CHAPTER-I

THE TRACT DEALT WITH

1.1 NAME AND SITUATION

1.1.1 The working plan covers the forests of PirPanjal Forest Division with its headquarter at Karipora, Budgam. The present PirPanjal Forest Division comprises of four Ranges, viz.

1. Doodganga Range with its head quarter at Chadoora.
2. Raithan Range with its headquarter at Raithan.
3. Sukhnag Range with its headquarter at Arizal.
4. Soil Conservation Range with its headquarter at Budgam.

1.1.2 Besides above four Ranges, one Control Room is functional at Budgam under the charge of Range officer Control Room created with the view to combat timber smuggling and to deal other important forest protection matters.

1.1.2 The Forest Division is situated between 33° 42 ′ and 33° 58′ North Latitude and 74° 48′ and 74° 24′ East Longitude occupying an area of about 480.75 Sq. Kms. In South-East **Zumkhal-Nallah** separates the Forest Division from Shopian Forest Division while as in the North–West, it is the Bahak-Nallah which separates the division from recently carved out Special Forest Division Tangmarg. The Division was earlier comprising of Gulmarg and Pattan Ranges also, but after formation of Special Forest Division Tangmarg, the Khag and Shunglipora Blocks of SPSP Range and entire Gulmarg & Pattan Ranges were carved out of this division and made part of newly created Special Forest Division-Tangmarg; thus leaving behind Blocks Drung, Sutharan, Zagoo Kharian, Ringzabal & Khalket for which new Range with its headquarter at Arizal, named as Sukhnag Range was created. The forests of this Division now spread over the administrative districts of Pulwama, Budgam and Srinagar, represented over survey of India G.T Sheets No: 43K/5, 43 K/6, 43 K/9, 43 K/10 and 43 K/13 on the scale of 1:50000. The division was earlier spreading over portions of District Budgam, part of Srinagar District, Part of Baramulla District and part of Pulwama District. But after reorganization only District Budgam comes under this division fold now.

1.2 CONFIGURATION OF GROUND

1.2.1 World famous PirPanjal mountain tract forms the main topography of the area. Tatakuti having an altitude of 4745 mts forms the loftiest mountain peak on extreme North West boundary of this division. The glacier formation between Tatakuti and Ashidar Gali forms perennial water source base for Ashidar Nalla in the highest rugged zone. Other peaks of prominence falling on western ridge are Shilmahinu (4612 mts) Nurpur Naza (4502 mts) Farish (4475 mts) Shivnag (4359 mts) Kharang (4341 mts) Chinmarg (4306 mts) Bod angan (4251 mts) Gurwan, Hundru (4237 mts) Kharilab (4226 mts) Kralsangri (3985 mts) Dumkit (3860 mts) Lalsha Ki Alam (3667 mts). Some of the important meadows of the tract are Doodhpatri, Yousmarg, Toshmaidan, Chhanz, Barga maidan etc.

1.2.2 While the southern face of Pirpanjal mountain range is steep and precipitous, the Northern face constituting the pirpanjal forest division is gently sloping. Though the general topography varies from gentle to moderate, yet some steep and precipitous slopes do also occur. Towards the foot of the mountains, fan like projections with flat tops, run at a very gentle angle towards the valley. These are a known as “Karewa”. These karewa are pierced by mountain torrents and seamed with ravines. These are subject to heavy erosion due to their loose, friable and clayey nature, besides being the victims of faulty agricultural practices.

1.2.3 The tract lies between an elevations of 1820m to 4745mts. However the tree belt occurs between 1820m to 3200m. Almost all the aspects are represented, the northern being the most prevalent.

1.3 DRAINAGE

1.3.1 The area is drained by a number of streams and Nallas, namely Doodganga, Shaliganga, Sukhnag, and Romshi ultimately tributing to the river Jhelum. Due to the construction of large number of roads, transportation of timber floating has almost completely been replaced by more efficient vehicular traffic.

1.3.2 Romshi originates near about the sunset peak. Its main tributaries are Gaddar nalla and Birnai nalla originating from Shopian Forest Division and Hakriaj

nalla originating from the Yusmarg. It forms the boundary between Shopian Forest Division and P.P. Forest Division and flows into Jehlum at Kakpora.

1.3.2 Doodganga originates from Margusar. Its main tributaries are Wavijnar (at Fresnag) Shumer (at about Haijan maidan) and Shakrikul (around Branwar). In its course it reaches Rambagh (Srinagar) before flowing into the Jhelum.

1.3.3 Shaliganga originates near Noorpur gali. Its main tributaries are Razdain Nar, Ashdar Nar, Nijraj Nar and finally joins Doodganga at Wathoora Budgam.

1.3.4 Sukhnag originates near Daman Sar, Gurwan Sar, Pam Sar and Bodh Sar. Its main tributaries are Godtar Nalla, Watdar Nalla, Sinwar Nalla and Gurwap Nalla. It joins Ferozpora Nalla of Special Division Tangmarg at Trikoulbal near Gund Ibrahim before entering the Wular Lake.

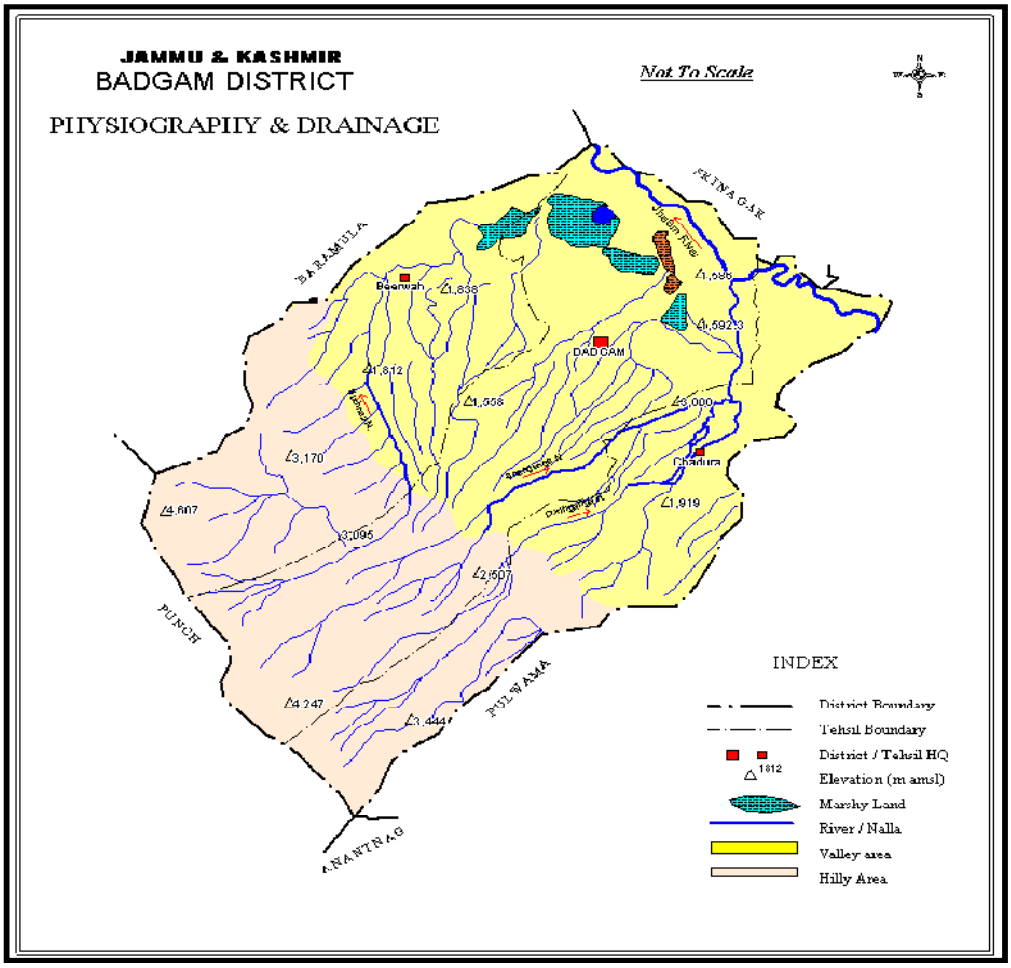


Fig 1: Physiography and drainage of District Budgam (Source:Central Ground Water Board)

1.4 GEOLOGY, ROCK AND SOIL

1.4.1 The Pir Panjal Range is a group of mountains that lie in the Inner Himalayan region, running from east southeast to west northwest across the Indian state of Himachal Pradesh and the disputed territories comprising Indian-administered Jammu and Kashmir and Pakistan-administered Azad Kashmir, where the average elevation varies from 1,400 m (4,600 ft) to 4,100 m (13,500 ft). The Himalayas show a gradual elevation towards the Dhauldhar and Pir Panjal ranges. The Pir Panjal is the largest range of the lower Himalayas. Near the bank of the Sutlej river, it dissociates itself from the Himalayas and forms a divide between the rivers Beas and Ravi on one side and the Chenab on the other.

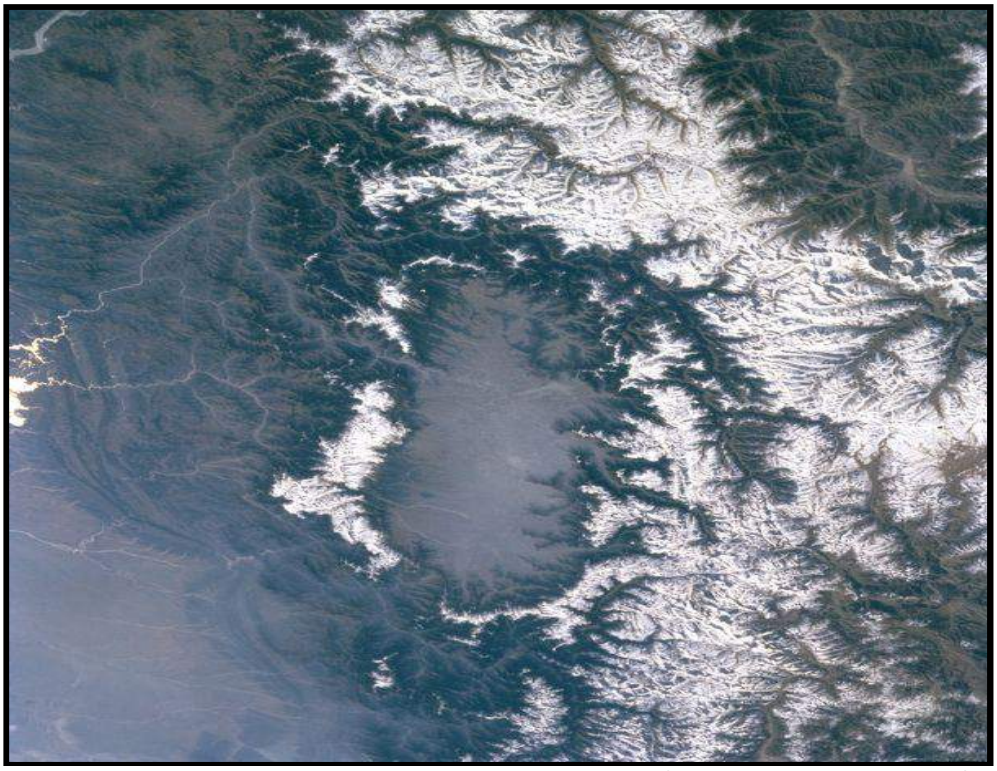


Fig 2: The Snow capped Pirpanjal range separates Kashmir valley from plains (Satellite Imagery)

1.4.2 The PirPanjal consists of higher mountains cut into by deep ravines and precipitous defiles. It is a singularly well-defined range of mountains which may be taken as a type of mountains middle Himalaya. The ridges generally present a steep escarpment towards the plains and a long gentle slope towards Kashmir. Such mountains are spoken of as having an “Orthoclinal” structure, with a “writing desk” shape. The Northern & Eastern slopes facing Kashmir valley have a dense forest vegetation, succeeded higher up by a

capping of snows while the opposite slopes are barren and devoid of snow, being too steep to maintain s soil-cap for the growth of forests or allow the winter snow to accumulate.

1.4.3 The composition of soil varies as per the under lying rock formation. The depth of the soil varies with the change in slope and the depth of the rocks. The soil is comparatively shallow on steep slopes and deep on moderate slopes.

Table 1: Origin and evolution of Geological formations

S. No	Formations	Age
8	River terraces, low level alluvium, pebble beds recent moraines (not shown in above sketch map)	Sub ï recent
7	Karewas upper Karewas ï later moraines, lower karewas ancient moraines.	Pleistocene to Pliocene
6	Murres	Lower Miocene
5	Nummulitic	Lower Eocene
4	Tries	Triassic
3	Tanawal and permo-carboniferous slate	Permian
2	Panjal trap and Agglomeratic slate	Upper carboniferous
1	Metamorphic series and Gneissose	Pre-Cambrian

1.4.4 The more specific details of the geological formations of the present Pirpanjal forest Division forming a part of Pir Panjal mountains are given by "Middlemiss, Geological survey of India" in a section of Pir Panjal across N. E slope from Nilnag to Tatakuti. These geological functions are described as under:-

1. Agglomeratic Slates and Trap

Rocks of this series are divided into two broad sections.

The lower rocks which are a thick series of Pyroclastic slates, Conglomerates and agglomaratic products, up to thousands of meters in thickness and called by the *Middlemiss* the "Pir Panjal agglomeratic slates" and

The upper rocks known as “The Panjal trapes”, an equally thick series bedded andesitic and basaltic traps generally over lying the agglomerates” *(D.N. Wadia).*

2. **Lower Gondwana**

The panjal traps are directly over lain at several places by a series of beds containing fossily Gangmopteris and Glossopteris plants. These beds are composed of charts, siliceous shales, carbonaceous shales and flaggy beds of quartzite which in their constitution are largely pyroclastic.

3. **Trias**

It is a thick series of compact blue limestone, slates and dolomites forming picturesque escarpments and cliffs at several places. Limestomes are the principal components of this system. The rocks are of light blue or gray tint, compact and homogenous, and sometimes dolomitic in composition.

4. **Karewa series**

Kerewas are considered as remnants of the deposits of a lake or a series of lakes which once filled the whole valley basin from and to end. The draining of lake or lakes by the opening and subsequent deepening of outlet at Baramulla and has laid them open to denudation which has dissected the once continuous alluvium into isolated mounds or plate forms. The thickness of these mounds may exceed 2000m. Lithologically, the Karew series consists of blue, grey, and buff slits, sand, partly compacted conglomerates and embedded moraines. Moraines of various periods are found inter-stratified with finer Lake sediments of karewas at different levels.

5. **Alluvium**

Alluvium comprises of loam, slit, pebbles, boulders and recent glacial moraines usually along the flood plains of rivers and Nallas viz, Dudhgnaga, Nilnag, Sukhnag, Ferozpora Nalla etc.

1.4.5 Soil: The composition of the soil varies as per the underlying rock formation. The depth of the soil varies with the change in slopes and the dip of rocks. The soil is comparatively shallow on steep slopes and deep on moderate slops. The distribution of conifers in the tract depends largely on the composition, depth and porosity of the soil. The absence of deodar in

Dudganga and Raithan Ranges is largely attributed to the ill-drained soil of the area.

1.5 CLIMATE AND RAINFALL

1.5.1 The altitudinal variation and the differing topographical features are two main factors responsible for the variation in the microclimate. It is temperate in the lower elevation but very cold in the higher up with the everlasting snow. Four distinct seasons viz, Spring, Summer, Autumn and Winter are well represented. The spring, which is cool with light showers, starts in March and ends up in May. The Summer falls between June to August and are hottest and are particularly dry. Autumns months fall between September to November and are very bright and pleasant with a little cold and particularly dry. Winter months of December, January and February are extremely cold and experience heavy snow fall. Frost is experienced from middle of November on wards. Due to biting cold and presence of snow the period of forest working gets reduced to only about six months from May to October.

1.5.2 PRECIPATATION

During the summer months Kashmir valley gets very little rain due to the barrier put across the moon-soon by the lofty Pir Panjal Range itself. However, these forests do get some sporadic rain every now and then when some moisture laden winds steal into the valley through the saddles or 'gent galies'. The main form of precipitation is snow in winter and some stray rains in other seasons particularly in spring.

1.5.3 The climatological table presented below gives the average monthly rainfall in millimeters for the period 1971-2000 and other important climatic information at Srinagar station situated close to the Pir Panjal Forests.

1.5.4 TEMPERATURE

The monthly average, minimum and maximum temperature and relative humidity recorded at Srinagar station which is in proximity of division is given below in the tabulated form.

Table 2: Climatological Table of Srinagar station for the period from 1971 to 2000

Month	Mean Temperature(°C)		Mean Total Rainfall(mm)	Mean Number of RainyDays	Mean Number of days with			
	Daily Min	Daily Max			HAIL	Thunder	FOG	Squall
Jan	-2.1	6.3	049.6	4.9	0.1	0.1	1.9	0.0
Feb	-0.2	8.8	072.3	5.7	0.1	0.6	0.9	0.0
Mar	3.6	13.9	115.6	8.3	0.1	2.0	0.0	0.0
Apr	7.7	20.4	085.4	6.5	0.1	4.5	0.1	0.0
May	10.8	24.4	071.7	6.1	0.3	9.6	0.1	0.0
Jun	14.7	29.1	043.7	3.9	0.2	7.0	0.1	0.0
Jul	18.2	30.0	059.6	5.0	0.1	6.8	0.1	0.0
Aug	17.4	29.5	071.8	5.3	0.0	6.0	0.3	0.0
Sep	12.5	27.8	026.6	2.5	0.1	3.6	0.2	0.0
Oct	5.7	21.4	031.2	2.0	0.0	1.6	0.1	0.0
Nov	1.0	15.6	028.3	2.0	0.0	0.3	1.4	0.0
Dec	-1.6	8.8	047.8	3.5	0.0	0.0	1.5	0.0
Annual	7.5	19.9	703.6	55.6	1.2	42.1	6.7	0.0

Source: "Meteorological Centre Srinagar"

Table 3: Monthly Mean Maximum Temperature of Srinagar Station (Degree Celcius)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2001	11.7	13.7	18.0	21.7	28.4	29.6	30.1	30.2	26.9	24.4	15.5	10.6
2002	09.3	09.5	16.8	20.6	26.5	28.9	30.5	29.8	25.1	23.3	18.5	10.0
2003	11.2	10.3	13.7	21.0	22.2	30.1	30.9	28.6	26.9	23.0	15.4	10.0
2004	07.1	13.0	21.7	20.7	25.4	27.8	29.4	29.3	29.0	20.6	17.9	09.7
2005	07.5	06.5	14.7	20.7	21.8	29.3	28.9	30.4	29.3	22.7	15.8	09.9
2006	04.3	13.4	16.0	21.1	28.2	27.6	30.9	28.7	25.9	22.9	15.0	08.4
2007	10.0	12.0	14.7	25.6	25.5	27.8	29.8	30.1	27.3	24.1	17.1	09.9
2008	05.5	08.7	20.0	20.1	25.6	29.6	29.9	29.5	26.5	22.9	15.4	10.4
2009	09.0	11.0	16.0	20.4	25.3	26.7	29.9	31.4	28.6	22.9	14.5	10.7
2010	10.9	09.8	20.7	21.3	22.7	25.7	28.9	28.5	26.6	23.8	18.6	11.3
2011	07.9	09.5	17.1	18.6	27.7	30.3	29.8	30.1	27.8	22.3	15.7	10.4
2012	04.8	09.7	16.2	19.9	23.8	27.4	30.9	29.9	26.3	21.2	16.8	09.0
2013	07.8	10.8	18.3	20.0	24.9	29.4	31.1	28.8				

Source: "Meteorological Centre Srinagar"

Table 4: Monthly Mean Minimum Temperature of Srinagar Station (Degree Celcius)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001	-03.6	-00.3	03.2	08.5	12.9	17.4	19.5	17.6	11.2	06.1	00.9	-00.9
2002	-02.8	-00.5	04.5	08.6	11.7	15.2	17.1	18.2	11.6	06.6	00.7	-00.8
2003	-02.9	00.4	03.7	08.6	09.1	14.9	18.9	17.1	13.6	05.1	00.7	00.0
2004	00.3	01.1	05.6	08.5	10.7	15.0	16.9	17.1	12.6	06.2	01.1	-00.7
2005	-00.3	00.7	05.3	07.1	09.9	14.4	18.0	16.9	13.7	05.8	-00.2	-03.3
2006	-01.3	03.3	04.7	07.2	13.3	14.7	19.3	18.3	12.3	08.0	03.5	00.0
2007	-02.5	02.9	03.0	08.9	11.9	16.0	17.8	17.8	13.3	03.9	-01.1	-02.0
2008	-02.5	-01.4	05.3	07.7	11.5	18.3	19.1	17.8	11.3	06.9	01.0	00.7
2009	00.4	01.5	05.0	08.0	10.8	13.0	16.9	17.9	11.9	05.1	00.5	-00.8
2010	-01.5	00.4	06.5	09.0	11.1	13.5	17.7	18.8	13.3	07.3	02.2	-03.7
2011	-02.7	01.5	03.9	07.0	12.6	16.7	18.3	18.1	14.1	06.9	02.8	-01.9
2012	-03.1	00.2	04.3	08.2	10.1	14.1	18.6	19.1	14.5	05.8	01.6	-00.4
2013	-02.2	00.9	5.4	8.3	11.4	16.9	19.3	19.1				

Source: "Meteorological Centre Srinagar"

Fig 3: Monthly Mean Maximum/Maximum Temperatures of Srinagar Station (Degree Celcius)

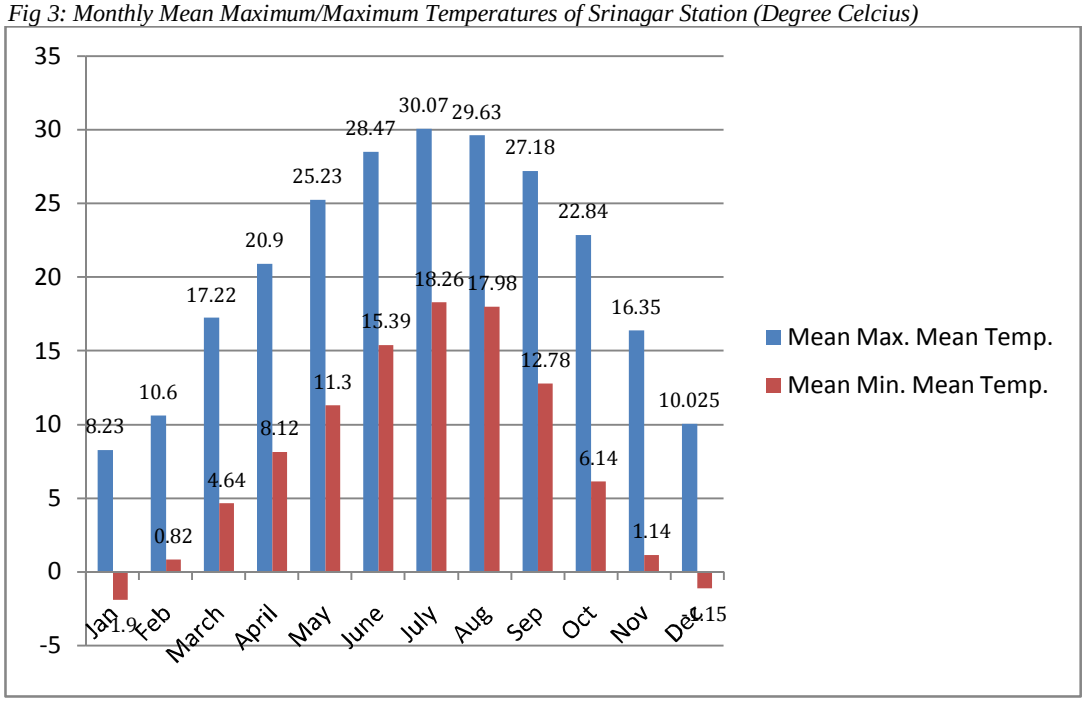


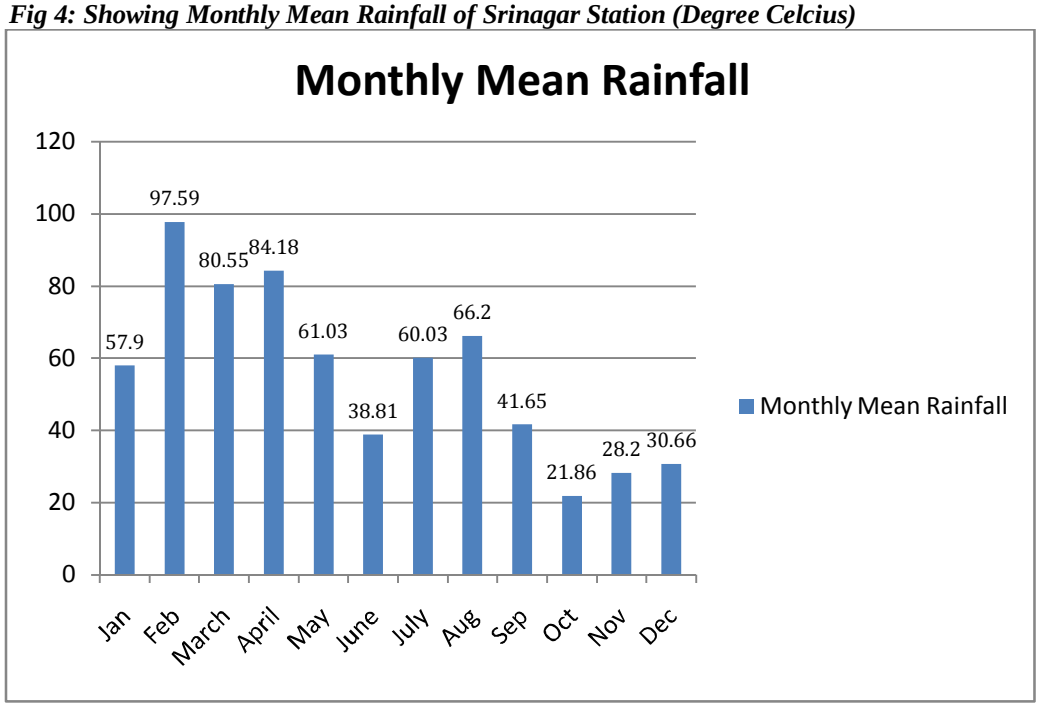
Table 5: Monthly Total Rainfall of Srinagar Station (millimetres)

