

2

The Forests

The forests of Himachal Pradesh are of special importance as they provide the cover for the watersheds of most of the rivers originating in the state. Himachal Pradesh also contains one of the last extensive stretches of Western Himalayan Forests in a near pristine state. The forests of Himachal, known for their majesty and grandeur, are under great stress as a result of the impact of modern civilisation, economic development, and population growth.

2.1 Forest Resources and Productivity

2.1.1 The Extent of Forest and Pasture Areas

The perception of what constitutes a forest, and thus the size of the area classified as forest, has changed in recent years in the state. Until the mid eighties, forests were conceived in terms of tree production, and only the cultivable area was measured (21,215 sq.km. or 38.1 per cent of the total geographical area). Since the introduction of the new forest policy, forests have been considered more as an ecosystem, and the definition of forest area extended to include areas of rocky precipices, alpine snow, and meadows which, although devoid of actual tree cover, are none the less an integral part of the larger forest eco-system. The legal forest area is now calculated to be 37,591 sq.km., or 67.5 per cent of the total geographical area of the state, of which 6,376 sq.km. is under alpine pasture and perpetual snow cover and 21,215 sq.km. under forest cover of some sort. About 65 per cent (60% of the recorded forest area) of the forests are found at altitudes above 1,800 masl. Satel-

lite imagery shows the actual forest cover in the state to be only 12,502 sq.km. or 22.4 per cent of the geographical area, a per capita amount of 0.24 ha. This is far below the stipulated norm of 66 per cent of area to be under forest cover. Only 9,565 sq.km. (17.2% of the geographical area) has a crown cover of more than 40 per cent. There are only four districts in which the overall forest cover is more than 33 per cent, and five more in which forest cover is between 19-33 per cent. The majority of 'forests' in the state are either understocked, rocky, or non-existent. The area of legal, estimated, and actual forest is shown in Table 2.1, the legal types of forest in Table 2.2, and the distribution according to district in Tables 2.3 and 2.4.

2.1.2 Forest Types

Himachal has a diverse and rich flora as a result of the very varied physio-climate. Differences in elevation lead to eco-zones with different vegetative cover, land use, and land capabilities. Every type of west Himalayan flora is represented, from Himalayan meadows, through fir and rhododendron forests, to tropical scrub and bamboo forests in the lower hills. The forests are rich in vascular flora, which form the most conspicuous vegetation cover. Over seven per cent (3,295) of the 45,000 species of plants found in the country are found in the state. Among the rare plants is the living fossil tree *Ginkgo biloba*, a native of China, of which two plant species have been found in Manali and Kalpa.

The forests can be classified broadly into coniferous forests and broad-leaved forests. The

Table 2.1: Forest Area

Type of Area	Area (sq.km.)	% of Total Area	% of Legal Forest Area
Forest Area (legally defined)	32,525	67.5	100
Area with permanent snow cover	4,934	8.9	13.1
Alpine pasture	6,376	11.5	16.7
Theoretical area with forest	21,215	38.1	56.4
Actual area under tree cover (satellite imagery)	12,502	22.4	33.3
Dense forest (crown density above 40%)	9565	17.2	25.4
Open forest (crown density 10-40%)	2,937	5.3	7.8
Scrub forest (crown density less than 10%)	1,845	3.3	4.9

Source: DFFC Records

Table 2.2: Legal Classification of Forest Areas

Name	Area (sq.km.)	Percentage
Reserved Forest (RF)	1,896	5.0
Demarcated Protected Forest (DPF)	10,358	27.6
Undemarcated Protected Forest (UPF)	22,991	61.2
Unclassed Forest	868	2.3
Other managed by Forest Department	948	2.5
Not managed by Forest Department	530	1.4
Total	37,591	100.00

Table 2.3: Forest Area in Different Districts (sq.km.)

District	Forest Area in Village Records	Area According to Forest Records				Area in Revenue Records
		RF	DPF	UPF & Others	Total	
Bilaspur	1,154	1	118	309	428	113
Chamba	6,924	373	3,521	989	4,883	2,716
Hamirpur	1,099		95	154	249	197
Kangra	5,769	74	542	2,177	2,793	2,345
Kinnaur	2,234		218	6,190	6,408	215
Kullu	498	161	3,031	1,768	4,960	
Lahaul & Spiti	2,156	71	110	9,190	9,371	128
Mandi	3,984		1,237	849	2,086	1,605
Shimla	4,165	53	1,106	2,242	3,401	954
Sirmour	2,247	1,065	57	601	1,723	488
Solan	1,803	54	275	403	732	196
Una	1,542	44	48	465	557	281
Total	33,575	1,896	10,358	25,337	37,591	9,238

Note: RF Reserved Forests

DPF Demarcated Protected Forest

UPF Undemarcated Protected Forest

Table 2.4: Area of Forest with Different Crown Densities by District (sq.km.)

