्यालय पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, भारत सरकार अथवा माननीय सर्वोच्च न्यायालय के आवश्यकतानुसार कार्य योजना के अनुमोदन की समीक्षा, संशोधन अथवा आह्वान करने हेतु स्वतंत्र होगा तथा कार्य योजना में वर्णित समस्त उपचार समसामयिक नीतियों एवं विधियों के संपूरक होंगे।

भवदीय,


क्षेत्रीय अधिकारी 30/11/2023

प्रतिलिपि सूचनार्थ एवं आवश्यक कार्यवाही हेतु:-

1. प्रधान मुख्य अरण्यपाल (HoFF), हिमाचल प्रदेश वन विभाग, टालैण्ड, शिमला-171001, हिमाचल प्रदेश।
2. प्रधान मुख्य अरण्यपाल (वन्य जीव)-सह-मुख्य वन्य जीव वार्डन, हिमाचल प्रदेश वन विभाग, टालैण्ड, शिमला-171001, हिमाचल प्रदेश।
3. मुख्य अरण्यपाल (कार्य योजना एवं बंदोबस्त), हिमाचल प्रदेश वन विभाग, मण्डी-175001, हिमाचल प्रदेश।
4. आदेश पत्रावली।

प्रभारी का. ० त्र. ०


05/02/2023 11/12/2023