Year	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC
2001	21.3	46.1	56.0	57.0	37.0	52.8	80.8	67.8	33.5	15.9	36.0	18.0
2002	35.5	105.8	105.1	77.7	47.3	82.2	16.8	75.0	54.5	08.2	00.0	08.9
2003	28.7	180.0	173.4	127.6	91.4	20.4	97.9	19.8	62.4	08.7	14.6	59.4
2004	79.2	38.1	09.6	145.4	86.6	36.7	58.3	62.3	12.0	61.3	33.2	12.5
2005	85.6	188.5	104.8	48.1	63.6	08.3	115.5	15.6	16.8	18.6	14.4	00.0
2006	134.3	63.3	48.2	52.7	26.3	33.9	103.3	171.3	93.3	15.3	73.5	72.2
2007	08.1	52.6	210.3	01.5	46.2	50.9	54.9	47.4	14.0	00.0	00.0	15.9
2008	76.3	105.0	09.4	81.5	52.3	24.7	33.1	65.3	22.5	36.6	83.4	59.6
2009	86.5	108.9	41.2	85.6	44.6	44.0	21.1	20.2	15.9	06.5	45.5	18.3
2010	24.1	88.9	61.0	126.8	186.4	45.3	69.8	132.1	16.9	51.4	2.0	43.0
2011	54.2	100.9	100.8	105.8	20.1	27.0	37.1	68.4	46.5	29.1	24.1	33.1
2012	60.2	78.7	58.0	82.7	39.8	24.3	12.1	26.6	111.5	10.8	11.7	27.1
2013	58.7	111.9	69.4	102.0	51.8	54.1	79.8	88.8				

Year	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***
Annual Total	***522.2***	***617.0***	***884.3***	***635.2***	***679.8***	***887.6***	***501.8***	***649.7***	***538.3***	***857.7***	***647.1***	***543.5***

Source: "Meteorological Centre Srinagar"

Fig 4: Showing Monthly Mean Rainfall of Srinagar Station (Degree Celcius)



The meteorological department has no observatory at Budgam. Therefore the precise weather data could not be obtained. As per Central Ground Water Board, the climate of the district is Temperate cum Mediterranean type. In the higher reaches the temperature remains cold throughout the year. Average minimum and maximum temperature varies from –11°C to 33°C. The winter season starts from the middle of the November and severe winter conditions continues till the middle of February/March. The district receives an average annual precipitation of about 660 mm in the form of rain and snow for about 70 rainy days.

1.6 WATER SUPPLY

The various nallas originating from snow covered mountains forming boundaries of the division provides the water supply which is supplemented by spring rains and occasional summer showers. The whole area is traversed by a network of streams. Some streams are perennial. The four important nallas of this tract are:-

1.6.1 **Romshi** originates near about the sunset peak. Its main tributaries are Gaddar nalla and Birnai nalla originating from Shopian Forest Division and Hakriaj nalla originating from the Yusmarg. It forms the boundary between Shopian Forest Division and P.P. Forest Division and flows into Jehlum at Kakpora.

1.6.2 **Doodganga** originates from Margusar. Its main tributaries are Wavijnar (at Fresnag) Shumer (at about Haijan maidan) and Shakrikul (around Branwar). In its course it reaches Rambagh (Srinagar) before flowing into the Jhelum.

1.6.3 **Shaliganga** originates near Noorpur gali. Its main tributaries are Razdain Nar, Ashdar Nar, Nijraj Nar and finally joins Doodganga at Wathoora Budgam.

The better known Nags (springs) are:-

1.6.4 **Gandhak Nag:** The Sulphurous waters of this Spring are believed to have medicinal and curative properties especially for those with skin disease (Gandak means sulphur). The spring is located in Drang Khaipora, a village in the Khag administrative Block.

1.6.5 Nara Nag: Also known as Narian Nag. This spring is located near Khag village. It is said to get its waters from the Tosha- maidan Sar (lake). The waters of the Sar seep into the ground to re-emerge downhill at the Nara Nag. In support of this plausible theory is the legend of a mendicant who accidently dropped some sheep-dung in to the Toshamaidan Sar lake. He found it floating on the Nara nag when he reached the nag a few days later. In order to be sure that there was indeed an underground link between the Sar and Nag, he went back to the Sar and threw turmeric powder into it. After a few days the turmeric-coloured waters reached the nag and proved the mendicant's theory right.

1.6.6 Pushkar Nag: The ancient Kashmiri Hindu Scripture, the Neelmat Puran contains the oldest extant mention of this spring which originates in Pushkar village which is between khag and and Ferozpura. The Puran says that bathing in the spring carries as much spiritual merit as reading the Vedas (the oldest of all Hindu scriptures) all night long. The nag flow eastward. This Nag is now in Special Tangmarg Forest Division.

1.6.7 Sukh Nag: This perennial spring flows from the several small lakes between the Toshamaidan and Nurpur passes, on the east of the Panjal range. It cascades down the mountains and pours off a 20' cliff at Kanj Zubji, near the Toshamaidan, as a waterfall. Sukhnag originates near Daman Sar, Gurwan Sar, Pam Sar and Bodh Sar. Its main tributaries are Godtar Nalla, Watdar Nalla, Sinwar Nalla and Gurwap Nalla. It joins Ferozpora Nalla of Special Division Tangmarg at Trikoulbal near Gund Ibrahim before entering the Wular Lake.

1.6.8 Sut haran: The name is probably a corruption of the Hindi/Sanskrit expression, Sita harran (lit.: abduction of Sita). However, the local legend does not refer to the abduction of goddess sita. Instead, it is about her having bathed in this spring at some stage during the 14 years exile (Banvas) of lord Ram. It is said that Shri Ram camped in these woods, accompanied by his wife, Sita, and brother, Laxman. Near the spring there is a rock which the goddess is supposed to have sat on. The spring, knows for the sweetness of its water, is located in a dense forest. It is close to the Toshamaidan meadow on one side and the 'line of control' on other. The tos(h)amaidan Sar lake found in the middle of the Toshamaidan meadow originates at this spring.

1.6.9 The important canal of district Budgam is **Ahaji canal** which was originally constructed almost a century back for providing irrigation to the culturable command area of 6896 hectare of land falling right from Arizal Beeru to Budgam spreading across 102 villages. The other two canals are Kashi canal & Munshi canal which start from Yousmarg and irrigate Charar-sharief area.

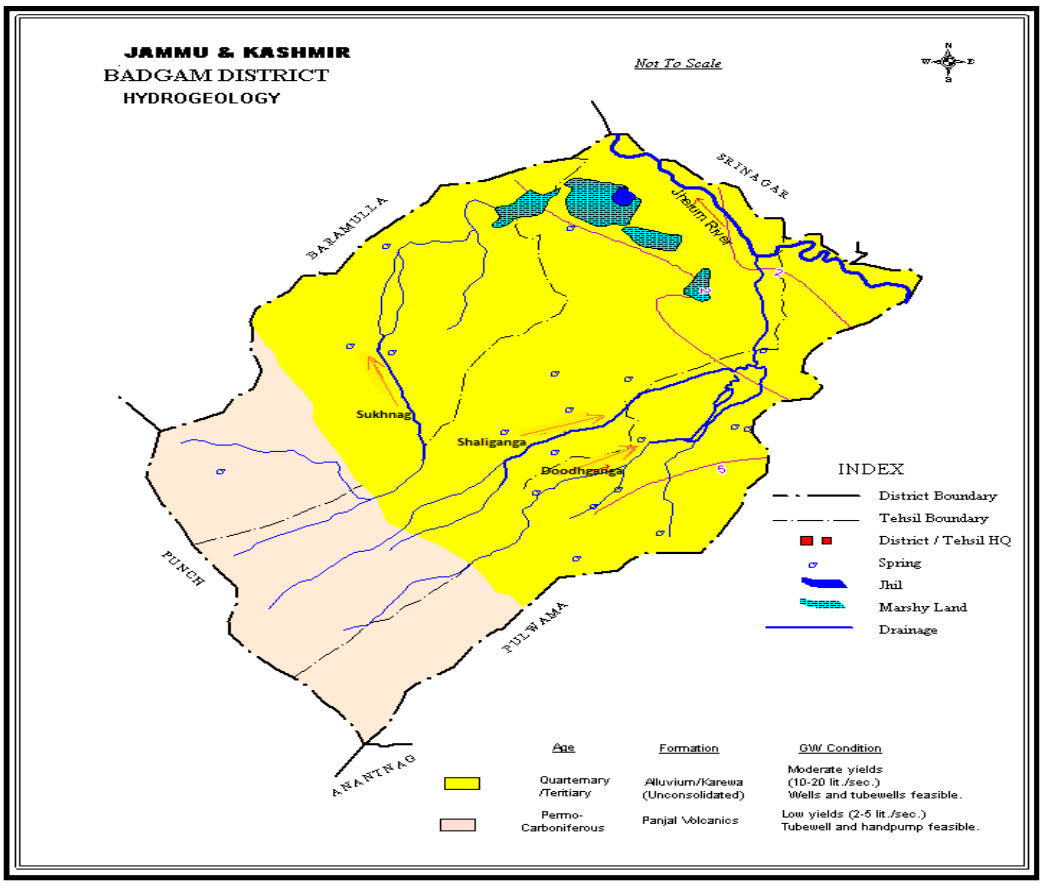


Fig 5: Hydrogeology of Budgam District (Source: Central Ground Water Board)

1.7 DISTRIBUTION OF AREA

1.7.1 The PirPanjal Forest Division has gone through reorganizational changes many times. It was in the year 1919AD that ex-Shopian Forest Division was created. It was constituted out of Haripora and Shupyan Ranges detached from Kashmir Division, along with a part of Sri Pratap Singh Pora (SPSP) Range transferred from Pir-Panjal Division. Its boundary extended from Noorabad Range of Kashmir Division upto watershed between Shaliganga and Sukhnag Nallahs. It was in the year 1924 AD that Khag Range (present Sukhnag Series) was added on, while the Narva (Noorabad Range) was excluded and transferred from this division to Kashmir Division, thus constituting the

Pirpanjal Division as it stood upto 1982 AD. It was in the year 1982 AD that the Pir Panjal Forest Division was reorganised comprising of Gulmarg Range of ex JV Forest Division besides Dudhganga and SPSP Range of ex-P.P. Division. Thus the Pir Panjal Forest Division comprised of four Ranges namely Dudhganga Range, Raithan Range, SP SP Range and Gulmarg Range. In the year 2010, the division was again reorganised vide Govt. order No. 251-FST of 2010 dated 17-06-2010. In the said reorganisation, the Khag and Shonglipora territorial blocks, out of SPSP Range were transferred to Special Forest Division, Tangmarg. The remaining blocks viz Drung, Sutharan, Zagoo Kharian, Ringzabal & Khalket were constituted into new range and named as Sukhnag Range with its headquarter at Arizal. In the year 2012, the Sangerwani Block of Dudhganga Range was shifted to Shopian Forest Division for better administrative control and protection of forests since it was falling in Pulwama district.

1.7.2 The total area of the forest Division is 480.19 Sq. Kms which includes a sizeable portion of alpine scrub and pasture lands. The net commercial area of the Division works out to be 209.6265 Sq. Kms.

1.7.3 The Range wise distribution of area is as under:-

Table 6: Range-wise distribution of forest area

Range	**Forest area in hectares**	**Alpine area in hectares**	**Total area in hectares**	**No. of compts./ Subcompts**	**Remarks**
Doodganga	9356	6616	15972	38	From Co. Ri-25 to Ri-32, from Co. N1 to N6 and from D1 to D19
Raithan	6329.4	8182	14511.4	26	From D20 to D34 and from S1 to S3
Sukhnag	5268.25	12259	17527.25	22	From Co. S4 to S24.
Budgam S.C. Range	9	0	9	1	Ompora City forest & Budgam City forest
Total	**20962.65**	**27057**	**48019.65**	**87**	

1.8 DEMARCATION AND STATE OF BOUNDARIES

1.8.1 The forests are demarcated & delineated on the ground by means of boundary pillars. These boundary pillars are dully numbered as per the demarcation map & files. Most of these have been damaged or have

disappeared at various places of division because of the ulterior motive of land grabbers to encroach upon the forest land. The damage to the boundary pillars is huge near large habitations and chaks.

1.9 LEGAL POSITION

1.9.1 All the demarcated forests come under the purview of the J & K Forest Act-1930 AD as amended to date. In the state there is no usual distinction between 'Protected' and 'Reserved' forests. All these forests are legally owned by J & K State and are managed by the J & K Forest Department under the administrative control of Principal Chief Conservator of Forests. The following enactments and rules govern the preservation, regulation and control of these forests.

1. The J & K Forest Conservation Act, 1997 A.D.
2. The J & K Forest (Sale of timber) Act. Samvat 1987 (1931 AD)
3. The Kuth Act, Samvat 1978 (1921 AD)
4. The Cattle Trespass Act, Samvat 1977 (1920 AD)
5. The J & K Khacharai Act, Samvat 2011 (1954 AD)
6. The J & K Soil Conservation and Land Improvement Scheme Act 1959 AD.
7. The J & K Wild Life (Protection) Act 1978 AD.
8. The Public Safety Act-1984
9. The rules and regulations laid down in the Forest Law Manual/Forest Law Compendium besides rules and regulations enacted from time to time.

1.10 RIGHTS AND CONCESSIONS

1.10.1 The Government of Jammu & Kashmir does not recognize any right of people over the forests but the villages living in the vicinity of the forests enjoy liberal concessions as embodied in Kashmir Forest Notice in lieu of obligatory discharge of certain responsibilities enunciated in the said notice. Concessionists are categorized into "A" and "B" categories for the purpose of the extent of major concession (timber) granted. The category "A" includes the villagers residing within five Kms of the boundary of the demarcated forests provided that the forest is not detached from their village of residence by an unfordable stream at its lowest winter level. The category "B" includes the villagers residing within the distance limit of 5-8 Kms, from such forests. The important concession granted is under:

1.10.2 Timber for buildings

(i) The timber granted to the villagers is for the bonafied use only. The concessionists of the "A" zone living in inaccessible areas get timber under Kashmir notice (Fir and Kail only) at following rates as per Govt. order No. 204-FST of 1992 dated 17-11-1992.

Table 7: Cost of timber under Kashmir notice

Species	Cost per cft in log form- A zone	Note:
Deodar	Rs 66.33	(i) These rates are exclusive of conversion & Transporattion charges which are charged as per actual expenditure incurred by the department (ii) The concessionist shall not be granted morethan 200cft of timber in each individual case.
Kail	Rs 42.54	
Fir	Rs 39.48	

(ii) Most of the areas are now well connected with road network. The practice of granting trees at concession rates under Kashmir Notice has become redundant and instead timber is being increasingly supplied at government controlled sale depots established throughout the Division. The timber under Kashmir notice is issued only in remote and inaccessible areas where depot facility is not available. The residents of towns get the supply of timber through Government controlled sale depots under the conditions and rates prevailing at these depots. The fire suffers and other calamity suffers are given timber free of cost within "A' zone. No deodar timber is given on concession or free of cost. The timber obtained as free grant or at concession rates cannot be sold, bartered, exchanged or used other than for the purpose sanctioned.

(iii) The following table gives the prevalent depot rates as per Government Order No 212-FST of 2010 (Dated:- 13-05-2010).

Table 8: Timber rates in vogue from Forest Sales Depots

S.No	Zone	From	Rate per Cft			*Standard rates of timber for concessionists w.e.f 1-4-1992* *(Govt. order No. 204-FST of 1992 dated 17.11.1992)*
			Deodar	Kail	Fir	
01	A	Log	185.00	130.00	74.00	Deodar Rs 132.48 /cft Kail Rs 85.08/cft Fir Rs 78.96/ cft
		Sawn	215.00	160.00	104.00	
02	B	Log	345.00	245.00	138.00	
		Sawn	375.00	275.00	168.00	
03	C & MC Zone	Log	513.00	360.00	205.00	
		Sawn	543.00	390.00	235.00	

Plus 13.5% VAT and Re.1/cft Forest Development fund

1.10.3 Timber for Agricultural Implements

The concessionists are entitled for free grant of timber for Agricultural Implements particularly from broad leaved species like *Aesculus indica, Prunus padus* and *Acer* species etc.

1.10.4 Fallen material

Dead fallen material for domestic use can be collected free of charge.

1.10.5 Minor Forest Produce

The collection of M.F.P. other than especially restricted is allowed to concessionists.

1.10.6 Lopping

Lopping for fodder and fuel wood purposes can be conducted on all trees except conifers, walnuts and special class broad leaved species.

1.10.7 Grazing

The grazing and grass cutting in demarcated forests are allowed to concessionists except in the areas specially prohibited for the purpose.

1.10.8 Felling Refuse

The felling refuse from the recently vacated coupes can be collected with prior permission of Chief Conservator of Forests, for this purpose the concession limits is upto 8 kms.

1.10.9 The statement showing the volume of timber granted to concessionists in this division from 1990 onwards is given below:-

Table 9: Volume of timber issued from A, B, C Zones & under Kashmir Notice

Year	Stocks Dumped				Stocks Supplied				Kashmir Notice
	"A" Zone	"B" Zone	"C" Zone	Total	"A" Zone	"B" Zone	"C" Zone	Total	
1991-92	_	_	_	308921	_	_	_	290278	
1992-93	_	_	_	87451	_	_	_	65276	
1993-94	_	_	_	348547	_	_	_	102979	
1994-95	_	_	_	123701	_	_	_	134864	
1995-96	_	_	_	54677	_	_	_	42450	
1996-97	_	_	_	120705	_	_	_	105727	
1997-98	_	_	_	52603	_	_	_	47914	

1998-99	_	_	_	89893	_	_	_	80235	
1999-00	51590	29426	105303	186319	52288	9429	105006	166723	
2000-01	36111	13377	88894	138382	33669	12001	75478	121148	
2001-02	37661	11877	74339	123877	36609	11076	71064	118749	
2002-03	35547	11651	72845	120043	29225	8873	70267	108365	
2003-04	45281	11080	132487	188848	45410	12304	132177	189891	
2004-05	30650	9562	106805	147017	30185	9562	110989	150736	
2005-06	38911	15790	156812	211513	38714	16513	155763	210990	
2006-07	29448	10935	0	40383	29120	11075	0	40195	
2007-08	46806	20482	0	67288	43731	17245	0	60976	2519
2008-09	42487	17895	49719	110101	42993	17963	35961	96917	993
2009-10	59585	25703	77954	163242	57565	25734	80993	164292	
2010-11	41167	17209	73541	131917	41245	17209	72823	131277	0
2011-12	45718	19483	88154	153355	45752	19159	83230	148141	266
2012-13	60574	25226	98412	184212	60634	25551	98593	184778	4585
2013-14									

1.10.10 In lieu of concessions granted under Kashmir Forest Notices, the concessionists have to render the assistance to the Department in-

i. Extinguishing fires in these forests.

ii. Extinguishing fires in neighborhood of those forests to prevent their entry into the latter.

iii. Preventing offences against these forests.

iv. Arresting and tracing offenders committing offences against these forests.

1.11 GRAZING

1.11.1 All the areas are open to grazing and grass cutting except those which are closed for the purpose by notification. There is no restriction as regards cattle grazing in these forests or the distance they come from. However, browsing by goats in deodar forests is prohibited. The grazing is being regulated under J & K Kahcharai Act, 1954 and the rules framed there under.

1.11.2 The grazing fee leviable under the provisions of this act amended vide SRO No. 147 of 11-3-1978 is indicated below:-

Table 10: Grazing fee liable to animals

S. No	Kind of animal	Rate A	Rate B	Rate C
1	Pack bullocks	0.80	0.80	0.80
2	Teli bullocks	0.50	1.00	2.00
3	Buffaloes	1.80	3.15	11.25
4	Riding ponies	2.50	3.75	7.50
5	Pack ponies, mules	2.80	2.80	5.00
6	Donkeys	0.65	0.65	0.65
7	Sheep for Ladakh	0.15	0.20	0.60
8	Camels	5.00	10.00	15.00
9	Goats imported for commercial purpose	----	-----	2.50
10	Sheep for rest of the state	0.15	0.20	0.65
11	Sheep imported for commercial purpose	----	----	0.20

Explanation:

"A rates" in respect of-

(i) Livestock other than goats which graze within the limits of a village whether moving for grazing during summer to recognized Bahaks or not;

(ii) Goats which do not move for browsing beyond the limits of their village;

"B rates" in respect of-

(i) Livestock other than goats which move from place to place within the state for grazing;

(ii) Goats which move for browsing from place to place but do not migrate from the territories of the state on one side of the PirPanjal mountain range to such territories on the other;

"C rates" in respect of-

(i) Livestock other than goats which enter for purpose of grazing or are imported for commercial purposes into the state;

(ii) Goats which move for browsing from the territories of the state on one side of the Pirpanjal mountain range to such territories on the other.

No Kahcharai shall be charged on-

(a) Sheep and goats less than 6 month old;

(b) Animals other than sheep and goats less than 3 years old; and

(c) Livestock in villages where adequate grazing facilities do not exist and cattle are not taken to forests and Bahaks for grazing.

The following livestock, shall be exempted from the levy of Kahcharai fees, namely

(i) Cows and bullocks (other than Teli Pack bullocks);

(ii) Animals belonging to any department of J & K government;

(iii) Livestock of persons living within the limits of a Municipality e town area.

1.11.3 The following statement gives the Tehsil-wise details of cattle population within the jurisdiction of the division as per 2007 census

Table 11: Cattle population of Budgam district

S.No	Tehsil	Total Cattle Population	Total Buffalo Population	Total Horses	Total Ponies
1.	Budgam	128776	34	956	569
2.	Beerwah	170695	2387	2059	1586
3.	Chadoora	107426	516	1180	567
Total		406897	2937	4195	2722

(Source: Department of Animal Husbandry, Budgam)

1.11.4 The following statement gives the Block-wise details of Sheep and Goat population within the jurisdiction of the division for the year 2012-13.

Table 12: Block-wise Sheep & Goat population of Budgam district

S. N	Name of the Block	Sheep Population			Goat Population	Total (Sheep and Goat)	Wool Production in Kgs	Mutton Production in Kgs
		Local	Cross Bred	Total				
1.	Budgam	2514	12934	15448	4704	20152	28382	103497.84
2.	Beerwah	6520	14083	20603	11396	31999	34686	156338.58
3.	B.K.Pora	2335	8265	10600	2363	12963	18865	66508.02
4.	Chadoora	6208	15738	21946	6482	28428	37684	142892.64
5.	Khansahib	12874	38179	51053	12789	63842	89232	324416.24
6.	Khag	4743	12505	17248	4275	21523	29753	108916.02
7.	Nagam	5892	28962	34854	5628	40482	63816	211604.76
8.	Narbal	1914	10934	12848	12363	25211	23782	122973.9
Total		43000	141600	184600	60000	244600	3.2620	1237148

(Source: Department of Sheep Husbandry Budgam)

1.11.4 The following statement shows the revenue collected on the livestock grazing in the division from 1990 onwards.

Table 13: Revenue collected on livestock grazing

Year	Revenue collected
2000-2013	No revenue collected

1.11.5 However, the actual incidence of grazing is much higher than shown above due to the fact that sizable number of cattle remains un-noticed and un-registered, though several grazing check posts have been established to

register the migratory cattle and collect the grazing fee. Also the livestock is checked in the pasture lands (Bhaks Partal) by the staff of the forest Department deputed for the purpose.