District	Area of District	Forest Cover			
		Dense (> 40%)	Open (10-40%)	Total	
				sq.km.	% of district area
Bilaspur	1,167	49	108	157	13.45
Chamba	6,528	1,801	323	2,124	32.54
Hamirpur	1,118	151	62	213	19.85
Kangra	5,739	1,071	684	1,755	30.56
Kinnaur	6,401	547	82	629	9.83
Kullu	5,503	1,911	133	2,044	37.14
Lahaul & Spiti	13,835	15	4	19	0.14
Mandi	3,950	848	461	1,309	33.14
Shimla	5,132	2,094	331	2,425	47.25
Sirmour	2,825	740	279	1,019	36.07
Solan	1,936	164	254	418	21.59
Una	1,540	174	216	390	25.32
Total	55,673	9,565	2,937	12,502	22.46

distribution of species follows an altitudinal stratification, apart from areas with micro-climatic changes resulting from aspect, exposure, and local changes in rock and soil. The vegetation varies from dry scrub forests at lower altitudes to alpine pastures at higher altitudes. Between these two extremes lie distinct vegetation zones with mixed deciduous forests, chir, ban oak, and mixed and pure coniferous and kharsu oak forests. The forests have been classified according to "A Revised Survey of Forest Types of India" by Champion and Seth.

Broadly, the forest types in Himachal Pradesh can be classified as follow.

- Moist tropical forests
- Dry tropical forests
- Montane sub tropical forests
- Montane temperate forests
- Sub alpine forests
- Alpine scrub

1.1.3 Forest Resources

The growing stock has been enumerated in the 58 per cent of the total forest area under management for which working plans have been prepared and are in operation. The growing stock in this area has been assessed at 102.5 million cubic metres. No assessment has been

made of the growing stock in the 42 per cent of total forest area allotted to protection working circles. The growing stock of various commercially important species is given in Tables 2.5-2.7.

The data in the Tables are taken from the latest publication of the Forest Survey of India (FSI) and may not tally with the statistics published by the Forest Department of Himachal Pradesh. The data published by FSI has wider acceptance and has therefore been used to formulate the strategy and action plans for forest management.

Table 2.5: Growing Stock of Different Species

Name of Species	Forest Area	Growing Stock ('000 cu.m.)
Deodar	645	14,215
Kail	731	13,616
Chir	1,460	10,053
Fir/Spruce	1,264	41,012
Sal	183	2,563
Ban Oak	594	7,296
Mohru Oak	25	1,206
Kharsu	375	7,436
Maple	NA	1,703
Horse Chestnut	NA	1,723
Walnut	NA	651
Bird Cherry	NA	1,037
Total	5,277	102,511

Table 2.6: Change in Growing Stock Over Time of Commercially Important Species ('000 cu.m. standing volume)

Species	1975	1980	1985	1990	1995
Deodar	12,859	12,397	12,716	13,298	14,215
Kail	13,753	13,396	13,710	12,996	13,616
Fir/Spruce	44,220	44,726	39,691	39,026	41,012
Chir	7,295	8,006	7,982	8,644	10,053
Sal	3,011	3,011	3,011	2,563	2,563
Others	18,723	17,949	18,733	20,312	12,052
Total	99,861	99,485	95,843	96,839	1,02,511

Table 2.7: Growing Stock in Different Types of Forest

Forest Type	Area (sq.km.)				Volume ('000 cu.m)				Annual increment '000 cu.m
	DF	OF	SF	Total	DF	OF	SF	Total	
Fir	81	97		178	3,366	4,034		7,400	82
Spruce		16		16		501		501	5
Fir-Spruce		65		65		1,200		1,200	13
Blue pine		145	17	162		2,722	181	2,903	39
Deodar		629	36	665		17,227	808	18,035	240
Chir		613	1,101	1,714		5,005	4,797	9,802	163
Mixed Conifer	48	5,242	385	5,675	1,490	161,585	7,183	170,258	288
Hardwood mixed with conifer		661	105	766		14,252	421	14,673	244
Upland hardwoods	32	952	297	181	656	18,834	850	20,340	339
Khair		81	87	168		253	74	327	11
Misc.	65	838	909	1,812	472	5,433	3,066	8,971	179
Total	226	9,339	2,937	11,402	5,984	231,046	17,380	254,410	1,603

Note: DF dense forest, crown cover density above 40%

OF open forest, crown cover density 10-40%

SF scrub forest, crown cover density less than 10%

The growing stock of main timber species was assessed by complete enumeration or by sampling. The stock was only assessed in areas within a regular or selection working circle or where calculation of yield was required for some reason in the Working Plan. No assessments have been made in the areas within protection working circles or other areas earmarked for conservation. The prescribed yield of silviculturally available wood has changed over the years during the preparation and revision of Working Plans.

Table 2.8 shows the yield prescribed for commercial species from 1975 to 1995.

Productivity

Most of the area of Himachal Pradesh comes under Zone IV, where the length of the growing period is 180-210 days and the potential productivity is 4.32 cu.m per ha/per annum. The estimated average annual increment and prescribed yield for important species for the state as a whole is given in Table 2.9.

Broadly speaking the forest potential is the MAI (minimum annual increment) of the existing crop. The MAI for the enumerated areas for which yield has been prescribed is es-

Table 2.8: Prescribed Yield for Commercial Species ('000 cu. m.)

Species	1975	1980	1985	1990	1995
Deodar	0.92	0.88	0.95	1.10	1.08
Kail	1.11	1.04	0.88	0.94	0.87
Fir/Spruce	4.83	4.62	2.40	2.30	2.48
Chir	0.53	0.57	0.52	0.96	0.96
Sal	0.11	0.11	0.11	0.19	0.19
Others	-	Not Prescribed	Not Prescribed	-	-
Total	7.50	7.22	4.86	5.49	5.58

Table 2.9: Annual Increment and Prescribed Yield (calculated for 1990)

Species	Rate of Increment, %	Growing Stock '000 cu.m	Annual Increase in Growing Stock '000 cu.m	Prescribed Yield '000 cu.m
Deodar	1.56	13,298	207.44	110
Kail	1.51	12,996	196.92	94
Fir and Spruce	1.24	39,026	483.92	230
Chir	1.90	8,644	164.24	96
Others	1.00	22,875	228.75	19
Total		96,839	1281.27	549
Additional*		32,279	300.00	
Grand Total		129,118	1,581.27	

Source: Gupta, 1994

* Additional increase in growing stock in other working circles where no felling has been prescribed

estimated to be 1.11 million cu.m. According to the FSI the total estimated growing stock for HP is 212 million cu.m. If the MAI is taken as 1.5 per cent of the growing stock, the total potential annual yield is 3.18 million cu.m. Of this, 1.11 million cu.m is in enumerated worked areas, and 2.07 million cu.m in areas allotted to protection working circles,

conservation areas, and other areas not enumerated.

Table 2.10 shows the area covered by different species in the forests where commercial felling is prescribed, the volume of growing stock per ha, and, for selected species, the percentage this represents of the potential growing stock per hectare

Table 2.10: Area of Major Tree Species in Forests with Commercial Felling, Volume of Growing Stock, and Volume of 'Normal' Growing Stock

Species	Area (sq.km.)	Growing Stock per ha (cu.m.)	Potential Growing Stock per ha (cu.m)	% of Normal Growing Stock
Deodar	650	204.6	726	28.2
Kail (Blue Pine)	745	174.4	653	26.6
Fir/Spruce	1236	915.7		
Chir Pine	1247	69.3	297	23.23
Sal	183	140.1		
Oaks	921	163.5		
Other BL Species	541	97.0		
Total	3523	193.4		

(managed under prime conditions). Table 2.11 shows the total growing stock of commercially important species, the prescribed yield, and actual removals, from 1970-1990. Table 2.12 shows the average annual prescribed yield and removals through salvage lots and right holders for different species over three years (1989-90 to 1991-92), and Table 2.13 the actual removals since 1981-82 by different agencies.

The total annual prescribed yield at present is only about 0.56 per cent of the growing stock

available for commercial felling and less than half of the potential available based on calculations of the MAI. In recent years annual removals of timber have ranged from 63 to 95 per cent of the prescribed yield, only 33-46 per cent of the mean annual increment of the enumerated growing stock. This doesn't take into account the 8,900 sq.km. of forest kept under Protection Working Circles where no felling is prescribed. In many cases the unprescribed yield from thinning has been included in the figure for removals, and thus

Table 2.11: Total Growing Stock and Yield

Year	Growing Stock (lakh cu.m)	Prescribed Yield (‘000 m ³)	Actual Removals (‘000 m ³)	% of Prescribed Yield
1970	82,076	541	681	125
1975	99,861	750	471	63
1980	99,485	722	464	64
1985	95,843	486	460	95
1990	96,839	549	436	79