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CHAPTER-II

THE FOREST FLORA AND FAUNA

PART A - FOREST FLORA

2.1 COMPOSITION AND CONDITION OF CROP

2.1.1 The Forests of PirPanjal Forest division extend in the form of an un-interrupted belt from Romshi Nalla in the South-East to Bahak Nalla in the North –West. It is essentially a splendid Fir Forest division though extensive patches of almost pure Kail Forest occur at lower slopes. Deodar is very poorly represented in the Division. The conifer forms the dominant canopy throughout, except some small patches, where deciduous trees compose the crop. In the understory the broad leaved deciduous species are seen in some restricted localities. Deodar, Kail, Fir and Spruce are the principal coniferous tree species found in these forests, besides broad leaved trees species like Horse chestnut, Maple, Ash, Hazel nut, Bird cherry, Popular, Willow, Birch and Walnut. Generally the crop is homogenous but it shows a marked differentiation into species along its altitude gradient. The species occurrence and composition is mainly dictated by the altitude and aspect.

2.1.2 The following table gives the area in hectares occupied by the principal species Range – wise (from stock maps).

Table 14: Range-wise distribution of principal species

Range	Deodar (ha)	Kail (ha)	Fir (ha)	Broad leaved (ha)	Encroachment (ha)	Blank & Pasture Belts (ha)	Total (ha)
Dudhganga	0	1819.45	6522.9	25	455.15	7149.5	15972
Raithan	0	621	4405	79.25	367.15	9039	14511.4
Sukhnag	4.5	164.85	3762	31.25	326.25	13238.4	17527.3
Total	4.5	2605.3	14689.9	135.5	1148.55	29426.9	48010.7

2.1.3 Deodar, the most valuable species of Himalaya conifers is poorly represented in this Division. It is almost absent in division except scarcely present in few compartments of this division viz S-13, S1a, N2b. It is also present in some patches where it has been planted. In Sochalnari Soil unit (Compartment N1a

in Doodganga range) the deodar crop has come up very well and is regenerating naturally. A theory has been put forward that deodar used to occur as continuous belt parallel to the Kail in Pirpanchal division in recent past. The extinction of this belt has been attributed to close proximity of deodar to densely populated city of Srinagar. Existence of deodar timber utilized in shrines of Charar-i-shrief and Pakherpora supports the above theory of occurrence of deodar in this tract because at that time there was no mechanized transport to bring the timber uphill.

2.1.1 KAIL FORESTS

(i) These forests cover 14.94% of the total commercial stocked area of the division. Its general altitude zonation is from 2000 m to 2400 m above mean sea level but it may creep up to 3000 m or more on hotter aspects like Southern, South-eastern and South-Western. Kail forest occur either pure or in mixed form, towards the lower elevations its main associate is deodar which occur on well-drained soils. The Fir is its main associate towards higher elevations, which eventually come down in depressions and along the nallas. The Kail flourishes well as colonizer on exposed slopes and degraded sites. It often colonizes the clearance made in deodar and Fir forests. As the Kail canopy closes up with the passage of time, the principal species regenerates underneath it. The crop is generally young to middle aged with or without a scattered overwood of mature trees. The overwood has gradually been removed in the past illicitly, accidentally or under government authority. The natural regeneration is not a problem if the area is protected from biotic interference. These Kail forests along with those of deodar are subject to heavy biotic interference due to proximity to habitation, easy slopes and easy accessibility. These forests also bear the brunt of demands of the locals to a great degree. The evil effects the biotic interference of such Kail-Deodar forests is quite evident in compartments like Ri32, N1b, and N2a, N3, N4, N5, N6, D19b, D33b, D33c, D33d, D34a, D34b, S1a, S18, In these compartments crop have been badly lopped and damaged. These areas have also become victims of encroachments.

(ii) Pure stretch of Kail is seen along the riverbed of Doodganga Nalla particularly along the compartments D2, 7, 8, 13, 14a, 14b, 18b. Riverian Bluepine is also seen in compartment D33b. Kail also occurs in patches as sub-alpine Bluepine

at higher altitudes (upto 3300m), but its quality is poor and growth stunned and bushy.

(iii) On the whole the broad leaved associates are generally absent in the Kail forests, due to persistent and excessive grazing, occasionally Poh, *Indigofera*, Rosa Spp., Viburnum spp. etc; may be seen to form undergrowth in such forests. Species like *Plect-ranthus rugosus*, *Artemisia, Berberis* occur on drier sites. *Fragaria nubicola* and *Viola odorata* generally form a mat on the floor of these forests. *Indigofera spp*. *Viola spp* are the indicators of the soil conditions favourable for its regeneration. In the high level Kail forests, broad-leaved associates are more frequent particularly in depressions and along nallas due to moist conditions.

2.1.2 FIR FORESTS

(i) The PirPanjal Forests are well known for its high quality Fir. These forests cover 84.25% of the commercial stocked area of the division. The general altitudinal zonation of fir is from 2100m to 3200m above mean sea level but it may exist beyond the lower or upper limits depending upon the site conditions and aspect. The best quality fir forests occur in all the three territorial ranges of the division.

(ii) The fir forests clothe most of the catchment areas of the principal nallas of the tract and constitute more or less pure stands with sprinkling of spruce. The species forms a light mixture with Kail on exposed sites and extends down into kail/deodar zone along the cooler aspects and shady depressions. Towards higher elevation, the crop attains a stunted form though it may go right up to the snow lines, being finally replaced by high-level broad-leaved species. The diameter class distribution is fairly normal except in higher reaches where higher diameter classes predominate and regeneration is absent.

(iii) The accessible fir forests which have been heavily exploited in the past have preponderance of young to middle aged crop. The comparatively in accessible high level forests still have middle aged to mature and over mature crop. The regeneration in these areas is adequate due to low moisture retentivity and excessive grazing. Another fact for inadequate

regeneration in such areas is the presence of over mature trees, which do not bear viable seed.

(iv) Oaks, Laurals, Arundinarias, Cornus etc. are mixing from the forests though they are the common associates of outer Himalayan fir forests. The broad-leaved associates of fir in these forests are Horsechest-nut , Maple, Ash, Birdcherry, *Populus ciliata* etc. The percentage of these broad-leaved species is negligible.

(v) The undergrowth mainly comprises of *Viburnum species, Skimmia laureola, Sambucus alba* and *Podophyllum hexandrum.* Besides above the other species found are *Spiraca spp., Lonicera spp., Prinsepia spp., Berberies spp., Phytolacca acinosa, Verbascum thapsus, Rosa brunonii, Rubus nivans., Parrotiopsis jaquemontiana, Actasa spicata.*

(vi) The ground flora includes *Fragaria vesca, Viola odorata*., *Anemone spp., Rumax spp., Polygonum spp., Strobilanthes spp., Impatiena spp*., etc.

(vii) Various sub-alpine pasturelands are present within the fir forests; these are commonly known as Behaks. The two most beautiful sub-alpine pasturelands are the Yusmarg and Doodhpatri.

(viii) *Texus baccata* is seen confined to shady and moist depressions. Its small patches have been observed in compartments Ri-25 to 30 with maximum density in compartment Ri-29 of Doodganga range.

2.1.3 BROAD-LEAVED SPECIES

(i) The broad-leaved species are found scattered in small patches in moist depressions particularly along the nalla beds and on too heavy and moist soils. The important species met within these forests are Horsechest-nut, Bird cherry, Maple, Arkhor, Pohu and *Populus ciliata*. Walnut and Ash are rather scare. Betula occurs above the fir zone and generally forms a transition zone between fir and alpine pastureland.

(ii) The condition of these forests is very miserable due to heavy lopping and ruthless felling by locals as well as Gujjars. Over grazing has further deteriorated their conditions.

2.1.4 ALPINE FORESTS

(i) With the increase in altitude above 3100 m to 3200 m, fir forests fade out and ultimately merge with alpine vegetation. The climate of the area being cold and windy, the tree vegetation consists mainly of Betula, Juniper and high-level Rhododendron. Dwarf willow and species of Spirasa are also seen. The crop loses its height and becomes stunty and bushy. Beyond this scrub forest, there are large pasture-lands known as margs. These are summer grazing grounds of Gujjars and Bakkerwals. The alpine flora of these margs consists of species like *Primula macrophylla, Androsac spp., Saxifraga spp., Corydalis spp., Aconitum spp., Agrotia spp., Gentiana spp., Aster laccidus, Thalictrum majus, Viola biflora, Androsae spp. etc.*

2.2 FOREST TYPOLOGY

(i) In the revised classification of the "Forest types of India", champion and Seth (1968) have classified the forests of the Kashmir valley into the following groups.

Group 12 = Himalayan moist temperate forests
Group 13 = Himalayan dry temperate forests
Group 14 = Sub-alpine forests
Group 15 = Moist Alpine forests scrub

(ii) The flora of the valley differs considerably from the flora of inner Himalayas because the flora of a locality is determined by the locality factors. The present temperate climate of valley is due to the presence of formidable barrier in the form of Pir Panjal range, which has come in its present from due to great tectonic movement time in 'tertiary era'. This barrier does not allow monsoon winds to inter into the valley. The only precipitation which the valley receives in summer months is brought about by winds that escape in through Jhelum gorge. The main precipitation is in the form of snow. The difference in the outer Himalayan temperate flora and valley temperature flora are marked by the absence of various genera in the valley, e.g. Oaks, Laurels etc.

(iii) As the flora of valley differs from that of outer Himalayas, therefore, our forest types do not strictly fit into the broad forest groups as given by Champion and Seth. In the past, attempts have been made to classify the

vegetation of valley by Inayat and Ticku(Kashmir Valley Temperate Forests-Indian Forester Vo.90,No. 6-1964 and Vo 191, No.8-1965), by Kawosa (Langet Working Plan, 1978), by Zadoo and Wadoo (J.V. Plan and Kamraj Plan-1981), by Kema (Sindh W. Plan 1983) and by Shamim (Kashmir W.Plan, 1983). Hifizullah Siddiqi in 1988 revised W.plan of PP forest division and reported that such attempts have not been able to reflect the vegetal diversity completely and he himself attempted to classify the forest types of P.P. forest division as were identifiable which is given below.

(iv) While maintaining broad outlines of above classification, the vegetation of this division was classified into the following three groups:-

Group I= Kashmir Valley Temperate Forests.
Group II=Kashmir Valley Sub -Alpine Forests.
GroupIII=Kashmir Valley Alpine Forests.

2.2.1 GROUP-I KASHMIR VALLEY TEMPERATE FORESTS

(i) This group corresponds to the Champion and Seth's group 12 & 13. The chief character of this group is the extensive occurrence of coniferous forests with very little species diversity. The species distribution varies considerably with altitude and aspect. The deciduous component is confined to damp depressions, nalla banks or the moist glens. This group is further identifiable into two sub groups.

Sub group IA	= The Foot hill (low level) Forests
Sub group IB	= The Montana (High level) Forests

2.2.1.1 Sub group IA = The Foot hill (low level) Forests

(i) This sub group is characterized by an altitudinal range of 1820 m to 2400 m distributed over the lower belts of mountain ranges and the Keraws. The conditions are relatively dry as compared to montane forests. The sub group bears pure deodar or kail, or a mixture of both. The degraded sites bear deciduous scrub. Being in close proximity to habitation, these forests are subject to heavy grazing, lopping and other biotic interference. In view of vegetal differences, the sub-group is further classified into the following types.

Type IA (1) The Foothill Blue pine Forests
Type IB (2) The Foothill Deodar Forests

(ii) ***Type IA (1) The Foothill Blue Pine Forests***

(a) These forests occur within the altitudinal range of 2000m to 2400m. The crop is almost pure Kail. It grows on comparatively drier but easy slopes as well as on fresh alluvium, the karewa formation and the degraded sites.

(b) Distribution

This type is represented in Co's. N2a, N2b, D33a, D34a, and in the foothill of Co's Ri-32, N1a, N3 to N6, D1, D2, S13, and S18.

(c) Floristics

i. Pinus wallichiana
ii. Aesculus indica
iii. Parrotiopsis Jaqumontiana, Viburnum foetens, Cotoneaster spp., Indigofera spp., Rosa spp., Rubus spp., Berberis spp..
iv. *Fragaria spp., Plantigo spp., Traxicum spp., Oryzopsis spp., Trifolium spp., Rumex spp.*

(d) Ecological Status

Kail in this zone is a colonizer and is at a serial stage. Soon after colonization it changes the site conditions favourable for deodar and thus in due course of time gets replaced by deodar (if seed source is available). These forests have come to stay only due to biotic interference and can thus be said to be in Biotic Climax.

(iii) ***Type IA (2) The Foothill Deodar Forests***

(a) These forests occur within the altitudinal range of 1820m to 2100m. The crop is generally pure deodar. However, some kail is mixed occasionally, particularly towards upper limits, on much exposed slopes and on ill drained sites. *Parriotiopsis jacquemontiana* is the common shrub underneath.

(b) Distribution

This type is represented in Co's S/13, of Sukhnag Range.

(c) Floristics

i. Cedrus deodara
ii. Aesculus indica
iii.Parrotiopsis jaqumontiana, Viburnum spp., Desmondium spp., Cotoneaster spp., Rosa spp., Berberis spp., Indigofera spp., Rubus spp.,
iv. Fragaria vasca, Traxicum spp., Viola spp., Thymus spp., Oryzopsis spp., Artemisia spp.

(d) Ecological status

These deodar forests grow well and regenerate easily. The stability of deodar in this zone is due to the favourable soil conditions which afford a good drainage. These forests are, therefore in a state of Edaphic Climax.

2.1.1.2 Sub group IB- The Montana (high level) forests

(i) This sub-group is characterized by an altitudinal range of 2100m to 2500m. Towards the upper limits it merges with sub-alpine forest while on lower elevations pure stands of deodar or kail occur. The transition, in the upper limits is governed by the aspect of moisture conditions. On cooler aspects fir may replace deodar and kail at relatively lower altitudes whereas on hotter and exposed aspects kail may go up even to the tree line. The undergrowth is relatively dense. Broad-leaved deciduous species take up the position in moist depression and along the nallas. This sub-group is divided into the following types on the basis of crop characteristics.

Type IB (i) Montane Mixed Coniferous Forests
Type IB (ii) Riverian Blue Pine Forests
Type IB (iii) Montane Deciduous Forests

(ii) Type IB (i) Montane Mixed Coniferous Forests

(a) This type extends throughout the altitudinal zonation of sub-group IB. These forests contain all the three major conifer species i.e. deodar, kail and fir. The preponderance of an individual species is dictated by the aspect, altitude and soil conditions. The trees are of large girths and attain good height.

(b) Distribution

This type is represented in Co's D1, D20a, D27, D28a, S11.

(c) Floristics

i. Cedrus deodara, Pinus wallichiana, Abies pandrow, Picea smithiana, Taxus baccata

ii. Aesculus indica, Taxus baccata

iii.Viburnum spp., Sambucuss spp., Parrotiopsis, Skimmia Spp., Podophyllum spp.,, Desmodium spp.,

iv. Fragaria spp., Rumex spp., Polygonum spp., Viola spp., Valleriana spp., and ferns.

(d) Ecological status

In these forests, replacement of one of the association by another is frequent. Kail is in the serial stage. As the conditions get moister, kail yields place to fir and deodar in upper and lower reaches respectively. Thus deodar is here at the climatic climax.

(iii) Type IB (2) Riverian Blue Pine Forests

(a) This type occurs on fresh alluvial deposits along with the nalla beds. Undergrowth is almost absent. The crop is almost pure and young to middle aged.

(b) Distribution

This type is seen in the form of kail patches throughout the riverbed of Doodhganga nalla and Romshi nalla from 2200m to 3000m. It is also seen in Co. D33b of Raithan Range.

(c) Ecological status

The kail is in its serial stage. As the crop is in river beds, it may either be washed away with floods or may progress to coniferous type appropriate to the altitude.

(d) Floristics

i. *Pinus wallichiana*

ii. Poplus spp.

iii. Berberis

(iv) Type IB (3) Montana Deciduous Forests

(a) This type occurs within the altitudinal zonation of sub-group IB. it occurs in patches in cool depressions and along the nallas. Deciduous scrubs take over in the sites which are more exposed and steep. This type is further classified into two sub-types as under:

Sub-type IB (3) (i) –Montana Broad Leaved Forests
Sub-type IB (3) (ii) –Montana Scrub Forests

(b) Sub-type IB (3) (i) –Montana Broad Leaved Forests

This type is found in small patches or strips within the mixed coniferous forests along moist northerly aspects in hollows and depressions. They are formed of mixed species of broad leaved trees.

- *Distribution*
  This sub-type is represented in Co's D12, D25, S3, S4, S2o, S23.

- *Floristics*
  i. *Asculus indica, Prunus padus, Acer spp., Populus ciliata*
  ii. *Viburnum* spp., *Indigofera* spp., *Rosa* spp., etc.
  iii. *Fragaria* spp., *Polygonum* spp., *Rumex* spp., etc.

- *Ecological status*
  The forests are at post climax stage as a result of excessive moisture.

(c) Sub-type IB (3) (ii) –Montana Scrub Forests

These scrub forests are found in the sites which are seen more exposed besides being steep. In these areas kail is seen growing as individual trees here and there. The whole ground is covered by scrub like plectranthus etc.

- *Distribution*
  This sub-type is represented in Co. D29 of Raithan Range.
- *Floristics*
  i. *Pinus wallichiana*
  ii. *Plectranthus* etc.
- *Ecological status*
  The Kail is in its Seral stage.

2.2.2 GROUP II- KASHMIR VALLEY SUB-ALPINE FORESTS

(i) The general altitudinal zonation of the group is between 2500m to 3300m. The crop includes fir and kail forests. In the lower reaches, fir is of good density but it fades into fir-kail crop of open nature covering the precipitous upper slopes. *Abies pindrow* is replaced by *Abies spectabilis* in the upper reaches of this zone. This group also includes sub-alpine pasturelands commonly known as Margs and Bahaks.

(ii) This group is identifiable into three sub-groups as under:-
Sub-group IIA –Sub-Alpine Fir Forests
Sub-group IIB – Sub-Alpine Blue Pine Forests
Sub-group IIC – Sub-Alpine Pasture Land

2.2.2.1 Sub-group IIA – Sub-Alpine Fir Forests

(a) These forests are distributed throughout the altitudinal range of the group mainly on cooler aspects. The crop is young to middle aged in the areas which have been exploited in the past while it is middle aged to mature and over mature in the areas, which have not been still exploited due to comparative inaccessibility. Spruce forms a small proportion of the crop, however, in lower reaches Kail is mixed with fir in light proportions. Towards higher elevation, these forests are seen in the form of patches mature stunted crop. The regeneration of fir in these areas is affected due to the excessive grazing and low moisture retentively.

(b) Distribution
This type occurs in Co's Ri-25, 26, 27, 28, 29, 30, D3 to D13, D15, D16, D17, D22, D23, D24, D25 S2, S3, S5, To S7, S9, S10, S12, S14, ti S17, S19 to S24.

(c) Floristics
i. *Abies pindrow, Abies spectabilis, Picea smithiana, Pinus wallichiana, Texus baccata*
ii. *Aesculus indica, Prunus padus*
iii. *Sambucus ebulus, Skimmia Laureole*
iv. *Adiantum* spp., *Salvia* spp., *Artemisia* spp., *Podophylum* spp.

(d) Ecological Status

The status of fir in this zone is that of climatic climax.

2.2.2.2 Sub-group IIB-Sub-Alpine Blue Pine Forests

(a) Within the altitudinal zone of group II, sizable patches of Blue-pine are seen on southern and exposed sites. Sometimes scattered trees are distributed over rocky cliffs extending even up to the timberline. Due to sub-alpine climatic conditions, the crop is stunted and bushy in growth. The kail crop is generally infested with *Arceu-thobium minutissimum*.

(b) *Distribution*

This type is represented in Co's D3, D7, D8, D11 etc.

(c) *Floristics*

i. *Pinus wallichiana*
ii. *Aesculus indica, Prunus padus*
iii. *Desmodium* spp., *Vibernum* spp.
iv. *Artemisia* spp., *Polygonium* spp., *Atropa* spp., *Fragaria* spp.

(d) *Ecological status*

This type is seral in character (secondary succession) as it has come up only after the destruction of previously existing fir community. This seral stage may remain stable if biotic interference continues, otherwise it may pave the way for establishment of fir in due course of time.

2.2.2.3 Sub-group IIC – Sub-Alpine Pasture lands

(a) Continued grazing and browsing in sub-alpine fir and kail forests, especially on ridges, moist sites and generally in proximity of springs has resulted in the formation of pasturelands. These grass lands are generally known as Behaks/margs and are utilized by Gujjars and locals as the grazing ground for their cattle. These grasslands bear some scattered bushes and are surrounded by high forests.

(b) *Distribution*

This sub-group is distributed throughout altitudinal zonation of group II. Some of the such important pasturelands are Yusmarg and behak like

Hamakhal, Haijan, Frasnag, Dudpathri, Lichipathri, Kadalabal, Najin, Gagdibal etc.

(c) *Floristics*

i. *Viburnum* spp., *Indigofera* spp., *Desmodium* spp.,

ii. *Rumex* spp., *Taraxixum* spp., *Trifolium* spp.

iii. *Fastuca* spp., *Dactylus* spp., *Stipa* spp., *Cynodon* spp.

(d) *Ecological status*

These grasslands are at edapho-cilmatic climax.

2.2.3 GROUP III–KASHMIR VALLEY ALPINE FORESTS

(i) This group occurs beyond the elevation of 3300m above the sub-alpine tree belt. It consists of vast trees less pasturelands surrounded by scrub type of vegetation.

(ii) The two sub-groups identifiable in the group are as under;

Sub-group IIIA –Alpine Scrubs

Sub-group IIIB –Alpine Pasturelands

2.2.3.1 Sub-group IIIA – Alpine Scrubs

(a) This sub-group forms a transition belt with the sub-alpine tree belt on its lower side alpine pastures on its upper side. The vegetation consists of such species which can survive in extreme cold temperature and windy conditions. The ground is steep to precipitous and generally rocky.

(b) *Distribution*

The sub-group is represented in the compartments D4, D10, D11, D12, D25, D29, S3, S5, S8a, S8b.

(c) *Floristics*

i/ *Betula utilis, Rhododendren* spp., *Salix* spp.

ii/ *Berberis* spp., *Lonicera* spp.

iii/ *Aconitum* spp., *Primula* spp.

(d) *Ecological status*

These forests seems to be at climatic climax.

2.2.3.2 Sub-group IIIB –Alpine Pasturelands

(a) These are vast open tree less lands known as Margs. These bear luxuriant growth of perennial herbs and other grasses. Stunted shrubs may be found

occasionally in these grass lands. These grass lands generally occur on very gentle slopes and are used by Gujjars and Bukerwals for grazing their cattle.

(b) *Distribution*

These alpine pasturelands exist at Matchhoi, Rayil, Dainzab, Handipathri, Channz, Tso-Maidan, Patha Danwas, Khilanmarg etc.

(c) *Floristics*

i. *Primula* spp. *Androsae* spp., *Cynogbasum* spp.

ii. *Fritiaria* spp., *Anemone* spp., *Saxifraga* spp.

iii. *Trifolium* spp., *Taraxicum* spp., *Sausuria Lappa* etc.

(d) *Ecological status*

The ecological status of these pasturelands is not certain and may be Bio-climatic climax.

Table 15: Status of some threatened medicinal Plants

S.No	Botanical name	Status
1	*Aconitum heterophyllum*	V
2.	*Arnebia benthamii*	E
3	*Artemisia absinthium*	V
4	*A.maritima*	E
5	*Atropa acuminata*	E
6	*Berberis lycium*	V
7	*Bergenia ligulata*	V
8	*Datura stramonium*	V
9	*Dioscorea deltoidea*	E
10	*Ephedra gerardiana*	V
11	*Equisetum arvense*	V
12	*Fritillaria arvense*	E
13	*Heracleum candicans*	E
14	*Imula racemosa*	V
15	*Lavertera cashmeriana*	V/E
16	*Physochlaina praelata*	E
17	*Picrorhiza praelata*	V
18	*Podophyllum emodi*	E
19	*Rheum emodi*	V
20	*Saussurea costus*	E
21	*Taxus Wallichiana*	E
22	*Tribulus terrestris*	V
23	*Valeriana wallichii*	V

Source: (Source: Biodiversity of Jammu & Kashmir: A Profile by WWF-India) E- Endangered; V- Vulnerable

2.3 INJURIES TO WHICH THE FLORA IS LIABLE

Injuries to which flora is liable are both biotic as well as abiotic. Biotic injuries include grazing, lopping illicit damage, encroachment, torchwood extraction and forest fires. It also includes damage by fungi, parasites, insects and wild animal. The a-biotic agencies of injury include winds, snow, avalanches, landslips, frost, drought etc.

(i) Grazing

The light controlled grazing is useful to these forests particularly to fir forests as it reduces the grasses and shrubs and breaks down the thick layer of un-decomposed needles thereby creating better soil conditions for germination of seeds, yet uncontrolled heavy grazing is very harmful. The excessive and un-restricted grazing as seen in these forests particularly near habitations causes the following damages;

i. Grazing animal graze the seedling of the desired species. They also trample the seedling of desired species and crush them or their roots get exposed by removal of soil by the hoofs of moving animals.

ii. Un-controlled grazing by heavier cattle compact the soil, reduces its porosity resulting in increased run off.

iii. Heavy continuous grazing results in depletion of palatable grasses. Thus un-palatable and relatively dry and grazing resistant inferior grassed develop.

(ii) Lopping

The incidence of lopping of confers as well as of broad-leaved species particularly in the forests near habitation is heavy. The lopping is done by the locals as well as by Gujjars and Bakerwals. The conifers are being lopped for the purpose of firewood and charcoal whereas broad-leaved species are lopped for the purpose of fodder mainly. Repeated lopping year after year weakens the trees and they become prone to many diseases of insects and fungi. The growth of these trees is seriously affected and they cannot produce flowers and seeds. In course of time such trees die leaving behind no regeneration to take their place.

(iii) Illicit Damage

The forests, which are near the habitation particularly the kail-deodar belt is subject to heavy damage in the form of illicit felling. With the construction of roads in the interior of forests, the process of illicit felling is spreading to

those areas also. The population explosion, the increase in the standard of living and the rapid urbanization pose a great threat to the very existence of these forests.

(iv) Encroachment

The forests which are in close proximity to habitation have to bear the brunt of encroachments also. The rates of encroachment in these forests is very alarming. Encroachment is done in a very surreptitious but planned manner. As the trees standing on the forestland is hindrance, the first thing is to remove them by illicit felling or by killing them by girdling, burning or sometimes by cutting a ring round the tree below the ground level. As the trees die, they are gradually removed. When there are no trees the bushes and shrubs are cut, the area is ploughed and seeds of maize, etc., are sown.

(v) Torch wood extraction

The process of torchwood extraction is a source of great damage to the kail trees. The torchwood is extracted by villagers for lighting. Sometimes villagers scoop out the torchwood at the base of the tree trunk, with the dual intention of extracting the torchwood and to lift the tree away once it falls down under the pressure of wind or load of snow.

(vi) Fire

Fires are not common in this division. No major fire has been recorded in this Division in the recent past. Some small fires may be seen in the autumn months due to the carelessness of nomadic grazers. Some intentional fires may be set by grazers in order to improve the quality of grass for their cattle. Sometimes deliberate fires are caused by the villagers near the fringes of their private lands with the intention of encroaching upon the tree-less forest land.

(vii) Fungi

Fomes pini (syn. *Tremates pini*) is the common fungus, that attacks kail on ill-drained soil. The fungus causes decay mainly in the heartwood. *Fomes annosus* causes root and butt rot in deodar growing on unsuitable sites. *Bracalayalla deformans* cause occasional damages to tree of fir and spruce. Broad-leaved trees are damaged by *Fomes formentorius*.

(viii) Parasites

Armi (*Arceuthobium minutissium*; the dwarf mistletoe) causes damage in blue pine forests. It is minute angiospermic parasite. The infection results in spindle-shaped or fusiform swellings on branches or on main bole causing deformity and development of witch's brooms, top dying and death of effected branches. Heavily infected stands get stunted leading eventually to death of trees.

(ix) Insects

The insects attack in the forests of this division is insignificant. Certain *Scolytidea* insects attack dead and diseased trees of deodar while as *Euzophora cedrella* moth may damage its canes occasionally. The *Cicadids* damage the kail crop. *Tomicus* spp., insects may attack weak and debarked poles of kail. Caterpillars of *Lepidopterous* insects cause early summer defoliation in some broad-leaved species. Cockchafer grubs and cutworms attack nursery seedlings.

(x) Animals

The bear debarks deodar and kail poles so as to lick the sap in spring. Flying squirrels and parrots damage the cones of conifers. The monkey feed on the cones of conifers and fruits of other trees.

(xi) Climbers

Hedera helix is seen occasional in these forests but do not cause any serious damage.

(xii) Abiotic agencies

Considerable damage to these forests is caused by natural agencies such as wind, snow, avalanches, landslips, frost, draught, lightening etc. The winds uproot the trees particularly those scooped at the base. The extent of wind damages in this division is quite sizeable. The young saplings and poles of conifers get broken under heavy load of snow in winter. The avalanches and landslips uproot and break the trees particularly on steep hills and erodible sites. The injuries due to frost, drought and lightening are negligible in these forests.

PART B -FOREST FAUNA

2.4 GENERAL DESCRIPTION

2.4.1 These forests being in the form of a continuous belt of several thousand meters width harbour a rich wealth of wildlife. The variance in fauna is further increased due to considerable variation in altitude. On one side the lower extreme of this forest tract being in close proximity to habitation has to bear burnt of biotic interference while on the other extreme it embraces the perennial snowcapped mountains practically devoid of any biotic interference.

2.4.2 In the past the fauna was not considered important, therefore, no attention was given to this aspect in the previous plans. Now it is an established fact that flora and fauna go hand in hand in nature. Flora is indispensible for fauna and in turn influences flora. Any disturbance in this ecological balance will lead to disastrous consequences for both. The fauna gets food shelter, protection and privacy from the flora and in turn, it helps to the latter in dispersal of its seeds, soil working, decomposition of humus, control of diseases maintenances of hygienic conditions etc.

2.4.3 Keeping in view the above facts, an attempt has been made in this plan to identify and enlist the existing fauna of this tract.

2.5 CLASS MAMMALIA

1. *The Rhesus Monkey, Macaca mulatta (Kashmiri: Ponz):-* They are found around the habitation and rarely enter into denser forests. They move up to an altitude of 2400m. Great damage is caused to the crop by troops of these monkeys. They are quite fearless.
2. *The Common Languor, Semnopithacus ajax (Kashmiri: Langoor):-* They migrate to lower elevations during winter and summer. They may go up to 3000m or more elevation.
3. *The Leopard or Panther, Panthera pardus (Kashmiri: Suh).* The Panthar will kill and eat anything wild or domestic animals which it can overpower safely. It is seldom that it takes to man-eating.
4. *The leopard cat, Felis bengalensis (Kashmiri: Chitta billi):* It is very rare species.

5. *The Jungle cat, Felis Chaus (Kashmiri: Wan Brar):* Its pale green eyes give cruel expression. They are found close to the habitation.
6. *The Himalayan Black Bear, Ursus thibetanus (Kashmiri: Hapat):* It has taken to cliffs and secluded spots. It comes down in winter. It lives in caves and comes out for food from dusk to dawn.
7. *The Brown bear, Ursus carctos (Kashmiri: Lal Hapat or Kein Hapat):* It is keen of scent, but shortsighted. It is partly herbivorous and partly carnivorous. Many cattle are killed every year by Red bear. The old bears are shy and seldom appear until nearly dusk.
8. *The Himalayan Yellow Throated Martin, Martes flavigula:* An animal resembling with squirrel and cat. On ground, they hunt mice, hares, pheasant etc. They are being killed for their skin.
9. *The Common Fox, Vulpes vulpes (Kashmiri: Loh):* It lives in open country,in wasteland, rocky hills and broken country. It lives in burrows dug by itself. It sleeps by day and come out for food at dusk. It eats fruits, berries, birds and other small animals.
10. *The Jackal, Canis aureus (Kashmiri: Shal):* It lives in the holes in ground and come out at dusk. It destroys cultivated land. It eats fallen fruits, chickens, lambs, goat and sheep.
11. *The Common Utter, Lutra lutra (Kashmiri: Wader):* It is found along the nallas & rivers. It lives in hallows beneath the tree root growing at water edges or in bushes along the river. It feeds on fish. Its skin is highly prized.
12. *The Small Indian Mongoos, Herpestes auropunctatus (Kashmiri: Nul):* It lives in holes burrowed by itself. It is diurnal in habit and hunts for its food in bushes, hedges and cultivated fields. It is useful in eradicating vermin.
13. *The Himalayan Mouse Hare, Ochotona roylei*: It somewhat like a genuine pig. It lives in open rocky ground and pine forests of steep slopes. In forest, they burrow under the roots of the trees. They feed on coarse grasses, alpine flowers etc.
14. *The Red flying Squirrel (Pteromya inornatus):* The common stripped squirrel *(Funumbulus palmarum)* and the five striped Palm squirrel *(Funanublus pennat*) have been reported in the wild walnut trees and amongst hazel in October. All squirrels are commonly known as Gilheri.
15. *The Himalayan Marmot, (Marmota Himalayan):* It has been reported from this tract.
16. *The Indian Field Mouse, (Mus booduga):* The common field rat *(Nesocia bengalensis providens)*, the common house rat *(Rattus rattus)*, the house mouse *(Mus musculus*), the Bandicoots (*Bandicota gigantea*) have been

reported. All rates are known as “gagur” and mice are known as “khrinte” in Kashmiri.

17. *The Musk dear (Moschus chrysogastr (Kashmiri: Rouse*): The little animal is becoming scarce due to the commercial value of its musk (Kashmiri Nafa). The horns are absent in this dear. The food consists of grasses, leaves, flowers and lichens.
18. *The Fulvus fruit bat,* (*Rousettous leschenaulti*): They live in the caves and have very good sense of smell to recognize the fruit trees.
19. The *Great Eastern Horse shoe Bat, (Rhinolophus luctus) (Kashmiri: Rata Kreil).* It lives in far off corners of the caves and in old buildings. It starts hunting in the evening around the houses and trees noiselessly.
20. *The Hystrix indica (Porcupine):-* It feeds on root and soft bark of young conifer saplings. The animal causes immense damage to young crop.

2.6 AVES

The tract is rich in both migratory and resident birds. Some of the common birds are as under:-

1. *Himalayan Griffon Vulture (Gyps himalayensis):* Practically the largest bird in Himalayas. They are seen as gatherings around animal carcasses or individual birds soaring at great heights.
2. *White-backed Vulture (Preudogyps bengalensis):* The long billed vulture is seen closer to the habitation. At rest, adult is easily differentiated by its blackish brown plumage and white back.
3. *Indian Griffon Vulture (Gyps fulvus):* It is smaller than Himalayan Griffon. The adult is a rich fulvus or cinnamon brown but often also quite pale.
4. *Himalayan Jungle Crow (Corvus macrorhynchos):* It is largest than house crow. A uniformly jet black crow with heavily bill. Its cawing is hoarser and deeper than house crow.
5. *Himalayan Snow Cock, Tetragallus Himalayensis* (Kashmiri: Gur Kakao or Ramchikor): It is found on the higher ridges among crags and rocky ground near the snow line.
6. *Monaul-Lophophrus impejanus* (Kashmiri: male is called as Suna Murg and female is called haum): It is well distributed in upper forests.
7. *Chukors (Alectoris chukar):* They live on high open hill side. They are fast and strong fliers. They are very good for eating.

8. *Cuckoo, Cuculus canorus* (Kashmiri: Shahkukor, Kaku): It is regular visitant to Kashmir arriving in May. It is about that of pigeon size. It has pointed wings.
9. *Blue Rock Pigeon (Columba livia):* - It is found in the track up to 2500m elevation in rocky sites and in domesticated conditions. Its call notes are well known a deep gootr-gootr –goo, etc.
10. *Alpine Swift (Apus apus):* The size is between bulbul and myna. A brown band across the breast provides a good identity mark. They move at a terrific speed. They live in about grassy hillsides and precipitous cliffs. They are insectivorous.
11. *Kashmir Roller, Craocias garrulus* (Kashmiri: Nilak raisk): It is seen in lower parts of the forests.
12. *Kashmir Pied Woodpecker, (Picus):* It goes about pairs and has the usual woodpecker habit of scuttling up the trunk and branches of trees in alert spurts tapping on bark from time to time or digging into interstices with its strong bill for grubs and insects.
13. *Rufous tustle dove (Streptopelia orientalis):* They are seen in pairs or in small flocks in the open. They are rather tame and confining about hill stations. It is fond of shady places.
14. *Common swallow, Hirundo rustica (Kashmiri Kitji):* It is a regular visitor in early spring. Its visit is an indication of spring. Every where it is tame and confiding, enters houses for nesting.
15. *Golden Oriole, Oriolus oriolus (Kashmiri: Poshnul*):- It arrives here at the end of April and remains here through summer. The nest is most ingeniously fixed with strips of rags, long grasses and twin worked in and out and bound round the supporting branches.
16. *White-Cheeked Bulbul, (Pyenonopus leucogenys*): It is found in open scrubs and on hillsides dotted with Berberis and other bushes.
17. *Kashmir House Sparrow, Passer domesticus (Kashmiri char):* - It lives comfortably amidst human habitation.
18. *Common Myna, Acridotherus tristis (Kashmiri Har):* - It is found upto 3000m elevation. The nest is a collection of twigs, roots, paper and miscellaneous rubbish placed in the holes of trees.
19. *Gray Tit (Parus major):* - An active sparrow like bird inhabiting fairly open wooded localities. The bird is insectivorous and hunts around trunks and branches.
20. *The Streaked laughing thrush (Garrulax lineatus):* - It is slightly smaller than Myna. Seen in pairs or parties in thick undergrowth usually well concealed.

21. *Large Spotted nutcracker (Nucifraga caryocatactes):* - They are spotted singly or separated pairs. Sometimes parties on the trees in pine forests. They feed on the seeds of spruce and various species of pines.

2.7 INJURIES TO WHICH THE FAUNA IS LIABLE

The fauna of this tract has suffered a lot due to interference by man and his domestic cattle. The main causes of injury to the fauna are;

(i) Poaching

The fauna of this tract has suffered enormously due to in-human behavior of man. Many animals particularly the musk, dear; the pheasants and the bear have been the main targets.

(ii) Encroachment

This tract has suffered a lot due to encroachments particularly near the habitations. Due to encroachment and removal of forest flora, the habitat of the forest fauna has been enormously damaged. With construction of new roads inside these forests, the fauna has become more prone to human interference.

(iii) Grazing

The grazing and browsing by domestic animals has increased the competition for food. It has been observed that the wild fauna has always been the looser in this struggle. Furthermore the domestic cattle carry and spread diseases in forest fauna.

(iv) Fire

The fire destroys both flora and fauna of a tract. However, no major fire has been reported in the recent past in this tract.

(v) Other biotic agencies

Besides direct injuries to fauna, fungi, insects and other parasites also cause indirect damage to it by their adverse effects on flora of the tract.

(vi) Climate

The wild animals being more resistant, generally survives the vagaries of nature, but sometimes they do suffer during heavy rain fall, early and heavy snowfall or by snow avalanches.

Table No: 16 List of important wildlife species of J&K and their Status as per IUCN's Red DataBook / J&K Wildlife Protection Act, 1978 (Amended upto 2002)

S. No.	Species	Region	Status as per IUCN's RedData Book	Status as per Wildlife Protection Act
1.	Snow leopard	Ladakh, Kashmir & Jammu	Endangered	Schedule – I
2.	Common leopard	Jammu, Kashmir & Ladakh	Near Threatened	Schedule – I /Endangered
3.	Black bear	Kashmir & Jammu	Vulnerable	Schedule – II
4.	Brown bear	Ladakh, Kashmir & Jammu	Least Concern	Schedule – I / Endangered
5.	Ibex	Ladakh, Kashmir,Jammu	Least Concern	Schedule – I / Endangered
6.	Himalayan Tahr	Jammu	Near Threatened	Schedule – I / Endangered
7.	Spotted deer	Jammu	Least Concern	Schedule – III
8.	Barking deer	Jammu	LeastConcern	Schedule – III
9.	Goral	Jammu	Near Threatened	Schedule – I
10.	Markhor	Kashmir & Jammu	Endangered	Schedule – I /Critically Endangered
11.	Serow	Kashmir & Jammu	Near Threatened	Schedule – I / Endangered
12.	Hangul	Kashmir	Least Concern	Schedule – I / Critically Endangered
13.	Musk deer	Jammu, Kashmir & Ladakh	Endangered	Schedule - I / Endangered
14.	Chiru (Tibetan antelope)	Ladakh	Endangered	Schedule – I / Critically Endangered
15.	Tibetan gazelle	Ladakh	Near Threatened	Schedule – I / Endangered
16.	Nayan (Tibetan sheep)	Ladakh	–	Schedule – I

17.	Wild Yak	Ladakh	Vulnerable	Schedule – I
18.	Pallas cat	Ladakh	-	Schedule – I
19.	Black necked crane	Ladakh	Vulnerable	Schedule – I
20.	Golden eagle	Kashmir, Ladakh & Jammu	Least concern	Schedule – I / Endangered
21.	Western Tragopan	Kashmir & Jammu	Vulnerable	Schedule – I / Endangered
22.	Cheer pheasant	Kashmir, Jammu	Vulnerable	Schedule – I /Endangered

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CHAPTER III

UTILISATION OF THE FOREST PRODUCE

3.1 AGRICULTURAL CUSTOMS AND WANTS OF THE POPULATION

3.1.1 The Tehsil-wise population figures as available from the 2011 census are as under:-

Table 17: Tehsil-wise population of Budgam district

S. No	Name of Tehsil	Population		
		Total Males	Total Females	Total
1.	Khag	34457	33139	67596
2.	Beerwah	87277	76056	163333
3.	Khansahib	64227	59085	123312
4.	Budgam	70182	63673	133855
5.	Chadoora	113529	98704	212233
6.	Charar- e- Shrief	28369	25047	53416
	Total	398041	355704	753745

Source: Statistics and Evaluation Department

3.1.2 Muslims both Kashmiri as well as Gujjars form the dominant community of the area. They are found almost everywhere. Generally, Gujjars are confined to the upper parts of the Kerwas where cultivation is dependent on precarious supply of rain, while the Kashmiris occupy the lower irrigated flat areas (Payeen illaqa) which are well suited to grow paddy. Few pockets of Sikh population exist and are residing at Khag, Beeru etc. A small percentage of Hindu community also existed prior to 1990 represented by Kashmiri Pandits who were residing at Nagam, Budgam and Arigam etc. They migrated to Jammu during the turmoil period. The people in general are religious irrespective of being Muslims, Pandits and Sikhs. The shrine at Pakherpora and another at Charar-i-Shrief are situated at the foot of this tract.

3.1.3 Muslims of this area speak Kashmiri. Besides speaking Kashmiri, the Gujjars speak Gojri and the Sikhs speak Punjabi also. The main occupation of the Kashmiri is agriculture, mainly paddy cultivation in low-lying fertile, terraced and irrigated lands while on the upper non-irrigated areas Maize, Beans and other hardier crops are grown. They are hard working and intelligent people. They supplement their income by working in forests and working in plains in

winter. Apple and Almond orchards are also a great source of income to these people. They are self-supporting. Women help in every work except in ploughing the fields. They live in houses (Larhies) which are two to three storied, Kacha Bricks (sundried bricks)/ mud and timber structures. The roofs may be thatched are shingled. In recent years the socio-economic condition of the people has shown a general upward trend. With the rise of the socio-economic condition of the people, the kacha houses are being replaced by pucca and C.G.I roofed houses with most of the modern facilities. Some of the Kashmiri's have also taken the profession of graziers. These local graziers are called Pholu (Chowpan), Gooru or Galwan depending whether they keep sheep and goats, cattle, or ponies respectively. They usually keep the lower sub-alpine pastures, though occasionally they move to the upper alpine pastures when there is a scarcity of grass down below. They do have their boundaries fixed and come to the same pastures year after year. Mostly the Kashmiri graziers work as hired graziers because they do not possess their own livestock. They take up livestock of villagers of the payeen illaqa for grazing to summer pasturelands because there is scarcity of fodder in these areas. There is some loss of livestock due to predation and other natural causes such as excessive cold, cloud burst, diseases etc.

3.1.4 Though the local Gujjars are both agricultural and pastural but their main profession is pastural. Their settlements within the forests are known as "chaks". Their lands are less fertile, sloppy and un-irrigated. They mainly grow maize and beans in their fields. As graziers they mostly form a class of hired graziers. They generally live in Kothas, which are single storied, flat roofed, timber supported and mud plastered structures. They are most un-hygienic where in both human and cattle live in together. With upliftment in socio-economic conditions, the un-hygienic Kothas are being replaced by modern hygienic houses, though the change is very slow as compared to the Kashmiri's. The Gujjars overall are lazy and shirk work. Generally their financial and health condition is poor than Kashmiri's. The nomads like Banyaries and Bakerwalls invade during the summer months, i.e. from June to September. They came across the Pirpanjal from Rajouri, Poonch and Reasi etc. Banyaries mainly carry buffalos, cows and oxen. They trade Ghee and Cheese. Bakerwals mainly carry sheep and goats. They confine themselves to high alpine pastures. The other nomads who visit the alpine pastures of this tract are gaddies. They are few in number and keep their flocks of sheep restricted to very high elevations.

3.1.5 The developmental works of the area have increased with the improvement in situation. Special attention is being paid towards general progress of this area. A network of roads has now interconnected most of the area. A large number of schools, health centers and animal husbandry units spread over all over the district. Most of the villages have been electrified and have filtrated water supply facilities. In agriculture, emphasis is laid on new techniques of cultivation better varieties of seeds and proper dosage of fertilizers.

3.1.6 The chief requirements of the people are timber for construction of their houses, fuel-wood for cooking and heating, grazing lands, grasses and fodder for their cattle, torchwood for purpose of lighting in the villages, which have not been still electrified, MFP for domestic use, charcoal for kangeries, kangri twigs for manufacturing of kangeries etc. The unlimited and over increasing demand of the local population poses tremendous pressure upon these forests leading to their present day deteriorated and degraded condition. Gujjars and the Kashmiri women are the worst forest offenders because they often damage the forests by lopping, felling, hacking and pilfering. During the turmoil period, huge chunks of forests were damaged by people taking advantage of the situation. Presently the timber is being supplied to all the towns and villages at concessional rates through the timber sale depots. The fuel-wood is being supplied for use in Mosques only. The people meet the fodder requirements of their cattle population through scientific method of grazing over the vast pasturelands and lopping of broad-leaved species. The closures are also opened up for grass cutting during summer season for meeting the requirements of fodder. The broad-leaved species also supply timber for making agricultural implements used by the Zamindars.

3.1.7 Besids above, twigs of various shrubs are extracted from the forests for preparation of Kangaries. The finest Kangeries are made at Chararishrief and in its vicinity. Twigs Luni (*Cotoneaster* spp.) and Kanthi *(Indigofera*) are used for preparation of best quality Kangeri while the cheaper ones are prepared from Pohu *(Parrotiopsis jacquemontiana*) twigs.

3.1.8 The firewood consumption and requirement of timber for construction and other purposes is very high in this region due to harsh climatic conditions which prevail in the area for most of the period. The situation was not so critical in earlier times when forest resources were protected and these

demands were low. However, this balance has been seriously disturbed because of rapid growth in the population, huge demand of timber for house building, and other development activities within as well as outside the jurisdiction of the division.

3.1.9 Although no record of rural consumption of firewood and timber from these forests are available as result of any survey or study, therefore, in order to assess the demand for timber and firewood, a survey was conducted in villages of Pirpanjal Forest Division. On the basis of this survey the following assessments have been made in respect of timber and firewood demands.

3.2 TIMBER REQUIREMENT

3.2.1 The estimated population of Budgam district is 753745 (Rural=655833; Urban=97912) (Census,2011). The number of households in Budgam district as per cesus 2011 is 103363 numbers (Rural=89417 & urban=13946). Given a decadal growth rate of 21.18 percent, around 2500 new households will be added every year.

3.2.2 Results of the village survey reveal that the construction of an average sized rural house (double story) requires standing volume of timber as:-

(a) Window/Door frames = 150cft/house
(b) Window/Door shutters=100cft/house
(c) Truss work etc = 150 cft/house

Total = 400 cft/house

3.2.3 It is further assumed that 50% of existing houses requires a partial renovation/repair in 10 years. The partial repair/renovation of an existing house requires atleast 60cft per house.

3.2.3 The department also provides timber to religious institutions like Masjid Sharief, Imam Baras etc which involves atleast 1000 cft per structure. On an average the division receives 100 such applications annually.

3.2.4 Accordingly, the timber requirement per year is computed as under:

Table 18 (A,B,C,D): Annual timber requirement in District Budgam

(A) Annual Timber Requirement for New Houses in District Budgam (Double Story)				
S.No.	Component	No. of new households (No.)	Timber Qnt. Required (Cft)	Total requirement of Timber (Cft)
(i)	Door/window frames	2500	150	375000
(ii)	Door/window Shutters	2500	100	250000
(iii)	Truss work etc	2500	150	375000
	Total Annual Requirement		**400**	**1000000**

(B) Annual Timber Requirement for Renovation/Repair of Existing Houses		
(i)	Number of Households in District Budgam (No.'s)	103363
(ii)	Number of Households which require repair	50,000
(ii)	Timber requirement for repair/renovation (cft)	60
(iii)	Age of house fit for repair/renovation (years)	10
	Total Annual Requirement (50000X60/10)	**300000**

(C) Annual Timber Requirement for Construction of Religious Institutions		
(i)	Number of structures constructed every year (No.)	100
(ii)	Timber requirement per structure (cft)	1000
	Total Annual Requirement (100X1000) (cft)	**100000**

(D) Annual Timber Requirement for commercial buildings & other Government structures		
(i)	Number of structures constructed every year (No.)	1000
(ii)	Timber requirement per structure (cft)	200
	Total Annual Requirement (1000 x 500)	**200000**

(E) TOTAL ANNUAL REQUIREMENT OF TIMBER IN DISTRICT BUDGAM	
(A + B + C + D) = (1000000 + 300000 + 100000 + 20000)	**16,00,000**

3.2.5 Against an estimated requirement of 16 lac cfts of timber, the Forest Department supplies around 2 lac cfts of timber per annum to the concessionists in district Budgam (some part of timber is issued from Special Tangmarg Forest Division), which accounts for only 12.5 percent of the total timber requirement. Obviously, the rest of the requirement is met through trees outside forest (especially Poplar) and imported timber, conifer timber being available from Private Sales depot.

Table 19: Annual Timber supplies from Forest Sales Depots (FSD'S)

No. of FSDôs in PP Division	Volume of timber dumped during 2012-2013 (including SFC)	Volume of timber sold during 2012-2013 (including OB)
64	184212 cft	184778 cft

3.2.6 The issuing of Licenses to Private Sales Depots has been made liberal in the division for sale of imported timber in order to bridge the gap between demand and supply. The licenses issued to Sales depot for imported timber is to the tune of 80 as on date in Pirpanjal Division. Every year a good number of people approach to division office for registration of new sales depot and the number is increasing day by day. The market for imported timber is likely to flourish due to huge demand of timber. It is recommended that the opening of new sales depots for imported timber should be facilitated and encouraged so that timber becomes readily available for construction of houses and buildings as department is not in a position to fulfill the ever increasing demands of timber. The average imports of timber from the last three years in J & K has been to the quantum of 1 lac cum. India imports wood from all over the world, including the critical eco-regions like Heart of Borneo, Congo, and Amazon. The Kandla port in Gujarat handles more than 50 percent of timber imported in the country. The sale of timber from private sales depots during the year 2013 is summarized as under:-

Table 20: Volume of timber supplied by Private sales depots in Budgam

No. of Private Sales Depot as on 1st Jan. 2013	Annual sales (Conifer)	Annual Sales (Imported timber)	Total sales (cft)
95	46999.64 cft	187607.79 cft	234607.43 cft

3.2.7 Trees from outside forest (TOF) constitute an important element of growing stock with highest bearing on local people on their livelihood. The trees growing on farmlands and on homesteads are exploited by farmers as a cash crop and utilized in construction of house and for firewood/fuelwood purposes. The gap between demand and supply in timber and firewood needs is effectively filled by Tress from outside forest. The J & K State with an area of 222236 sq km has 148 million cubic meters volume of growing stock (ISFR-2011). The growing stock estimation for Budgam district works out to be around 1 million cubic meter with a geographical area of 1371 Sqkms.

However, in order to estimate accurately the growing stock of TOF in Pirpanjal Division, there is immediate need of carrying out special study for this purpose. The Agroforestry and Silvicultural models have to be promoted and facilitated for farmers. New fast growing species must be introduced having more timber value.

3.3 FIREWOOD/FUELWOOD REQUIREMENT

3.3.1 The consumption of firewood is very high in this region due to the harsh climatic conditions that prevail for most of the year. The villages where electricity is not available are heavily dependent on forests for firewood & fuelwood. In most of villages LPG connections are not available. Such villages directly take to forests for fulfilling the fuelwood needs. In winter, the consumption of firewood increases manifold as firewood is used by people to keep their houses warm. The results of survey conducted in PP Forest Division for estimation of annual consumption of firewood in Budgam is shown as under;-

(i) Firewood consumption in households

A) Total Rural Population of District Budgam = 367987
B) No. of Rural households using firewood/fuelwood= 50520
C) Assuming 60% of Rural population use firewood/fuelwood= 220792
D) No. of households using firewood/fuelwood (60%) = 30312
E) Average consumption of firewood/fuelwood per day = 10 kg/household
F) Total annual consumption of firewood/fuelwood=

1106388 say 11 lac Qntls/year

(ii) Firewood consumption in Brickkilns

(A) No. of Brickkilns in district Budgam= 174
(B) Average firewood consumption per Brickkiln per year= 500 qnts
(C) Annual total firewood consumption by Brickkiln per year= 87,000 Qntls

(iii) Firewood consumption by Bakery shops

(A) No. of Bakery shops in division= 832
(B) Annual consumption of firewood per Bakery shop per year= 330 Qntls
(C) Annual total firewood consumption by Bakery shops= 274560 Qntls

(iv) Firewood consumption by Masjid shariefs

(A) No. of Masjid shariefs in division= 741

(B) Firewood consumption during winter by each masjid= 60 Qntls

(C) Annual total firewood consumption by masjid shariefs= 44460 Qntls

(v) Firewood consumption in Miscellaneous Activities

(Muharram, marriages, cremation, household hamams etc)= 50,000 Qntls

Table 21: Estimated Annual Firewood/Fuelwood consumption

Component	Annual consumption (Qntls)
Household usage	1106388
Brick kiln	87000
Bakery shops	274560
Masjid sharief Hamam	44460
Miscl. activities	50000
Total	**1562408 say 15 Lac quintals/year**

Therefore around 15 lac quintals of firewood is consumed per annum in PP Forest Division. Against this demand, the department supplies meager 2000 Qntls of firewood annually to masjid sharies in municipal areas only. However, most of the villages in A zone extract firewood free of cost from forests. The other villages (B & C Zone) chiefly use firewood extracted from "Trees outside Forest". The estimated firewood consumption by A-zone villages is as under:-

Table 22: Estimated firewood consumption in A-zone

No. of A zone villages	Population of A-zone villages	No. of Households in A-zone	Estimated annual firewood consumption in A-zone
129	**180777**	**24032**	**877168**

Source: Census, 2011 & Socio-economic survey

The above figure of firewood consumption in A-zone can easily be presumed to be extracted from forest free of cost due to the close proximity of villages to forests. The cost of firewood is Rs 190 (The government rate at which Firewood is provided to local mosques). Therefore, the monetary benefits going to the people on account of free extraction of firewood from forests is whopping to the tune of Rs 16 crore annually.

(vii) In addition to the requirements of local population, firewood requirements of PC depot for further supply to Srinagar, Leh and Kargil are also being met.

The division supplies annually on an average 10,000 Qntls of firewood to PC depot.

(viii) While on one hand, the demand for firewood is increasing because of increase in population and short supply of caol, kerosene, electricity, LPG and other non-convention sources of energy. On the other hand, the sources of fuelwood are limited and depleted. Therefore in order to save the forests from over exploitation, broadleaved plantations must be raised on a major scale on degraded patches of forest. The broadleaved plantations shall have dual benefit. The degraded patches will get rehabilitated and principal conifers trees being lopped for firewood will be avoided as broadleaved plantations will fulfill such demands of villagers living near the forests. The people should be educated to give up the wide mouthed conventional chulas in favour of scientifically designed highly energy efficient chulas. The LPG connections should be encouraged. The electricity supplies to villages should be improved. Most importantly, the Agroforestry models should be promoted among farmers by giving special incentives to them so that firewood is taken out in short rotations from such fast growing trees raised on farmlands.

3.4 MARKET AND MARKETABLE PRODUCE

3.4.1 Due to increase in human population and rise in standard of living due to fast rate of development activity the demand for timber, fuel-wood and other MFP is ever increasing. In the order of out-turn, the major marketable timbers are Fir, Kail and Deodar. This tract is well known for its magnificent Fir forests. Fir is preferred locally as construction timber because it is cheaper than Kail and Deodar and readily available. Kail and Deodar are also used as construction timbers but their use is limited to doors and windows only because of their high price and non-availability. The broad-leaved species like Maple, Birdchery and Walnut are used in preparation of Rifle half-wrought. Walnut timber being fine-grained is chiefly used in furniture industry.

3.4.2 The minor forest products extracted from the tract of this division includes only Guchies. Though there is other MFP like Tripatri, *Podophyllum hexandrum* (Bankakri), *Atropa belladona* (Belladona), *Digitalis* Spp. etc readily available, however due to imposition of ban on extraction of MFP

from natural forests, no auctions have been conducted. The details of MFP extracted from the division for the last seven years is tabulated below;

Table 23: Minor forest produce extracted (in Qtls.)

Year	Guchies (Qntls)	Walnut (Qntls)	Revenue (Rs)
2013-14	No record	No auction	Rs. 75000
2012-13	No auction	ñ	-
2011-12	ñ	ñ	-
2010-11	ñ	ñ	-
2011-10	ñ	ñ	-
2009-10	ñ	ñ	Rs. 78865
2008-09	No record	ñ	Rs. 72275

3.5 LINES OF EXPORT

3.5.1 The chief line of export was by water before the division was opened to road traffic. Doodganga and Shaliganga nallas were the main lines of export to Srinagar, though other nallas like Romshi, Sukhnag etc were also used. The whole division has now been opened up by a network of roads, which include both tarred and fair weather roads. Thus the whole produce is hauled down through the roads all the year round. To reduce the chances of interruption in winter, the forest produce is transported down the fair weather roads during dry season and dumped at pucca loading points for onward transportation throughout the year.

3.6 METHODS OF EXTRACTION AND THEIR COST

3.6.1 After the nationalization of forests in J&K and imposition of ban on green felling by Hon'ble Supreme Court, all the required timber/firewood is being presently extracted either departmentally or by the State Forest Corporation. In the coupes to be worked out, markings under Q & Q norms are conducted in advance and all marked trees are serially numbered besides being branded with a hammer mark at the base of the tree. These trees are then classified into various diameter classes for the estimation of volume. The marked trees are then handed over to the SFC or alternatively exploited departmentally. All the arrangements for extraction and transportation of timber are being done through contractors/ Labour mates). They are however, required to do following operations at the time of felling of the trees,

1. To lop the tree upto $\frac{\square}{\square}$ of its height.

2. To cut the trees as near the base as possible with the help of axe or saw.

3. To control the direction of fall with the help of ropes and by orienting the cut.

3.6.2 The felling of marked trees is usually done in winter when ground is covered with snow. This is done in order to minimize breaking at the time of fall. However the felling is subject to accord of administrative approval by Chief Conservator of Forests. After the trees are felled, they are converted into logs of required lengths and then rolled down through rolling paths (off road transportation) to be collected at the loading points. From these loading points, the transportation is being done by trucks/Platforms. In view of undulating topography and damp clayey ground, tractor hauling is ideally situated to the forests of this division. The firewood is extracted in the form of hakeries, which are usually floated in the small rivulets to temporary catching points from where they are transported by trucks.

3.6.3 The conversion waste in these forests is still very high because SFC/department has not yet switched over the complete mechanization.

3.6.4 The average cost of extraction in these forests based on departmental tariff rates in vogue is as under:-

Table 24: Departmental timber extraction rates in vogue

S.N	Activity	Norm Rate	Remarks
1	Enumeration of Trees (Rs/Tree)	4.00	Sanctioned Rates of PCCF
2	Marking of Trees (Rs/Tree)	8.00	
3	Felling (Rs/CFT)	1.78	SFC Rates minus 15% Contractors benefit
4	Conversion	-	
4.1	Debranching/Debarking (Rs/CFT)	0.72	
4.2	Sawing/Log making(Rs/CFT)	2.82	
5	Loading logs(Rs/CFT)	3.55	
6	Unloading Logs(Rs/CFT)	0.035	

S. No.	Activity	Category wise Norm Rate				Remarks
		A	B	C	D	
		0-20 Degrees	20-30 Degrees	30-40 Degrees	>40 Degrees	
7	Rolling Upto KLP (RS/CFT/CHAIN) Engineering chain 100 Feet long	0.66	0.48	0.34	0.16	SFC Rates minus 15% Contractors benefit

S.No.	Activity	Volume (CFT)	Distance slab wise Rates				Remarks
			0-5 Kms	6-10 Kms	11-20 Kms	>21 Kms	
8	Kacha Road Transportation	Upto 5000	2.29	1.75	1.37	1.07	SFC Rates minus 15% Contractors benefit
		5001 to 10000	2.24	1.62	1.15	0.79	
		10001 to 20000	2.13	1.58	1.12	0.77	
		20001 to 40000	2.03	1.50	1.06	0.73	
		40001 to 80000	1.92	1.38	0.97	0.65	
		Above 80001	1.81	1.30	0.90	0.60	

Transportation of Timber from PLP to final destination:-	
(a)	Upto 40 Kms lead Rs. 0.40 per cft/Km
(b)	Beyond 40 Kms lead Rs. 0.35 per cft/km

3.7 PAST AND CURRENT PRICES

3.7.1 Due to increase in the demand of timber (as discussed under the leading market and marketable produce) prices have gone up considerably. The following statement shows the annual average sale rates of deodar, kail and fir since 1997-98 upto ending January 2013-14 (Source J & K SFC S & M (K) Circle)

Table 25: Specie-wise average sale rates per cft of SFC stocks through auction.

Year	Deodar (Rs/cft)	Kail (Rs/cft)	Fir (Rs/cft)
1997-98	270.26	173.85	116.32
1998-99	248.03	166.45	110.63
1999-00	225.35	165.79	97.43
2000-01	279.15	228.75	118.31
2001-02	320.49	248.39	139.23
2002-03	393.13	277.16	156.29
2003-04	553.18	364.31	210.14
2004-05	620.42	451.89	276.24
2005-06	760.60	518.51	333.56
2006-07	847.13	625.15	350.87
2007-08	973.79	607.56	345.54
2008-09	1111.87	725.60	382.67
2009-10	1192.36	553.05	389.73
2010-11	1259.04	824.46	408.86
2011-12	1202.20	757.60	388.10
2012-13	1394.16	599.53	441.71
2013-14	1319.61	799.66	405.06

Notes:
Sales Tax and Surcharge is charged as per practice in vogue.
The above quoted rates are average of A & B class stocks.

3.7.2 The State Forest Corporation has fair price shop established in Srinagar city to cater the needs of city dwellers. The sale rate of species from SFC Fair Price shop is as under:-

Table 26: Approved rates for fair price sales in Municipal Corporation areas of Srinagar for year 2013-14

Species/Class	Girth class (Inches)	Rates sanctioned For 2012-13		Rates sanctioned for 2013-2014	
		Log	Sawn	Log	Sawn
Deodar-B	24ò-35ò	1059	1951	1059	2244
	36-47ò	1270		1270	
	48-59ò	1563		1591	
	60-99ò	1683		1972	
Kail-B	24ò-35ò	649	1431	649	1646
	36-47ò	1063		1063	
	48-59ò	1168		1169	
	60-99ò	1355		1377	
Fir-B/C	24ò-35ò	376	732	376	842
	36-47ò	487		501	
	48-59ò	540		566	
	60-99ò	613		656	

3.8.3 Timber is also sold by the Forest Department through timber sale depots against the sanctions issued by the Divisional Forest officer. The species wise rates charged at the timber depots to grantees are tabulated as follows:

Table 27: Periodic change in specie-wise sales rates from Forest Sales Depot

Year	Zone	Type	Sale rate in Rs./cft		
			Deodar	Kail	Fir
1994-95 w.e.f. July 95	A	Log	60	38	22
		Sawn	75	45	30
	B	Log	105	68	52
		Sawn	120	82	58
	C	Log	145	83	57
		Sawn	176	114	64
1998-99 w.e.f. Aug. 98	A	Log	90	57	33
		Sawn	113	68	45
	B	Log	158	102	78
		Sawn	180	123	87
	C	Log	218	125	86
		Sawn	264	171	96
2001-02 (517 FST of 2002 dt.31/1/ 2002)	A	Log	162	103	60
		Sawn	204	122	82
	B	Log	246	160	120
		Sawn	281	192	136
	C	Log	340	196	134
		Sawn	411	266	150
2003-04 (501 FST of 2003 dt 21.10. 2003)	A	Log	146	93	54
		Sawn	184	110	74
	B	Log	197	128	96
		Sawn	225	154	109
	C	Log	272	157	108
		Sawn	329	213	120

2005-06 (314 FST of 2005 dt 01.08.2005)	A	Log	146	93	54
		Sawn	184	110	74
	B	Log	197	128	96
		Sawn	225	154	109
	C	Log	299	173	119
		Sawn	362	231	132
	M/C	Log	391	226	156
		Sawn	474	307	173
2006-07 (278 FST of 2006 dt: 19/5/2006)	A	Log	161	102	59
		Sawn	202	121	81
	B	Log	246	160	120
		Sawn	281	193	136
	C	Log	299	173	119
		Sawn	362	231	132
	M/C	Log	391	226	156
		Sawn	474	307	173
2010-11 (212-FST of 2010 dt 13.05. 2010)	A	Log	185	130	74
		Sawn	215	160	104
	B	Log	345	245	138
		Sawn	375	275	168
	C & MC	Log	513	360	205
		Sawn	543	390	235

Excluding Taxes and Development Fund @Rs 1/= per cft

3.8.4 The standard rates worked on the basis of 1978 rates at 10 times, to be called as Revised standard Rates for the year 1993 onwards. The rates are given below for principal conifer species.

Table 28: Revised standard rates of conifer species

Dia-class	Deodar	Kail	Fir	Chir
0-10 cm	170	110	70	40
10-20 cm	650	410	270	110
20-30 cm	1310	820	450	215
30-40 cm	2450	1540	1130	625
40-50 cm	4150	2740	2060	1480
50-60 cm	6700	4560	3940	2830
60-70 cm	10480	6730	6480	4570
70-80 cm	14030	8890	9060	6260
80-90 cm	18110	10880	10970	7990
90-100 cm	24080	13620	13670	9020
100-110 cm	26460	14940	14820	10000
110-120 cm	28360	15280	15770	11400
120-130 cm	29800	16000	16460	11810
130-140 cm	30840	16320	17120	12170
140-150 cm	32040	17000	17580	12420
150 & over	33120	17400	17900	12500
Note: For Postal(Yew) and Chalgoza (*Pinus gerardiana*), the standard rates will be the same as that for firewood.				

3.8.5 The revised standard rates apply to Broadleaved species as well as defined in Govt. order No: FST/32/66 of 1996 dated 12.04.1966 shown in table below:-

Table 29: Revised standard rates for Broadleaved trees

Classification	Species	Standard Rates
Special class	*Juglans regia* (Akhrut)	Revised standard rates shall be equal to deodar specie as shown above in all 10 cm dia classes
	Fraxinus excelsior (Sum,Sinno,Hum)	
	Buxus sempervirens (Chikri)	
	Acer spp. (Trikana, Kanzal)	
	Prunus padus (Tarani zum, Bharat, Jammu)	
	Cedrela spp. (Tun, Tooni)	
	Ulmus wallichina (Bran, Bari, Mannu)	
A class	*Dalbergia sissoo* (Tahli, Shisham, Guzzu)	Revised standard rates shall be equal to one half of deodar specie as shown above in all 10 cm dia classes.
	Aesculus indica (Bankhor, Coo)	
	Ougenia dalbergioides (Sandan)	
	Mangifera indica (Aam)	
	Olea cuspidate (Kau)	
	Terminalia chebula (Har, Harrir, Harror)	
	Prunus armeniaca (Hari)	
	Betula utilis (Bhojpatra, Burj)	
	Celtis australis (Kharok, Kharik)	
	Eugenia jambolana (Jaman)	
	Bambax malabaricum (Simbal)	
	Salix alba var. caerulea (Bed Angrizi)	
	Corylus colurna (Thangi, Findak, Pinakooni)	
	Terminalia belarica (Bahera)	
	Phyllanthus emblica (Amla Ambli)	
B class	*Morus spp* (Tut, Krun)	Revised standard rates shall be equal to three-eighth of deodar specie as shown above in all 10 cm dia classes.
	Rhus succedanea (Arkhun, Arkhar)	
	Populus alba (Sufeda, Fraste)	
	Populus ciliate (Sifeda, Sakki)	

	Pisacia integerrima (Makarsingi, Kakar, Kakro)	
	Quercus spp. (Bang, Moru, Burj, Rhim, Karsu, Morn, Ksu, Ken, Batrin)	
	Acacia modesta (Phulai)	
	Acacia catechu (khair)	
	Acacia arabica (Kikar)	
	Alnus nitida (Sarol,Champ, Kunis, Rajan)	
	Parrotia jacquemontiana (Hatab)	
	Cassia fistula (Amaltas, Kirangal)	
	Grewia oppositifolia (Pahari)	
	Stephegyne parvifolia (Kam)	
	Ilex dipyrena (Dratha)	
	Bassia latifolia (Mohwo)	
	Aegle marmelos (Bel, Billan)	
	Ficus religiosa (Pipal)	
	Pyrus pashia (Kaintha)	
	Ficus indica (Bar, Bor)	
	Pyrus lanata (Batta)	
	Punica granatum (Druni)	
	Lannaea granatum (Khaimbal, Khemal)	
	Albizzia spp. (Sarin)	
C Class	All other Broadleaved Trees	Revised standard rates shall be equal to one-eighth of deodar specie as shown above in all 10 cm dia classes

Table 30: Existing growing stocks of "Trees outside forests" district wise

CHAPTER-IV

STAFF AND LABOUR SUPPLY

4.1 STAFF

4.1.1 The following statement shows the permanent and the temporary establishment of division as sanctioned as well as actually working during 2013-14.

Table 31: Executive staff strength

S. No	Designation	Sanctioned post	Actual working		Pay Band+Grade Pay
1	DCF	1	1		15600-39100+6500
2	ACF	1	1		9300-34800+4800
3	Range Officers-I	5	1		9300-34800+4280
4	Range Officer-II	2	4		9300-34800+4200
5	Foresters	92	10	1	9300-34800+4200
				8	5200-20200+2800
				1	5200-20200+2300
6	Dy. Foresters	23	19	4	5200-20200+2800
				14	5200-20200+2300
				1	5200-20200+2100
7	Forest guards	170	69	1	5200-20200+2800
				4	5200-20200+2300
				28	5200-20200+2100
				34	5200-20200+1900
				2	3050-75-4590(Pre-Revised)
8	Watchers	5	14	8	5200-20200+1800
				6	4440-7440+1400
9	Chowkidars	8	15	9	5200-20200+1800
				6	4440-7440+1400
10	Malies	15	18	6	5200-20200+1800
				12	4440-7440+1400
11	Farash	0	0		4440-7440+1400

Table 32: Ministerial staff strength

S. No	Designation	Sanctioned post	Actual working		Pay scale
1	Accountant	1	1		9300-34800+4210
2	Head/Senior Assistant	1	0		5200-20200+2400
3	Junior Assistant	8	3	2	5200-20200+2400
				1	5200-20200+1900
4	Driver	2	1		5200-20200+2400
5	Orderlies	5	7	6	5200-20200+1800
				1	4440-7440+1400
6	Helper	0	34	19	5200-20200+1800
				14	4440-7440+1400
				1	2550-55-2610-60-3200 (Pre-revised)

Table 33: List of officers that served as DFO's of PP Forest Division

S.No	Name of DFO	Desig.	From	To
1	Sh.Ab.Hameed	DCF	28-12-1981	220-04-1983
2	Sh.Pervaiz Qadri (IFS)	DCF	22-04-1983	22-07-1984
3	Sh.S.S.Bali	DCF	22-07-1984	210-7-1986
4	Sh.N.A.Farooqi (IFS)	DCf	21-07-1986	13-06-1987
5	Sh.Shakir Hussain	ACF	13-06-1987	18-09-1987
6	Sh.Zaffar Iqbal	ACF	18-09-1987	01-01-1991
7	Sh.M.R.Malik	ACF	01-01-1991	30-11-1992
8	Sh.Miyan Javaid Hussain	DCF	30-11-1992	25-01-1997
9	Sh.Syed F.A.Geelani	DCF	25-01-1997	11-07-1998
10	Sh.Manzoor Ahmad	DCF	11-07-1998	02-10-1998
11	Sh.Nissar Ahmad	DCF	02-10-1998	03-07-2000
12	Sh.Gul Mohammad Naik	DCF	03-07-2000	07-07-2002
13	Sh.Mohd Shafi Malik	DCF	07-07-2002	03-07-2003
14	Sh.Shuja Ahmad Hydri	DCF	03-07-2003	05-09-2003
15	Sh.M.A.Beigh	DCF	05-09-2003	14-09-2004
16	Sh.G.A.Malik	DCF	14-09-2004	19-07-2005
17	Sh.M.B.Ali Qureshi	DCF	19-07-2005	10-02-2006
18	Sh.Mufti Nazim Din	DCF	10-02-2006	31-08-2006
19	Sh.Ab.Rasheed Shah	DCF	31-08-2006	11-11-2006
20	Sh.G.S.Kirmani	DCF	11-11-2006	30-04-2007
21	Sh.Wali Mohd Ganie	ACF	30-04-2007	18-12-2007
22	Sh.Javid Ahmad Indrabi	DCF	18-12-2007	26-03-2009
23	Sh.Ab.Hamid Bhat	DCF	26-03-2009	25-05-2009
24	Sh.Wali Mohd Ganie	ACF	25-05-2009	15-02-2010
25	Sh.Gh.Hassan Bhat	DCF	15-02-2010	25-04-2012
26	Sh.Syed Humayan Qadri	ACF	25-04-2012	18-02-2013
27	Sh.Irfan Rasool Wani (IFS)	DCF	18-02-2013	Till date

4.2 LABOUR

4.2.1 Generally, the local labour is adequately available for forest working in the division; however, sometimes the labour is imported from other parts of the valley to work in division. The local labour has become well versed in all types of forestry operations by the experience gained in due course of time. There is a serious shortage of labour during sowing and harvesting season because agriculture is the prime occupation of the locals. Moreover, with increasing developmental activities in the tract, the villagers are getting lured and tempted by handsome wages they get for the works of the comparatively easier nature form other departments. Besides, above the local people prefer the Govt. job. They are happy even if they are engaged as casual labourer or on muster roll basis in any Govt. departments. MGNAREGY scheme, which assures minimum 100 days wages for unemployed rural people has also drained available labour force from forestry works. In view of the above facts, the labour problem is likely to aggravate in future and only solution to the problem is the mechanization of forestry operations.

4.3 DEPARTMENTAL WORKS

The civil works are executed through contract system as well as by convenor system (Labour mate system). The contractors bring the labourers in the contract system; the local skilled, semiskilled and unskilled persons are largely engaged in the execution of departmental works. Most of the forestry works are executed through convenors (mates) under the supervision of forest officials and the payments are made to convenors that are selected from among the workers.

Table 34: Revised minimum rates of wages in respect of scheduled employment

Sr. No.	Scheduled Employment	Category of Workers			
		Skilled	Semi-Skilled	Un-Skilled	Ministerial/ Supervisor/Acctts
		Total Minimum Wages (In Rs)			
1	Agriculture	225	175	150	200
2	Auto Body Fabrication	225	175	150	200
3	Brick Kiln	225	175	150	200
4	Cinema	225	175	150	200
5	Construction Industry	225	175	150	200
6	Embroidery including Chain Stitching	225	175	150	200
7	Forest	225	175	150	200
8	Hair Cutting Saloons	225	175	150	200
9	Hotel/Restaurants, Tea Stall & Cinema	225	175	150	200
10	Ice Factory and Cold Storage	225	175	150	200
11	Light Engineering Works	225	175	150	200

12	Local Authority Municipalities and Town Area Committees	225	175	150	200
13	Manufacturing of Wood products	225	175	150	200
14	Manufacturing of Food products	225	175	150	200
15	Manufacturing of Soap and Detergents	225	175	150	200
16	Manufacturing of Tailoring and Ammunitions	225	175	150	200
17	Manufacturing of Sports Goods	225	175	150	200
18	Manufacturing of Tailoring of Garments	225	175	150	200
19	Manufacturing of Drinks and Breweries	225	175	150	200
20	Manufacturing of Medicines Hospitals Equipments	225	175	150	200
21	Manufacturing of Metal Steel Utensils	225	175	150	200
22	Motor Transport	225	175	150	200
23	Oil Mills	225	175	150	200
24	Private Brick and Tile Making	225	175	150	200
25	Private Transport Industries	225	175	150	200
26	Rice, Flour & Dal Mill	225	175	150	200
27	Rosin and Turpentine Products	225	175	150	200
28	Silicate Chemical Works	225	175	150	200
29	Shops and Establishments	225	175	150	200
30	Steel Metal Rolling Mills	225	175	150	200
31	Stone Breaking or Stone Crushing	225	175	150	200
32	Tanneries & Leather Manufacturing.	225	175	150	200
33	Wood Carving	225	175	150	200
34	Woolen Carpet making and shawl weaving	225	175	150	200
35	Workshop	225	175	150	200

Source: SRO-3- J & K Labour & Employment Department

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CHAPTER V

ACTIVITIES OF STATE FOREST CORPORATION

5.1 HISTORY OF STATE FOREST CORPORATION

5.1.1 Mr. RAMLAL KHUJARIA served as the CCF of forest department during 1957 to 1959 A.D. During this period, a temporary training centre was opened up at Batote for furnishing modern mechanical logging training to forest officers. It was in his period that departmental extraction started for the first time in Keran forests of Kamraj Forest division during the year 1959-60. The Departmental working of forest which was started on an experimental scale was named as "Keran Logging" in Keran Forests of Kamraj Forest Division. The same was renamed as Departmental Exploitation Project (DEP) when some more coupes were taken up in the valley for extraction. The DEP was kept under the administrative control of separate General Manager.

5.1.2 With the passage of time, some more areas were taken up for timber extraction in Kashmir Valley for winter working and few compartments were taken up in Jammu in Udhampur and Sunderbani Forests. With the success achieved, the DEP was expanded into a Departmental Logging Project (DLP) and certain drainages like Lolab, Romshi and Dudganga in Kashmir Valley and Neru, Kellard and Dudu Ranges in Jammu region were earmarked to be worked out by the DLP. The DLP had a Board of Governors chaired by the Chief Secretary to lay down policy matters and the DLP continued to be under the Chief Conservator of Forests with a General Manager to conduct day to day work. In the year 1973, the Government created a separate Organization called the Government Lumbering Undertaking (GLU), as a step towards taking over the responsibility of complete Nationalization of Forest Working in the State. Sh. PRITHVI NATH KOUL was appointed as the first GENERAL MANAGER of GLU.

5.1.3 In the year 1978, the State Legislature passed an Act called J&K State Forest Corporation Act, 1978. In pursuance of the SFC Act, 1978, the Government Lumbering Undertaking was converted into J&K State Forest Corporation with the objectives of better preservation, supervision and

development of forests and better exploitation of forest produce. The Corporation came into existence and started its functions independently from 01.07.1979. Mr. Nazir Ahmad Masoodi was appointed as first Managing Director of SFC.

5.2 QUALITATIVE & QUANTITATIVE NORMS

The recommendations of Expert Committee for Qualitative & Quantitative Norms for removal of trees from forests are given as below:-

5.2.1 Time Limits for Working out the coupes handed over to the State Forest Corporation:- The state Forest Corporation shall complete all the lumbering operations in compartments taken over by it within three years/three working seasons from the date the markings are handed over to it and hand over the compartments back to the Forest department thereafter. In very rare cases, where the work has been delayed due to exceptional circumstances, the Chief Conservator of Forests (Territorial) concerned may allow extension of one more year/one more working season to the SFC on the specific recommendations of the Managing Director. This condition will also apply to the compartments currently under work by SFC. However, in such compartments, the three year limit will be computed with effect from the current year i.e., 2009-10

5.2.2 Marking of fallen trees in coupes under work by the State Forest Corporation:- During the period referred in item 1 above, when a compartment is under work by the SFC, any material that becomes available in the form of fallen trees shall be marked and handed over to the corporation for extraction.

5.2.3 Duration of the Felling Cycle:- A compartment which has been worked out for dry standing/fallen markings, and has been handed back to the Forest department, may be taken up for dry standing/fallen markings again only after a period of five years would have elapsed from the date the compartment was handed back to the forest department. In the case of Fir Working Circle, such period shall be minimum eight years.

5.2.4 Norms for minimum availability of volume for enabling marking in a compartment:- No compartment should be marked unless a minimum

volume of 10,000 cft of dry, dead, fallen timber is available in it. The SFC will not be allowed to work a compartment unless it has a minimum marking (volume) of 10,000 cft. However, no such limitation of marking availability will apply to departmental extraction of timber by Forest department for meeting the local demands.

5.2.5 Protection, Reboisement and Unregulated Working Circle:- A compartment falling under Protection, Reboisement or Unregulated Working Circle may be marked and handed over to SFC for extraction of fallen trees only provided the volume of fallen trees in the compartment is not less than 10,000 cft. However, the restriction regarding minimum availability of 10,000 cft will not apply to departmental working in such compartments by Forest department for meeting the local demands.

5.2.6 Removal of trees that endanger life/property, and for aesthetic purpose:- The removal of dry standing/ leaning/fallen trees may be carried out by the Forest department if such trees pose a threat to life and property. Further in Aesthetic Working Circle, such trees may be removed by the Forest Department for aesthetic considerations also. The committee also recommended that the aesthetic working circle should be renamed as Eco-tourism working Circle whenever the respective working plans are taken up for revision.

5.2.7 Forest Conservation:- Recognizing the importance of ecosystem services being provided by the forests, the committee felt that concerted efforts should be made for regenerating and restocking of the forests. This, *inter alia* would require reduction of pressure on forests for meeting demands of timber and other forest produce. In this context, the committee also recommended that the import of timber into the state should be encouraged so that the gap between demand and supply is bridged to the maximum possible extent.

5.3 LOGGING OPERATION

Forest utilization is the process of harvesting, converting, transporting and marketing of stocks. It deals with the felling of trees, their extraction, rolling and dragging, and final transportation to ultimate destination.

5.3.1 Felling

Felling may be defined as the cutting down of trees which have achieved exploitable diameter or whose removal is prescribed in working plan. In context to Supreme Court direction, it encompasses type of trees which qualify under Qualitative and Quantitative norms. The felling operation involves set of procedure which is described as under:-

(i) **Enumeration of trees:** The trees which qualify for felling under Q & Q norms are enumerated and list submitted to Conservator of Forests-Working plan for technical clearance.

(ii) **Technical Clearance:** The CF-working plan examines the enumeration list vis-avis the working plan prescriptions, Q & Q norms, Supreme Court directions and other standing orders issued from time to time. After satisfying the eligibility of enumeration list, the technical clearance is issued for conducting of markings in the given coup. The main considerations for issuing technical clearance for conducting of markings are viz:-

- ***a.*** *That the compartment proposed for marking has not been gone over for removal of dry standing/fallen trees during past 5 or 7 years as the case may be(depends on the type of working circle) and the compartment has been proposed subject to the condition that volume available in the form of dry standing/fallen trees is more than 10000cft in regular working circles.*
- ***b.*** *That the compartment does not form part of Wildlife Sanctuary, National park, Natural Reserve and Biosphere Reserve.*
- ***c.*** *That the compartment proposed if falling under Protection Working Circle, Reboisement Working Circle and other Unregulated Working Circle shall have only fallen trees with a volume of more than 10000cft.*
- ***d.*** *That the compartment proposed if falling under aesthetic Working circle shall have dry standing/fallen/leaning trees only and the extraction work is to be done departmentally.*

(iii) **Markings:** The process of marking is carried out by the Marking officer (MO). The MO first identifies the candidate trees in the compartment. After the identification of such trees, he starts carving serial number (Tree No) and marking year on the lowest possible place on such trees with some Scratchier. Similarly he carves same mark on the tree bole of the same tree at the breast height (1.37m). Both the marks are hammered with a marking

hammer and made conspicuous with Coal tar and Kerosene glue. Meanwhile the Caliper-man measures diameter of marked trees and calculates total volume of timber with the help of Volume table.

(a) Preparation of Marking List: The trees that are marked for extraction in compartment are recorded in the Field-book. A list is prepared known as marking list in the prescribed format given below showing details of the marked trees and is submitted to DFO immediately, the marking is finished together with an abstract under diameter classes of the trees marked.

(b) MARKING LIST FORM

MARKING LIST OF TREES IN COMPARTMENT No._____

Felling Series of the _____ Working circle_____

Prescription _____

Date of marking_____ Hammer mark_____

Marking officer_____

S.No	Tree No.	Species	Diameter class recorded	Diameter class	Remarks

Explanation:

Tree No.: Standard number of a tree enlisted in marking e.g., 1/2013, 2/2013 and so on.

Diameter Recorded: Actual measurement of diameter of a tree in two axis e.g., 50/53

Diameter class: Standard diameter class in which tree falls e.g., 50-60, 60-70 etc

Remarks: Nature of damage to tree. Various abbreviations may be used e.g.,

Uprooted: U/r
Base scooped: Bs
Top broken: T/B
Broken at Ground Level: BGL
Diseased: Dis
Leaning: <or>
Lightening Struck: L/s
Malformed: M/F
Top Malformed: TMF
Splited: Sp
Forked: Y

(c) Technical Sanction: After the submission of marking list by the DFO and duly recommended by the Conservator of Forests, the Technical sanction is issued by CF working plan for extraction of marked trees from coups in conformity with the Qualitative and Quantitative norms.

(d) Administrative Approval.: With the issuance of technical sanction, the Chief Conservator of forest issues the administrative approval for extraction of marked tress either through SFC or departmentally which depends on the quantum of work, terrain, annual targets etc. The CCF has to take into the account the annual ceilings for extraction fixed by the Hon'ble Supreme Court of India which in no case shall exceed 80,000 cft per annum from the state of J &K.

5.3.2 Preparation of Outturn Register

After the work in any compartment finishes, the total outturn obtained from that compartment is recorded in a register known as outturn register. This compartment serves as the compartment history book of that very compartment. The form of outturn register is given below.

Tree No.	No. of Logs	Dimensions	Volume	Total Volume

5.3.3 Log Marking/Indents

Logs are marked at loading points which is known as *Passing*. At one end of the log, the species, its number, dimension and volume are carved out while as on the other end property mark and compartment number are engraved on the timber.

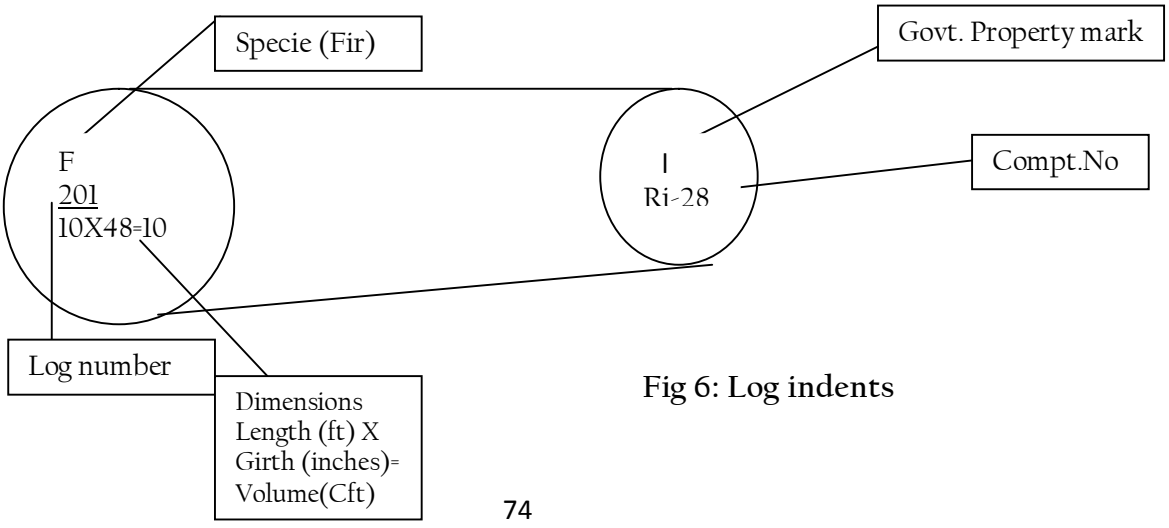

Fig 6: Log indents

5.4 EXTRACTION WORKS CONDUCTED BY SFC

In the table below is presented the volume of timber extracted by SFC in Pirpanjal division since 1990.

Table 35: Extraction of timber volume by SFC from compartments

S.No.	Year	Extraction (in lac cft)	Dispatchs (in lac cfts)
1	1995-96	1.96	1.947
2	1996-97	2.081	1.969
3	1997-98	0.971	0.437
4	1998-99	2.804	2.848
5	1999-2000	1.903	1.99
6	2000-2001	1.544	1.536
7	2001-2002	4.228	4.107
8	2002-2003	2.153	2.211
9	2003-2004	1.47	1.536
10	2004-2005	0.426	0.232
11	2005-2006	2.225	1.414
12	2006-2007	3.359	2.929
13	2007-2008	2.53	3.359
14	2008-2009	0.12	0.78
15	2009-2010	0.341	0.444
16	2010-2011	1.272	0.491
17	2011-2012	0.452	1.094
18	2012-2013	2.204	1.92
19	2013-2014	4.121	3.048
	Total	**36.164**	**34.292**

5.5 MARKINGS HANDED OVER TO SFC

In the table below is presented the compartments handed over to SFC, the markings extracted from such compartments and royalty due to SFC on account of such markings in Pirpanjal division since 1990.

Table 36: Markings/compartments handed over to SFC and royalty due

Volume handed over to SFC				Converted into Fit volume				Royalty due
Deo	Kail	Fir	Total	Deo	Kail	Fir	Total	
21972	106175	7392734	7520881	16289	62045	4316841	4395175	174486743.3

No royalty has been paid by SFC to department as on date.

Note: The conversion factor for calculating royalty on account of markings handed over to SFC is detailed:-

1. Deodar green fallen= Full volume
2. Deodar dry standing/fallen= $3/4^{th}$ of the volume
3. Deodar unfit = 33% of the volume
4. Kail green fallen= Full volume
5. Kail dry standing/fallen= ½ of the volume
6. Kail unfit= 33% of the volume
7. Fir green fallen= Full volume
8. Fir dry standing/fallen= ½ of the volume
9. Fir unfit= 33% of the volume

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CHAPTER VI

PAST SYSTEM OF MANAGEMENT

6.1 GENERAL HISTORY OF THE FORESTS

6.1.1 It seems that the Forests of this state were without any control prior to 1857 A.D. It was in this year that the initial attempts at administering the Forests were made by constituting 'Mahal Nawara' on Forest (exploitation) Department. The said Department was under the administrative control of Governor of Kashmir who exercised this control through an officer-incharge and some watchers called 'Shakdars'. There was, however, no control exercised over 'Zamindars' who used to cut the trees for their bonafide use without any check or hindrance. The contractors who would desire to fell the trees had to share the out-run half and half between the state and themselves. These contractors were free to fell any number of trees anywhere. This unregulated and uncontrolled felling of trees both by Zamindars and contractors resulted in over exploitation of easily, accessible Forest areas. The Forest conservancy in the state was introduced in the year 1883 AD. When and 'Ain-Janglat' was passed. It enjoined that 'the State Forests must be carefully guarded' and that for trees removed for other than domestic use 'a ransom of two annas per rupee' must be paid. The erstwhile Department was split up into two wings viz. 'Mahal—Nawara' and the Mahal-i-Janglat. The former was made responsible to look after exploitation and collection of rasum on timber and Firewood while the latter was made responsible for the Forest protection. The staff was very meagre as there being only two supervising officers for the entire valley. The contractors were usually 'Hanjis' (Boatman) who had the only known mode of transport of timber viz, boats. They were free to fell any number of trees anywhere for the payment of nominal lump-sum fee. Thus heavy, un-controlled and unregulated felling continued in more accessible areas resulting in their further destruction.

6.1.2 The foundation of scientific Forestry was laid in the year 1890 AD. When Mr. Mac-Donell of erstwhile Indian Forest Service was appointed as First Conservator of Forests. Under his expert guidance the Forest Department was organized on the modern lines. The demarcation of Forest was undertaken, ranges, blocks and beats were constituted, felling was

systematized, Fire conservancy was introduced and construction of roads and building in the Forests was started. The practical execution of Mr. Mac-Donell's reforms was done by Rai Shaib Lt. Col. Thakur Bhikram Singh. He actually demarcated the Forests and reduced Forest offences to minimum.

6.1.3 It was in the year 1919AD that ex-Shopian Forest Division was created. It was constituted out of Haripora and Shupyan Ranges detached from Kashmir Division, along with a part of Sri Pratap Singh Pora Range Transferred from Pir-Panjal Division. Its boundary extended from Noorabad Range of Kashmir Division upto watershed between Shaliganga and Sukhnag Nallahs. It was in the year 1924 AD that Khag Range (present Sukhnag Series) was added on, while the Narva (Noorabad Range) was excluded and transferred from this division to Kashmir Division, thus constituting the Pirpanjal Division as it stood upto 1982 AD. It was in the year 1982 AD that the present Pir Panjal Forest Division was constituted as a result of re-organization of J&K Forest Department. It now comprises of Gulmarg Range of ex JV Forest Division besides Dudganga and SPSP Range of ex-P.P. Division. Thus the present Pir Panjal Forest Division comprises of four Ranges namely Dudganga Range, Raritan Range, SP SP Range and Gulmarg Range.

6.2 PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS

In the Forests of present Doodhganga, Raithan, SP SP Ranges, the fellings (mainly) for Firewood remained un-regulated till 1914 AD when a working scheme was prepared for the then Sri Pratap Singh Pora Range by Pt. Pran Nath Dakshindar. The scheme prescribed the working of these Forests under Indian Selection System with an exploitable girth of 2.28m. No yield, however, was prescribed. The working under this scheme resulted in over exploitation of accessible areas such as Dudhganga block.

6.2.1 B.SHER SINGH'S PLAN (1925-34 A.D.)

The first scientific working plan for the P.P. Division (constituted in 1924) was prepared by B.Sher Singh in 1925, advocating concentration of work not only on silvicultural grounds but also with a view to making low grade timber like Fir to pay its way. The salient prescription of his plan were conversion to uniformity of all the Kail, Deodar and low lying Fir Forests and selection system for distant Forests (mainly Fir). The Forests of the division were

divided into five Working Circles. The composition, management prescribed and results of working in each one of them are briefly described as under:-

(i) Pine Working Circle

It comprised of all the Kail and Deodar Forests. The important prescriptions for the Working Circle were:-

a)Silvicultural System	Conservation to uniform or shelterwood compartment system
b)Rotation	120 years
c)Periodic Rocks	Five PBôs (fixed of 24 years each.
d)PB 1	Representing 16% of total area of the working circle with mature and over-mature crop typically devoid of any regeneration.
e)PBV	Representing only 6% of the total area of working circle.
f)PB intermediate	PB II to PB iv
g) Yield from PB I	Kail 10957 cums, Fir 2882cum
e)Prescriptions	Thinning and cleanings in the young crop, removal of mother trees suppressing the young growth and artificial stocking of the blanks were prescribed in PB V. In PB inter, light and cautions thinnings were prescribed.

The prescriptions were generally sound but it took no advantage of the advance growth present in areas allotted to PB-I. Efforts should have been made to reap the mature crop gradually and not in First years of conversion. The concentration of mature crop in PB I compartment, in spite of conservatism in area allotment, has tended to give a higher yield from PB I than was expected from these Forests. The felled compartments failed to regenerate naturally. Weeds came in and necessity was felt to regenerate these areas artificially. Patch sowing/ broadcast sowing of Kail and under planting of Deodar was resorted to in these areas.

(ii) Fir Working Circle

It comprised of low lying Fir Forests. The important prescriptions for the Working Circle were

a) Silvicultural system	Conversion to uniform
b)Rotation	150 yrs
c)Regeneration period	30 yrs
d)Exploitable size	1.82m dbh (cb)
e)Total yield from W. Circle	Fir:90227 cum, Kail 5792 cum

The areas allotted to PB I comprised partially the entire commercial Fir Forests in the respective felling series; therefore the yield was much in excess. Luckily, the prescribed yield could not be marked for want of market of Fir. Typical text-book type uniform system was applied to these Fir Forests without any consideration for the silvicultural requirement of the species. This resulted in the failure of post-felling regeneration as seen in Ri-24 and 25. Furthermore, the blanks and openings caused by concentrated fellings was tried to be filled up with the planting of Deodar (in Fir Forest) without any silvicultural justification.

(iii) Selection Working Circle

It included Fir Forest of Doodhganga and Sukhnag Blocks, the former on account of predominance of young crop and the latter for the reasons of steep topography and lack of export facilities. The important prescriptions for the Working Circle were;

a) Silvicultural system	Conservative (light) Selection system
b)Exploitable diameter	75cum dbh
c)Felling cycle	10 yrs
d)Yield	Kail 2250cum: Fir 41485cum annually

The yield was based on partial enumerations, calculated by Howard's modification of Von Mantel's formula. The yield was in excess as no reducing factor was taken into account for poorly stocked compartments. Fortunately, only parts of compartments S6 and S7 were worked during the period of plan.

(iv) High Level Working circle

It included the upper reaches of Forest growth which were to be maintained as protective belts against snow slides. No work had been prescribed for this Working Circle.

(v) Un-regulated Working Circle

It comprised the Forests of Nilnag block, being not served by any floatable stream these Forests were intended to provide fuel wood to Charar-i-Sharief. Felling if necessary, were to be made on improvement basis. No fellings were done in this Working Circle.

6.2.2. R.L.KHAJURIA'S PLAN (1935-45 A.D)

The above plan was revised by Mr. R.L.Khajuria. The most salient change brought out in the management of these forests was that only those compartments were allotted for working (in regeneration block) which had sufficient advance growth regeneration. The Forests were divided into four working circles. The composition, management prescribed and results of working in each one of them are briefly described as under:

(i) Kail Working Circle

With a few minor alterations, the constitution of this working circle was same as that of Pine working circle of previous plan. The important prescriptions for this working were:-

a) Silvicultural system	Conversion to uniformity to continue
b)Rotation	150 yrs corresponding to an exploitable size of 75 cums dbhob for Kail
c)Conservation period	120 years commencing from the operation of last plan
d)Regeneration period	30 years, 5 (fixed) period blocks, allotted only PB I and PB V, rest as intermediate PB.
e)Yield	(I) Entire working cirlce: Kail and Deodar:9555 cum: Fir 8417 cum. (II) PB 1 Kail(and Deodar):7417 cums Fir 6111 cums

The area of PB I was in excess of due proportion by about 17% though the total area of PB I and PBV was equivalent to 2/5 of working circle.

PB-I consisted of freshly allotted areas of having abundant advance growth and the felled areas worked under the last plan. PB-V consisted of young crop with practically no over wood.

The removal of over wood in the form of regeneration fellings according to the requirements of the crop in PB I to realize the yield in the first instance and artificial regeneration of felled areas with Kail were the main features of management. Though the stress was laid on regenerating the previously worked areas within the remaining 20 years of regeneration period, yet the accordance progress observed was slow. The freshly allotted areas worked in accordance with the prescriptions contain all most even aged crop of young to middle age.

(ii) Fir Regular Working Circle

Its constitution was same as that of Fir working Circle of previous plan. It comprised of all low lying and accessible Fir Forests. The important prescriptions for this working circle were:

a) Silvicultural system	Conversion to uniformity allowed to continue
b)Rotation	120 yrs corresponding to an exploitable size of 75 cums dbhob for Kail
c)Conservation period	120 years
d)Regeneration period	40 years, 5 period blocks, regeneration bock PBI & PB V= 30% of the area of entire working circle.
e)Yield	Growing stock of regeneration block (30 years being the remaining years of regeneration period) Kail:3398 cum: Fir: 37662 cum.

Though the uniform system had proved a failure in Fir, yet it was allowed to continue probably because in the allotment of compartments for regeneration felling care was taken to take advantage of advance growth and in actual markings silvicultureal requirements of the crop were given preference over the system advocated. Only compartments D7, S1a, S1b of the present PP Division were worked. The felling were totally in the interest of the crop. Artificial regeneration of compartments Ri 24a, 25 was not carried out as per the plan suggestion. They were nominally closed to grazing which resulted in the increased used growth.

(iii) Selection working circle

It comprised of Fir and Kail chiefly the former, pure or mixed, such as were not fit for export of timber but had a considerable local annual demand from the concessionists and other. Due to excessive damage by villagers these compartments were generally poor stocked, the only exception being Nilnag block.

Fellings were prescribed under a light improvement-cum-selection system. Maximum annual yield for each compartment was fixed on the basis of partial enumeration which were confined to Nilnag block. The Nilnag figures were reduced by 75% in applying them to other forests. The actual working was restricted to the grant of trees to concessionists. Sales on standard and commercial rates were practically negligible. The volume limited laid down for each compartment were scrupulously observed.

(iv) The un-regulated working circle

This working circle comprised of such compartments which could not be brought under any regular system of management in the absence of keen demand for Fir in the market, and consequent un-economic exploitation of some of these forests, or on account of their poor stocking, remoteness and high altitudes that rendered silvicultural operations difficult and necessitated their retention as protective belts. No regular felling were prescribed in ill stocked, un-commercial and generally un-accessible compartments. In densely stocked forest areas that were quite fit for exploitation, fellings were to be carried out according to the demand for timber, local or from outside. It was left entirely to DFO and his resources to carry out any operation considered fit after the approval of Chief Conservator of Forests. The treatment prescribed was light selection system. Under these prescriptions markings were done in compartment Ri31, D32 for supply of timber for fruit boxes.

6.2.3 HABIB KHAN'S PLAN (1946-64 AD)

The second revision of the P.P working.plan was prepared by Mr. Habib Khan. The plan was actually to expire in 1955 but got extended till 1964 because its revision prepared by Mr. Sheikh G. Mohammad was not sanctioned. The main features of Mr. Khan's plan was introduction of Indian Selection System in comparison to conversion to uniformity in respect of Fir. The change of system was a change in nomenclature only because the actual intensity of felling remained the same as before. The forests were divided into following three working circles. The composition, management prescribed and results of working in each one of them are briefly described as under:-

(i) Kail Conversion Working Circle

It included all well stocked Deodar and Kail compartments within short distance of the floating streams with the exception of a few minor alternations, the composition of the circle remained the same as in Kail working circle of previous plan. The important prescriptions for this working circle were:-

a) Silvicultural system	Conversion to uniformity
b)Rotation	150 yrs corresponding to an exploitable size of 75 cums dbhob.
c)Periodic blocks	Only conversion and converted blocks were recognized, un-alloted blocks were not differentiated.
d)Area allotted to converted block	1/3 of total area of working circle.
e) Conversion period.	100 years, including 20 years passed since the begning of conversion to uniformity, viz 1924-25
f)Regeneration create	30 years
g) Yield	1. From entire working circle Total fit volume of 45 cum dbhob and above divided by 100 (No of years taken by 30 cm tree to reach 75 cum dbhob) Kail and Deodar 10, 100cum, Fir 7400 cum 2. From a conversion bock, Total fit volume over 60 cum dbhob +1/3 volume of 45-60 cum dia class divided by 80(remaining years of conversion period) Kail (and Deodar) 5700 cum: Fir: 5300 cum 3.The balance yield of No. (1) minus No(2) is the yield from thinning and improvement fellings from converted block.

There was a deliberate attempt on the part of working plan officer to under estimate the yield which fortunately mitigated the socalled "silvicultural availability factor" to a large extent. Thus the prescribed yield looked realistic. At the beginning of the Khan's plan the proportion between the area converted and under conversion was 8345:16774: 1:2.

In view of the slowing down practice applied by Khan it should have been 40:100:2:5 but in actual it was 9:5. The cultural operations prescribed by working Plan Officer were not carried out. In a few compartments of converted block thinning were carried out but artificial stocking of S29a, S33 was not done. The eradication programme of *Arceuthobium minutissimum* was not also carried out.

(ii) ***Fir Selection Working Circle***

It included all the Fir forests which were well stocked and were either near the principal floating streams or close enough to villages. It was divided into two felling series namely timber felling series and fruit box felling series. The former comprised of Forests within a short distance of the main floating streams while the latter comprised of Forests which were not served by any

dependable stream. The important prescriptions for this Working Circle were:-

a) Silvicultural system	Indian Selection System
b)Rotation	180 yrs corresponding to an exploitable size of 75 cums dbhob
c)Felling cycle	30 years
d)Prescribed yield	From timber felling series, Fir:- 55555 cum Kail:- 2415 cum From F.B.F. series Fir:- 19440 cum Kail:- 1100 cum

Though the silvicultural system prescribed was Indian Selection System but in actual practice such marking Rules were laid down which stressed on creating uniform groups rather than selection type forests. For example removal of old trees of 60-75 cums dbhob class occurring among poles (groups) of less than 60 cums dbhob was prescribed. Thus it seems that the change in nomenclature was un-necessary. On one hand it was tendency of working plan officer to recommend marking of trees even below prescribed exploitable dia, but on other hand be slashed down the actual calculated yield and fixed it every low. This fact has defeated the purpose of his otherwise convincing and rational marking rules because tendency of marking Officer/ controlling officer is (though more often a misplaced notion) to remain within the prescribed yield limit to surpass it.

(iii) Un-regulated Working Circle

It included forests both of Kail and Fir that were not fit for systematic working on account of poor stocking or uneconomically long leads. It was divided into two felling series namely: protection F.S. and Miscellaneous F.S. The former included all such Fir and Kail compartments which though densely wooded could not be worked out because of their location in catchment area of principal streams. The latter included all the remaining compartments of Fir and Kail.

No fellings of any type were allowed in the P.F.S. Grazing was also restricted in some compartments of F.S. In M.F.S. markings for concessionists and other minor sales were allowed. The light markings were prescribed in the thinly wooded areas where as markings under rules laid in Fir selection Working

Circle were prescribed in normally stocked patches. This amounted to improvement-cum-selection system. No marking below 45 cm dbhob were prescribed except for improvement. Things were prescribed for Nilnag Forests. The staff coming off from eradication of Army attached trees was to serve as fuel wood for Ch.Shareif. Compartments S29a and S33 were to be closed to grazing and artificially stocked.
In actual practice very little was done in the forests of this working circle.

6.2.4 P.N.PANDITA'S PLAN (1965-76 AD)

The above plan was revised by Mr. P.N.Pandita. The plan was to expire in 1975 but got extended upto 1977 because its revision work was taken up lately. The main features of this working plan were:-

a) **A switch over to metric system.** Enumerations were conducted in 10Cm dia classes against 6" (15Cm) dia classes done earlier. Kulu volume table was also changed from 6" to 10Cm dia-class interval. The volume was calculated in Cubic meters instead of cubic feet.

b) **Total enumerations** were conducted in Deodar-Kail conversion Working Circle and Fir selection Working Circle in 10Cm dia-classes.

c) **Kail conversion Working Circle** of previous working plan was unnecessarily renamed as Deodar-Kail conversion Working Circle in view of very small proportion of Deodar to Kail.

d) **An overlapping (Timber sale Depot) felling series** was created in Fir Working Circle which was technically incorrect.

The Forests of the division were divided into four Working Circles. The composition, management prescribed and result of working in each of them are briefly described as under:-

(i) Deodar -Kail Conversion Working Circle

Its constitution was identical to that Kail Conversion working Circle of previous plan. The important prescriptions for the working circles were:-

Silviculture system	Conversion to uniformity (shelter wood compartment system)
Rotation	120 years corresponding to exploitable dia meter of 70 cms dbhob.
Conversion period	100 years from the beginning of first plan (1925)
Periodic blocks	Floating PB system comprising of regeneration block and un-allotted block. Regeneration block further divided into conversion block and converted block.
Annual yield prescribed	(a) For entire working circle Kail (and Deodar) : 9300 cum; Fir 5850 cums. (b) For conversion block;Kail (and Deodar):6700 cums;Fir :3600 cum.

In calculation of yield, silviculture availability factors i.e. 80% of G. stock of 70 cm dbhob, 50% of 50-70 cm dia class based on experience of marking of working plan officer were used. Increment was ignored and equated against mortality.

In conversion block a possible annual coupe of 116 ha (1392) for 12 years only two compartments (RB 19b and Rb 26b) of 369.6 ha have been worked out. At the end of plan the proportion of converted to unconverted (Conversion + unalloted) area was 6615.6 ha: 5032.3 ha (= 334.8+ 1686.5) in terms of commercial area while it works out to 6074.9 ha : 4332.4 ha (=2783.1+ 1549.3) in terms of net blocked commercial area. This gives a proportion of 52: 39 against a desired proportion of 52:48 corresponding to conversion period of 100 years in which 52 years have already passed from 1925). This shows that proportion of converted to under conversion was still more though the pace of conversion was reduced considerably.

In case of converted block various compartments like Ri 32, D2, D14b, D19b were marked for final fellings cum thinning. In this block also less commercial area were worked out as compared to prescriptions, thus the pace was slowed down. A third category of conservation areas were those that had not been regenerated in spite of first xxx fellings and no efforts were made to regenerate them artificially otherwise.

(ii) Fir selection Working Circle

With minor addition and alteration the constitution of this Working Circle was similar to that of previous working plan. The important prescriptions for the working circles were:-

Silvicultural system	Indian selection system
Exploitable size	70cm dbhob
Rotation	180 years
Felling cycle	30 years
Felling series	6 felling series, Five based on drainage (Veshu FS, Rambiara FS, Romshi RS, Dudganga FS, Sukhnag, FS) and one overlapping Timber sale depot felling series.
Calculation of Yield	By Brandis method
Prescribed yield	Yield was prescribed felling series wise as under:-
Veshu F.S:Fir:15200 cum: Kail and Deodar:1300 cumm	
Rambiara FS:Fir:22600 cum:Kail & Deodar:2350 cum	
Romshi FS Fir:23500 cum: Kail&Deodar:1400 cum	
Dudganga FS Fir:20000 cum: Kail & Deodar:1400 cum	
Sukhnag FS Fir:129002 cum: Kail & Deodar:600 cum	

The total yield was:-

Fir : 94200cum

Kail& Deodar:7050 cum.

The proportion of yield realized to yield prescribed works, 67.8% and 42.0% and 33.3% for, Romshi, Dodhgagna and Sukhnag felling series in terms of standing volume marked. The above comparison of prescribed yield and the yield realized shows that there has been under-realization of yield. The distribution of work in various felling series has been uneven: the highest concentration of work in Romshi and lowest in Sukhnag.

The constitution of overlapping (T. Sale depot) F.S. was technically incorrect.

(iii) Rehabilitation Working Circle

It included all such areas which had been degraded due to excessive working or other biotic influences. These Forests were to be rehabilitated by closure and sowing/ planting. With minor alterations it was identical with the Miscellaneous felling series of unregulated Working Circle of previous plan.

Prescriptions were made for rehabilitation of some of the compartments like Ri-23c, N1a, N2b, and D33d while complete rest was prescribed for the other compartments.

Only compartments N1a, N2b and D33 having an area of 455.2 ha were closed against the prescribed area of 96 B ha set for closure-cum-planting/ sowing. No rehabilitation work was done in these areas; even the closure was not effective. Light selection-cum-improvement markings were allowed

in some compartments (like S20, S24,) to meet the demands of concessionist only.

(iv) Protection Working Circle

It comprised of all such Fir and Kail Forests which though densely wooded could not be worked out because of their location in catchment areas of main streams. This Working Circle was similar to that protection felling series of unregulated Working Circle of previous plan, only complete rest was prescribed for these areas. No other prescription was made for the improvement of these areas.

6.2.5 B.L. TICKU'S PLAN (1977-87 A.D.)

The above plan was revised by Mr. B.L.Ticku. The plan was to expire in March 1987 but got extended upto 1989 because its revision work was taken up as late as in October 1987. The main features of this plan were:-

A) The old method of evaluating growing stock by enumeration was given up. The new scientific, economical and more precise method of point sampling was used for evaluation of growing stock.
B) Instead of Kulu volume Table, regional volume table was applied.
C) Age/ diameter tables, diameter/ stump girth co-relation No. of trees per ha/crop diameter correlation and height/ diameter tables for Deodar, Kail and Fir were included in the working plan, the tables showing total stocking and mean annual increment per ha of above three species were also included in the plan.
D) Deodar-Kail conversion Working Circle of previous plan was renamed as Kail conversion Working Circle in view of negligible proportion of Deodar to Kail.
E) The exploitable diameter of Fir (in Fir selection Working Circle) was reduced from 70 Cms dbhob to 60 cm dbhob.
F) The working plan officer had also given some broad outlines for pasture land development besides some statements showing alpine/ sub-alpine behaks and the grasses growing with altitudinal zonation. The Forests were divided into four Working Circles. The composition management prescribed and results of working in each of them are described under:-

(i) Kail Conversion Working Circle

It included all easily accessible and stocked Deodar-Kail Forests which were fit to be worked under concentrated form of working. Some Fir forming an intimate mixture with Kail-Deodar or in small separate patches was also included. This Working Circle was identical to D.K. conversion Working Circle of previous plan. The importation prescriptions in this working circle were:-

a) Silviculture system	Conversion to uniformity (shelter wood compartment system)
Rotation	120 years corresponding to exploitable dia meter of 70 cms dbhob.
Conversion period	100 years form the beginning of first plan (1995)
Periodic blocks	Floating PB system comprising of regeneration block and un-allotted block. Regeneration block further divided into conversion block and converted block.
Annual yield prescribed	For entire working circle Kail(and Deodar) : 9300 cum; Fir 5850 cums. For conversion block;Kail (and Deodar):6700 cums ;Fir :3600 cum.

While prescribing yield the so-called factor of availability was imposed as a rider due to failure of regenerating the already felled areas which bare no advance growth. It was fixed at 50% both for Kail and Fir.

In calculation of yield, the increment was equated against mortality including losses such as illicit damage, lopping etc, besides those due to natural causes.

Results:-

In conversion block compartment, N6 was marked and completely worked out during the plan period. None of the prescriptions were carried out in unalloted block. Compartments D20, D34 of converted block have been taken up for treatment by Soil Conservation Range of the division. They have been partly closed and planted besides some soil conservation works being conducted by in them. Compartments Ri24b have been partly fenced and planted by Directorate of Social Forestry. The closures of these compartments are not effective. Still most of the areas of converted block are deficient/devoid of regeneration. Some Deodar poles have been removed from compartment S30 of conversed block. The overall results of conversion under this working circle are not satisfactory because regeneration has not kept, pace with the fellings. The reasons for the mishap are that neither these areas were properly protected against biotic

influences nor any serious effort was made in the past to regenerate these areas artificially.

(ii) Fir Selection Working Circle

It included all well stocked, productive and workable Fir Forests. Some Kail forming an intimate mixture with Fir or in small separate patches was also included. Barring a small few addition (viz Cos. 16D and 17D), this Working Circle was identical to Fir selection Working Circle of previous plan. The important prescriptions for the working circle were:-

Silvicultureal system	Indian selection system
Exploitable size	60cm dbhob for both Fir & Kail 70 cms dbhob for Fir was retained in such forests which were situated on steep steeps, or where regeneration use high proportion of mature over mature trees.
Rotation	Fir=165 years, Kail=120 years
Felling cycle	33 years
Felling series	Five felling series as per drainage of main streams like veshu, Rambiara, Romshi, Dudhganga, Sukhnag.
Calculation of Yield	By Brandis method
Annual yield Prescribed	Yield was prescribed felling series wise as under:-
Veshu F.S:Fir:16700 cum: Kail:1200 cumm	
Rambiara FS:Fir:2100 cum:Kail:5700 cum	
Romshi FS Fir:27000 cum: Kail:3500 cum	
Dudganga FS Fir:22000 cum: Kail:900 cum	
Sukhnag FS Fir:18000cum: Kail:1500 cum	

Results:-

During the plan period the compartments Ri27, Ri 28, N4, N5, D7, D15, D20b, D21, D22, D25, D26, D28, D29, D30, S12, S15, S16 and S23 were marked. Out of above working in most of the compartments have already been completed while it is in progress in the rest of the compartments.

The prescriptions for disposal of debris, regeneration programme and control of grazing were not given any attention. The compartments Ri 31, S1a, S22, S23 and S27 have been partly closed by Directorate of Social Forestry and planted up. The closure are in a bad condition due to human interference.

(iii) Reboisement Working Circle

It included areas which had either failed to regenerate in view of drastic treatment in the past or had degraded due to heavy biotic interference in the past. Its constitution was identical to rehabilitation Working Circle of previous plan. The important prescriptions were as under:

These compartments were prescribed complete rest and recuperation through strictest possible protection from biotic interference most important being lopping, illicit damage and grazing. Reforestation of these areas in next 40 years was also prescribed. No yield was prescribed from this Working Circle. However to meet important demands of concessionists only dead, dry, dying and diseased (insect attack etc) trees were, to be marked. No healthy tree was prescribed for marking.

Results:-

Only compartments N1a was taken for treatment by Soil conservation Range of the division. The compartment was separated into different closures. The soil Conservation was works like DRSM works, sowing and planting was done in these closures. However, their condition at present is not satisfactory due to un-effective closure. Compartment Ri23 have been partly closed by Directorate of Social Forestry. H. C. nut have been sown and planted in the compartment by the said organization. The closure does not seem to be effective.

(iv) Protection working circle

It comprised of forests situated at very high altitudes. These either included or were boarding high level alpine pasture lands. The equality and quantity of these forests was very poor. These were un-commercial to exploit due to their situation on too steep or perceptions and rocky terrain. It also included sub- alpine blue pine forests of low productivity. These forests were to be retained for the purpose of soil and water conservation.

No treatment except rest was prescribed for these forests. No fellings of any nature were prescribed. Due to vast majority of Alpine/Sub-alpine pasture lands lying in this working circle, separate method of treatment was prescribed for them. It included introduction of rotational / regulated grazing, Castration of scrub cattle, application of chemical fertilizers etc. In the entire working circle none of the prescriptions have been implemented.

6.2.6 HAFIZULLAH SIDDIQUI'S PLAN (1988 – 1997)

The above plan was revised by Mr. Hafizullah Siddiqi. The plan was to expire in March 1997 but got extended upto 2013 because its revision work was taken up as late as in 2011-12. The main features of this plan were:-

A) For the assessment of growing stock, Point sampling technique was used.
B) Kulu volume Table was used in the plan for the assessment of the volume of the growing stock.
C) The working circles were constituted were Fir selection working circle, Aesthetic Working circle, Reboisement Working circle and Protection working circle.
D) The Kail Conversion Working Circle as prescribed in Tickoo's plan was done away with in view of negligible proportion of Kail.
E) The exploitable diameter of Fir (in Fir selection Working Circle) was increased from 60 to 80cms dbhob and for Kail from 60 cm to 70cm dbh(ob)
F) Only one felling series was constituted where in entire Fir selection working circle was designated as one felling series.

(ii) Fir Selection Working Circle

It included all well stocked, productive and workable Fir Forests. Some Kail forming an intimate mixture with Fir or in small separate patches was also included. Barring a small few addition (viz Cos. 16D and 17D), this Working Circle was identical to Fir selection Working Circle of previous plan. The important prescriptions for the working circle were:-

Silvicultural system	Indian selection system
Exploitable size	80cm dbhob for Fir 70cms dbh(ob) for Kail
Rotation	240 years for fir 145 years for Kail
Felling cycle	40 years
Felling series	One felling series (whole working circle as one felling series)
Calculation of Yield	By Brandis method
Annual yield Prescribed	Yield was prescribed as under:-
Kail= 2000cum , Fir= 28000cum	

Results:-

The markings could not be conducted and fellings executed as per the plan due to the eruption of militancy in Kashmir. Also in the year 1996, the Hon'ble Supreme Court of India imposed blanked ban on green fellings throughout the India in the writ petition titled Godavarman vs Union of India. Only dead, dying, diseased and fallen trees were extracted from the compartments during these years in conformity with the Qualitative and Quantitative norms fixed by the Expert Committee.

These forests encountered huge damages at the hands of people living in the vicinity of forests. Also the forests nearer to habitations were either encroached or subjected to clear fellings.

(ii) Aesthetic Working Circle:

It included the forests at and around the tourist spots like Yousmarg, Gulmarg and also those forests enroute to Gulmarg via Tangmarg. The important prescriptions for this working circle were:-

Silvicultural system	No particular silvicultural system prescribed. The compartments were prescribed complete rest to preserve the existing crop. Some prescriptions were prescribed for providing recreational facilities for tourists.
Growing Stock	No. of trees= 1117920 Vol. in cum= 1947677

The main objective of the management was to maintain and preserve the sylvan beauty of Yusmarg and Gulmarg-Tangmarg areas because all these places were a leading source of tourist attraction and public recreation in the valley.

Results:

No commercial fellings were prescribed in this working circle, however the dead and fallen trees were marked for extraction under Q & Q norms. The areas notified as wildlife protected areas were kept untouched. No fellings whatsoever were carried out in such compartments due to ban imposed by the Supreme court. A good number of closures were established in this working circle which are doing satisfactory. The Gulmarg-Tangmarg areas have been segregated out of PP division and carved into a new division called as Tangmarg Special forest division.

(iii) Reboisement Working Circle

It included all those forest areas which were poorly stocked and were not fit for regular working. This working circle was constituted by merging Kail conservation working circle/Deodar-Kail conservation working circle and Reboisement working circle/ Improvement working circle of the plans under review. The important prescriptions were as under:-

The area of the working circle was divided into two types for the purpose of treatment viz Type 'A' Area & Type 'B' Area.

(i) Type 'A' Areas

These areas were much poorly stocked. The total area calculated was equal to 3061.85 ha. This area was prescribed to be rehabilitated/ regenerated in 30 years at an average rate of 103 ha/year.

(ii) Type 'B' Areas

These areas were comparatively good stocked. The total area calculated was equal to 4350.25 ha. All this area was proposed to be regenerated in 30 years.

Silvicultural system	No particular silvicultural system was prescribed. The compartments were prescribed complete rest and rehabilitation through protection from biotic interference (illicit damage, lopping, grazing etc).
Yield	No yield was prescribed. However to meet important demands of concessionists only dead, dry and diseased trees were prescribed to be marked. No healthy tree was prescribed for marking.
Growing Stock	No. of trees= 1293721 Vol. in cum= 1815739

Results:

The rehabilitation work was almost done in most of the compartments prescribed. Many closures were established in such compartments under various schemes. The planting of conifers and broad leaved, patch sowing, dibbling and soil cosevation work like DRSM were done in these closures. The condition of these closures is satisfactory at present. However many compartments like N-1a, N-2a, D-33c, D-34b, D-33d, D-20c, S-13 and S-18 could not be completely treated due encroachment existing on the ground.

(iv) Protection working circle

It included poorly stocked and open forest areas occurring on high steep and precipitous slopes. These were the forests generally inaccessible high level fir forests especially situated at the source of main streams and nallas. Vast alpine pastures were also included in this working circle. The areas included in this working circle were very much prone to avalanches.

These forests were to be retained for the purpose of soil and water conservation. No treatment except rest was prescribed for these forests. No fellings of any nature were prescribed. Due to vast majority of Alpine/Sub-alpine pasture lands lying in this working circle, separate method of treatment was prescribed for them. It included introduction of rotational / regulated grazing, Castration of scrub cattle, application of chemical fertilizers etc. A few compartments of this working circle (50-58) of Gulmarg range were notified as protected area under Gulmarg Game Sanctuary for which separate management plan was prepared by Department of Wildlife. In the entire working circle none of the prescription have been implemented.

6.3 SPECIAL WORKS OF IMPROVEMENT

During the period under revision, many infrastructure works were carried out in Pirpanjal Forest Division. The division has established nurseries in all ranges. The demarcation works were carried out in encroachment prone areas. Some small length roads were also constructed. The details of special works of improvement carried out in PP Division are given below:-

6.3.1 BUILDINGS

The DFO office which was located in Sheikhbag Srinagar was shifted to Budgam in the year 1995-96. The shifting of office was raised in Board meeting where then DC Budgam Sh. S.k. Nayak pleaded for its transfer. Mr. Mian Javed was then DFO Budgam. The DFO office was established in DC office in two rooms upstairs. The foundation stone for present DFO office building in Budgam was laid in the year 1997-1998 and completed in 1999. The Range office buildings for Dudhganga located in Chadoora and Raithan located in Raithan were existing previously. The Range office building for Sukhnag was operational from North Jhelum Project building handed over to department. The new building was constructed during the year 2012-13 and

inaugurated on 30.10.2013. The Range office building for newly established Budgam Range was constructed in Budgam during the year 2012-2013. The DFO residence at Observation Post was reconstructed and made functional during 2012-13. One grand inspection hut at Dudhpathri has also come up during the year 2013-14. There is a need to construct Block huts and Guard huts for providing of logistical staff to frontline staff. The list of buildings existing in PP division is provided in Annexure.

6.3.2 ROADS

The forest department does not construct major roads now. There is wide road network existing in the district. Many roads have been constructed through the forest to connect the forest fringe habitations under the scheme PMGSY. The forest land is being diverted for such use to user agency under the provisions of J & K Forest Conservation Act. Such metalled roads have provided boon to forest department in extraction and dispatch of forest produce. The department constructs mainly approach roads and Kacha roads. The approach roads are constructed for connecting the Nurseries, Rest houses etc to main roads. The Kacha roads are constructed inside forests for transportation of timber from KLP to PLP. The road length maintained by PP Forest Division is provided in table below

6.3.3 NURSERIES

There are many nurseries existing in the Division. In all Ranges, one nursery exists at least as of now. The Sheikul-Alam Forest Nursery, Kanidhagan is by far the best nursery in the division. The nursery is gradually going hitect in production and in coming times will be the best nursery in the state in terms of high quality plant production. The other nurseries should be improved and their plant potential enhanced by using hi-tech methods of nursery operations. A list of nurseries existing in the division along with plant availability is given below in the table.

Table 37: List of nurseries existing in PP Forest Division

Range	Name of Nursery	Gross Area	Net Area	Plant availability *(ending March-2104* (Unit in lac no.ôs)						Total (in lac no.s)
				Conifer				B/Leaved		
				0 year	1st year	2nd year	3rd year	0 year	1st year	
Doodganga	Sheikh-ul-Alum Forest Nursery	6.00	3.00	0.87	3.90	0	0	1.00	1.33	7.10
Soil	Sarband Forest Nursery yusmarg	1.50	1.40	0.50	1.00	0	0	1.00	0	2.50
Raithan	Raithan Forest Nursery	0.05	0.02	0.50	0.50	0	0	0	0	1.00
	Raiyar Forest Nursery	0.05	0.02	0	0.63	0	0	0	0	0.63
Sukhnag	H.P. Forest Nursery	0.75	0.50	0	1.19	0	0	0	0	1.19
	Total	8.35	4.94	1.87	7.22	0	0	2.00	1.13	12.22

6.3.4 FOREST BOUNDARIES

The demarcation of Dudhpathri area and Kanidhagan block has been recently conducted by Demarcation Division Srinagar. No significant achievements have been made at this front. The general condition of boundary pillars demarcating these forests is not satisfactory. The department is at present trying to consolidate the demarcation records of each division. The department has also intention of digitizing the demarcation records. The introduction of modern tools in demarcation will certainly help in better profiling of forest boundaries. The forest area of PirPanjal Forest Division is 480.10 Sq. Kms consisting of 2715 no. of B.P's running over a 411.91kms of mainline as recorded in Form-1 of the division.

Table 38: List showing no. of B.P's & Boundary line range-wise

Range	No. of Pillars	Boundary line(in Km)
Doodganga	1664	169.6181
Raithan	549	104.9144
Sukhnag	502	137.3807
Total	2715	411.9132

6.3.5 VILLAGE FOREST COMMITTES

The PP Division has constituted as many as 33 Village Forest Committees. The said committees actively participate in forest protection especially in operations against timber smuggling, control of forest fires, eviction of encroachment, protection of plantation units etc.

Table 39: List showing no. of registered VFC's range-wise

Range	No. VFC committees
Doodganga	19
Raithan	11
Sukhnag	3
Total	33

6.4 PAST REVENUE AND EXPENDITURE

The following statement gives the revenue and expenditure figures for the Pirpanjal Forest Division from the year 1990 onwards upto ending March 2013.

Table 40: Revenue & Expenditure statement of PP Forest Division

S.No.	Year	Revenue	Expenditure	Deficit
1	1998-99	4452140	29736180	25284040
2	1999-00	14705105	34431000	19725895
3	2000-01	15088074	40165000	25076926
4	2001-02	15004010	36132429	21128419
5	2002-03	*Not Available*	*Not Available*	
6	2003-04	*Not Available*	*Not Available*	
7	2004-05	18145493	50881249	32735756
8	2005-06	25047959	61449000	36401041
9	2006-07	*Not Available*	57038000	
10	2007-08	6877250	60470299	53593049
11	2008-09	7508324	55411000	47902676

12	2009-10	25227931	78757000	53529069
13	2010-11	23626025	67131000	43504975
14	2011-12	25577086	*Not Available*	
15	2012-13	34055300	92811017	58755717
16	2013-14	34572262	97791585	63219323

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CHAPTER-VII
STATISTICS OF GROWTH AND YIELD

7. GROWING STOCK ASSESSMENT

7.1.1 For the assessment of growing stock "Point Sampling" technique was used. This technique evolved by Dr. Walter Bitterlich in 1948 AD is simple to apply in the field. It is especially suited to hilly terrain. This technique has been tried earlier in the state on many occasions and has been found to be fairly precise.

7.1.2 The point sampling methods is preferred to the method of total/partial enumeration in view of the following main advantages.

1. Accuracy
2. Precision
3. Least time and expenditure
4. Elimination of bias or human error

7.1.3 As the inventory of sampling is proportional to the heterogeneity of the crop to be measured, the population is constituted into more or less homogenous groups called "Strata". In the instant case, the stratification of the forest was done on the basis of condition, composition and silvicultural requirements of the crop. Three basic strata were thus identified viz;

(i) Commercial Fir Stratum
(ii) Non commercial Rehabilitation Stratum
(iii) Non commercial Alpine Protection Stratum

7.1.4 The sampling unit is a random sample point. The points are selected by fixing the co-ordinates using pairs of random numbers taken from table of random numbers on sample frame. Given the location of point on the sample frame, the same is then transferred to base map, and the relevant GT sheet of the area. The point is tracked using GPS.

7.1.5 The grids on toposheet are laid down by placing graph paper on topsheet depicting whole forest division. The boundaries of forest division are traced on the given graph sheet. The sub grids on a toposheet are read by a four digit code with reference to their divisions along X (Long) and Y (Lat) axis in the following manner. The south western corner of each toposheet are numbered as point 0000. The first two digits stood for division number along X(Long) axis i.e. horizontal axis while second two digits stood for division number along Y(Lat) axis i.e. vertical axis thus making 144 sub grids of 1.25' x

1.25’ on every toposheet of 1:50,000. The illustration of laying grids on the toposheet is shown as under:-

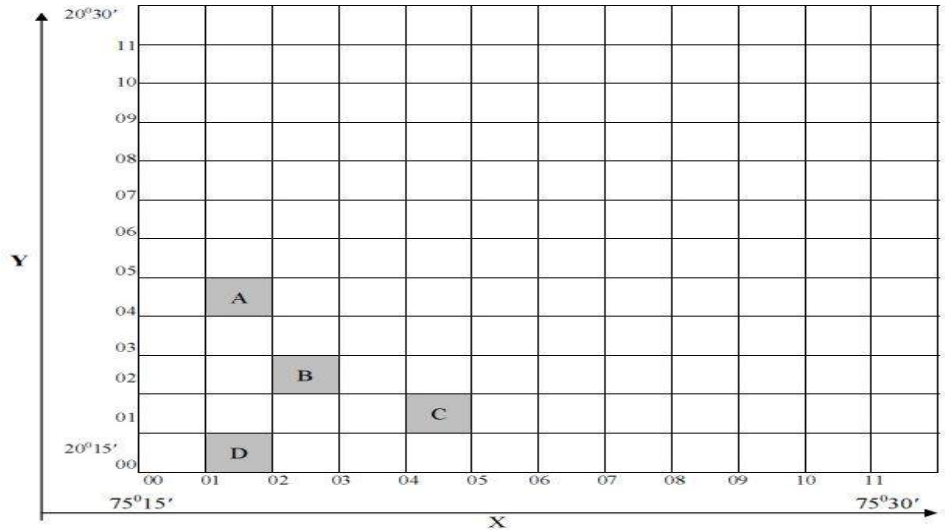

Fig 7: illustration of Grid design and selection of random sample points for point sampling

The sub grids as shown above and marked as A, B, C and D in it are being read as 0104, 0202, 0401 and 0100 respectively. The numbers are selected using random number table.

Fig 8: Layout of grids for Point Sampling on topographic sheet of 1:50,000 scale being laid by Cartographer Mr. Gh. Hassan Nakeeb in PP Forest Division.

7.1.6 Once the points are located on the map and GT map of the area, the next step is to objectively locate these points using GPS. After locating the point, the point sampling exercise is conducted of each point using wedge prism of suitable basal area factor.

7.1.7 At each point, stems are viewed through a fixed angle wedge prism and a complete sweep of 360^0 is taken. The trees having the displacement smaller than the diameter at breast height (OB) of the trees are tallied. The full tally trees are counted as one. While the half tallies trees are counted as half. The DBH (OB) and the height are recorded as basic data for assessment of the growing stock.

Tally Tree

Half-Tally Tree

Non-Tally Tree

Fig 9:- Pictorial illustration of tally & half tally trees viewed through wedge prism

7.1.8 To determine the number of points to be taken up for each stratum for desired accuracy, a pilot survey is conducted. The sample size required for an optimum survey is computed at the predetermined precision of 10% at 95% probability. Thus all the estimates are ±10% with 95% probability. The following formula is used to work out the number of sample points to be studied.

$N= (CV^2 x t^2)/p^2$
Where N=No. of sample points to be surveyed
CV=Co-efficient of variation
P=Precision (10%)
T= Students t (1.96 at 95%)

The number of points (n) to be taken up for each stratum is calculated according to the proportion of the stratum size.

n=N* (Area of the stratum/total area)

The standard formulae are used to determine the Basal area/ha, number of trees/ha and Volume/ha.

7.1.9 The data collected in the point sampling survey is processed through computer by using Microsoft Excel for each strata separately. In the present working plan, the following variables were computed to generate the estimate of growing stock.

a. No. of trees/ha.
b. Volume/ha.

7.1.10 The volume of tallied trees have been obtained corresponding to the diameter from the local volume table. In this case Kullu volume tables were used for computing the volumes. The computed results arrived at were subjected to various statistical checks to acquire accuracy of values. The results of the statistical analysis are tabulated as under:-

(i) Commercially Exploitable Stratum

Table 41: Results of Statistical analysis for Fir Selection Working Circle

Variable (per ha.)	Sample Points	Mean	Variance	Standard Deviation	Standard Error	Coefficient of variation	Confidence limits (95%) (X ± t x S.E.)		Confidence Interval	Lower limit as % of mean
	(n)	(X)	(S^2)	(S)	(S.E.)	(%)	Lower limit	Upper limit	(C.I.)	(%)
2	3	4	5	6	7	8	9	10	11	12
							t=	1.978		
No. of Stems	132	135.96	7947.90	89.15	7.76	65.57	120.61	151.31	30.70	89%
Volume	132	339.14	42745.00	206.75	18.00	60.96	303.54	374.74	71.20	90%

(iii) Commercially non-exploitable Stratum

Table 42: Statistical analysis of Bio-Aesthetic Working Circle

Variable (per ha.)	Sample Points	Mean	Variance	Standard Deviation	Standard Error	Coefficient of variation	Confidence limits (95%) (X ± t x S.E.)		Confidence Interval	Lower limit as % of mean
	(n)	(X)	(S^2)	(S)	(S.E.)	(%)	Lower limit	Upper limit	(C.I.)	(%)
2	3	4	5	6	7	8	9	10	11	12
							t=	2.03		
No. of Stems	35	186.06	11483.00	107.16	18.11	57.59	149.25	222.87	73.62	80%
Volume	35	349.79	25573.70	159.92	27.03	45.72	294.86	404.72	109.87	84%

Table 43: Statistical analysis of Rehabilitation Working circle

Variable (per ha.)	Sample Points	Mean	Variance	Standard Deviation	Standard Error	Coefficient of variation	Confidence limits (95%) (X ± t x S.E.)		Conf. Interval	Lower limit as % of mean
	(n)	(X)	(S^2)	(S)	(S.E.)	(%)	Lower limit	Upper limit	(C.I.)	(%)
2	3	4	5	6	7	8	9	10	11	12
							t=	1.99		
No. of Stems	75	108.40	16123.00	126.98	14.66	117.14	79.19	137.61	58.43	73%
Volume	75	135.83	22855.60	151.18	17.46	111.30	101.05	170.61	69.57	74%

Table 44: Statistical analysis of Eco-Conservation Working Circle

Variable (per ha.)	Sample Points	Mean	Variance	Standard Deviation	Standard Error	Coefficient of variation	Confidence limits (95%) (X ± t x S.E.)		Confidence Interval	Lower limit as % of mean
	(n)	(X)	(S^2)	(S)	(S.E.)	(%)	Lower limit	Upper limit	(C.I.)	(%)
2	3	4	5	6	7	8	9	10	11	12
							t=	2.00		
No. of Stems	51	142.37	22437.00	149.79	20.97	105.21	100.24	184.50	84.26	70%
Volume	51	300.74	35930.00	189.55	26.54	63.03	247.43	354.05	106.62	82%

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

7.2 VOLUME TABLE

7.2.1 Since the inception of scientific forestry in the state, Kulu volume tables have been adhered to in all the forestry operations. The same has been applied for assessment of volume of growing stock in this working plan also.

Table 44: Kulu Volume Table

Dia classes		Deodar		Kail		Fir	
cms	inches	cum	cft	cum	cft	cum	cft
10-20	04-08	0.14		0.14		0.14	
20-30	08-12	0.27		0.28		0.23	
30-40	12-16	0.76	27	0.76	27	0.84	30
40-50	16-20	1.33	47	1.36	48	1.56	55
50-60	20-24	2.10	74	2.27	80	2.97	105
60-70	24-28	3.14	111	3.34	118	4.90	173
70-80	28-32	4.39	155	4.42	156	6.85	242
80-90	32-26	5.66	200	5.35	189	8.30	293
90-100	36-40	6.85	242	5.14	217	9.40	332
>100	>40	7.56	267	6.74	238	10.19	360

7.2.2 Sh. Hafizullah Siddique in the previous working plan prepared a local volume table for Pirpanjal division. He prepared the same after conducting stem

analysis in the field as per instructions laid down in research code Vol.III. The said local volume table is reproduced here as under.

Table 45: Local Volume Table (Volume in cubic meters)

Diameter class (cm)	Deodar	Kail	Fir
20-30	0.44	0.40	0.53
30-40	0.65	0.82	1.06
40-50	1.50	1.51	1.80
50-60	2.10	2.20	2.75
60-70	3.03	3.00	3.90
70-80	4.05	3.47	4.60
80-90	6.02	5.10	6.30
90-100	8.75	7.30	8.10
>100	9.80	9.70	10.10

7.3 GROWTH TABLES AND INCREMENT TABLES

Sh. Hafizullah Siddique in the previous working plan prepared growth and increment tables using age/diameter and age/volume relationship of species. The said tables are reproduced here as under. In the present working plan, no such attempt was made.

Table 46: Growth and Increment table for Deodar

Age/Year	DBH(OB)	Volume (cum)	M.A.I (cum)	CAI (cum)
20	4.0	0.0115	0.0005	-
30	14.5	0.1160	0.00038	0.1045
40	21.0	0.3435	0.0085	0.0225
50	31.0	0.6575	0.0131	0.0314
60	38.0	1.0140	0.0169	0.0356
70	41.9	1.3769	0.0196	0.0362
80	48.0	1.7369	0.0217	0.0348
90	54.7	2.0845	0.0231	0.0324
100	58.25	2.4085	0.0240	0.0308
110	61.0	2.7150	0.0246	0.0306
120	64.0	2.9433	0.0245	0.0228
130	66.75	3.1703	0.0243	0.0227
140	69.25	3.3963	0.0242	0.0226
150	72.00	3.6213	0.0241	0.0225
160	73.75	3.8453	0.0240	0.0224
170	75.25	4.0683	0.0239	0.0223
180	76.50	4.2903	0.0238	0.0222
190	78.0	4.5113	0.0237	0.0221
200	79.3	4.7313	0.0236	0.0220
210	80.1	4.9503	0.0235	0.0219

Table 47: Growth and Increment table for Kail

Age/Year	DBH(OB)	Volume (cum)	M.A.I (cum)	CAI (cum)
20	2.2	0.03	0.0015	-
30	5.4	0.07	0.0023	0.004

40	9.6	0.12	0.0030	0.005
50	16.0	0.22	0.0044	0.010
60	22.4	0.33	0.0055	0.011
70	29.2	0.55	0.0078	0.022
80	35.8	0.84	0.0105	0.029
90	42.0	1.34	0.0148	0.050
100	48.6	1.75	0.0175	0.041
110	54.4	2.15	0.0195	0.040
120	58.4	2.55	0.0212	0.040
130	64.2	2.94	0.0226	0.039
140	68.9	3.15	0.0225	0.021
150	73.2	3.35	0.0223	0.020
160	77.2	3.55	0.0221	0.020
170	81.0	3.73	0.0219	0.018

Table 48: Growth and Increment table for Fir

Age/Year	DBH(OB)	Volume (cum)	M.A.I (cum)	CAI (cum)
30	4.4	0.0157	0.0005	-
40	10.5	0.0845	0.0021	0.0068
50	18.5	0.2700	0.0054	0.0185
60	25.8	0.5470	0.0091	0.0277
70	32.2	0.8680	0.0124	0.0321
80	37.7	1.2135	0.0151	0.0345
90	42.3	1.5642	0.0173	0.0350
100	46.5	1.9010	0.0190	0.0336
110	50.0	2.2162	0.0201	0.0315
120	53.2	2.5266	0.0210	0.0310
130	55.7	2.8045	0.0215	0.0281
140	58.5	3.0650	0.0218	0.0260
150	60.5	3.3145	0.0220	0.0249
160	62.5	3.5600	0.0221	0.0235
170	64.2	3.7570	0.0221	0.0207
180	65.8	3.9574	0.0219	0.0200
190	67.4	4.1500	0.0218	0.0192
200	71.0	4.3221	0.0216	0.0172
210	73.2	4.4940	0.0214	0.0171
220	76.2	4.6640	0.0212	0.0170
230	78.4	4.8300	0.0210	0.0166
240	80.20	4.9920	0.0208	0.0162

It is clear from the tables given above that M.A.I in case of Kail, deodar and fir culminates at an age of 130 years, 110 years and 160 years corresponding to diameter breast height (O.B.) of 64.2cms, 61.0cms and 62.5cms respectively. The C.A.I in case of Kail, deodar and fir culminate at an age of 90 years, 70 years and 90 years corresponding to diameter at breast height (O.B.) of 42.0cms, 41.9cms and 42.3cms respectively.

Table 49: Growth statistics of Robinia pseudoacacia for Kashmir & Chenab valleys for good & poor sites

Age (years)	Good Sites		Poor Sites	
	Height (m)	Diameter (cm)	Height (m)	Diameter (cm)
5	9.3	16.5	2.8	6.3
10	11.9	31.0	3.7	9.0
15	14.4	44.3	5.2	11.3
20	17.3	54.8	7.1	16.3
25	18.6	63.0	8.2	23.8
30	20.7	68.3	-	-
35	21.2	72.0	-	-
40	21.4	73.8	-	-
45	21.6	75.0	-	-

Source: Muthoo,M.K. & Kango, G.H. (1965). Robinia pseudoacacia linn. in India with special reference to Jammu & Kashmir. Indian Forestor 91(2).

Table 50: Yield table-Ningli Willow plantation (Site Quality I)

Age (Years)	Crop dia (cm)	Crop ht. (m)	Total Yield (m^3)	Charcaol Yield (Qtls/ha)	Stems per ha (No.)
-	-	-	-	-	2500
2	1.7	2.5	-	-	1790
4	7.3	8.7	7	17.3	1274
6	11.8	13.1	48	20.6	1137
8	15.0	16.2	122	23.9	1074
10	17.3	18.3	210	27.2	1039
12	19.1	19.8	260	30.5	1015
14	20.5	21.0	300	33.8	998
16	21.4	21.9	337	37.1	987

Source: An extract from the Yield Table prepared for Nigli (Kashmir) Willow plantation by Ticku.

Table 51: Height and Diameter Growth of Populus ciliata

Age (Years)	D.B.H (cm)	Height (m)	Age (Years)	D.B.H(cm)	Height (m)
4	2.8	4.15	18	25.6	17.80
6	6.3	6.60	20	28.0	18.80
8	10.4	9.48	22	30.3	19.60
10	13.8	12.05	24	32.6	20.40
12	17.0	13.61	26	35.0	21.00
14	19.9	15.42	28	37.1	21.50
16	22.8	16.84	30	39.4	22.00

Source: Tewari, Silviculture of Indian Trees

Table 52: Rotation Age & MAI/ha of Populus deltoids

Quality Class	Maximum MAI/ha (m^3)	Rotation age (years)
I	49.681	8
II	30.567	8
III	15.593	10

Source: Tewari, Silviculture of Indian Trees

Table 53: Local Volume Table of Poplar

Girth class		Volume in Cfts
In Inches	In Cms	
0-12	0-30	0.5
12-24	30-60	2.5
24-36	60-90	8
36-48	90-120	16
48-60	120-150	25
60-72	150-180	40
72-84	180-210	55
84-96	210-240	70
96-108	240-270	100
108-120	270-300	120
120-132	300-330	150
132-144	330-360	180

Source: Social Forestry Division- Srinagar

7.4 YIELD CALCULATION

For yield calculation, two different methodologies were followed to arrive at a conservative yield.

7.4.1 MODIFIED BRANDIS DIA-CLASS METHOD

This methodology aims at sustained yield of Class I trees. For sustained yield, regular entry of trees into Class II and Class III are considered. The mean number of trees/ha and volume/ha for each dia-class of lowest confidence limit are extrapolated to the commercial area of working circle to arrive at total number of stems/volume in each of the dia-class for the commercial area of concerned working circle. Based on the survival coefficient of each of the dia class, potential availability is worked out species-wise and dia-class wise. Then the entry of stems into Class I category from Class II and Class III are worked out. In case of deodar and kail, 60cm and above is considered as Class I, 50-60cm is considered as Class II and 40-50cm dia class is considered as Class III. In case of Fir, dia class of 70cm and above is considered as Class I, 60-70cm as Class II and 50-60cm as Class III respectively.

7.4.2 VON MANTEL'S METHOD

As per Von Mantel's method, annual yield is calculated as per the following formula.

Yield= 2(Growing stock volume)/Rotation

The Von mantel's formula also helps to arrive at a sustainable yield.

The growing stock volume of all dia-class from the lowest dia class i.e., 10-20cm is considered and yield is worked out accordingly.

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