Table 2.12: Annual Prescribed Yield and Removals for Different Species

Species	Annual Prescribed Yield (‘000 cu.m)	Average Annual Removals			Volume Left for Green Felling (‘000 cu.m)
		Through Salvage Lots	Right Holders, Free Grantees	Total	
Deodar	110.0	21.0	45.0	65.8	44.2
Kail	93.5	32.0	32.4	64.4	29.1
Fir/Spruce	230.5	98.1	7.5	105.6	124.9
Chir	96.3	59.9	36.8	96.7	-0.4
Sal	19.0	3.3	1.7	5.0	14.0
Total	549.2	214.2	123.3	337.5	211.7

Table 2.13: Removal of Timber by Different Agencies

Year	Government Agency	HPSFC*	Right Holders	Free Grantees	Remote Sawmills	Wood- based Industries	Other	Total
81-82	20.33	522.51	108.49	20.54	-	-	-	671.87
82-83	33.69	379.63	71.60	2.41	145.25	-	-	632.58
83-84	29.64	448.54	111.67	2.75	32.51	-	5.91	631.02
84-85	8.92	246.27	167.16	3.81	27.66	0.48	6.88	461.18
85-86	10.14	314.62	168.03	7.98	21.00	2.90	3.74	528.41
86-87	6.79	387.47	119.20	7.04	23.80	0.08	3.74	548.12
87-88	2.14	211.14	117.00	8.30	142.35	5.25	9.08	495.26
88-89	2.35	299.19	138.90	6.91	42.72	-	0.86	490.93
89-90	2.03	248.92	150.84	4.90	28.79	-	0.12	435.60
90-91	1.73	181.87	95.30	7.86	24.55	0.56	0.41	312.28

*Himachal Pradesh State Forest Corporation

further decreased the permissible removals from the main felling.

2.2 Forest Survey, Demarcation and Settlement

Forest settlements are concerned with the determination and agreement of rights and concessions in forest areas that have been surveyed and demarcated, in other words they are a settlement of status, rights, and concessions. Survey and demarcation of forest areas is essentially a part of the total forest settlement process. Forest demarcation and settlement has been one of the most pressing problems facing Himachal Pradesh from the time of its creation. Serious damage has been caused to forests as a result of such activities as encroachment, illegal felling of trees, and breaking up of land for quarrying. The need to demarcate the forest areas and achieve a settlement of the rights therein, has become more and more pressing with time. The process of forest survey, demarcation, and settlement also has complex but important implications for developing a rational land use policy. At present, the State does not have a land-use policy. More than 67 per cent of the land area is classified officially as forest, but not in the revenue records, which are the ultimate legal repository of the title of the land. There is a big discrepancy between the forest land statistics of the Forest and Revenue Departments.

Settlement operations include: (a) measurement and demarcation of the land area; (b) preparation of records like a map, field book, *jamabandi khasra bandobast*, and list of paths, routes, and religious places; (c) preparation of a record of rights; (d) notification of the area under the provisions of relevant laws; and (e) making an entry in the revenue records. Settlement operations in HP have been affected by major organisational changes in the state, in particular the creation of the State of Himachal Pradesh in 1948 following independence by amalgamation of 30 small hill states and the addition of new districts in 1966 following the reorganisation of the Punjab.

2.2.1 Demarcation and Classification of Forests

In the early 1860s, management of forest lands became the responsibility of newly created Forest Departments all over the country, and one of their first tasks was the classification of forests and demarcation of resources. The first attempt to demarcate the forests in HP began in the deodar forests of Bushahr State in the Shimla hills in 1868. In 1873, it was proposed that the forests be classified into three categories—*mehfuja* forests (Reserved Forest), *mehduda* forests (Protected Forest), and *dehati* forests (Village Forest). Permanent demarcation of forests commenced in 1884. Thereafter, measurement and demarcation of Reserved Forests were done under the Indian Forest Act (IFA). Boundary pillars were constructed as markers. Demarcation and classification of forests have continued to the present in the shape of various forest settlements, declarations, and notification of forests under IFA 1927.

Up to 1952, several different systems were used for classifying forests. In 1952, all forest lands in the state were brought under state ownership. Forests are now classified into three categories.

- Reserved Forest (RF)
- Demarcated Protected Forest (DPF)
- Undemarcated Protected Forest (UPF)

The main differences lie in the timber utility. Reserved Forests were created in areas remote from habitation where there were limited or no rights, or in areas close to villages where there was sufficient other forest land available for use by local people. Demarcated Protected Forests were generally those remote from habitation and containing valuable timber species such as deodar (*Cedars deodara*). Rights were clearly defined in these forests and more rights were permitted in their less commercially valuable portions; in particular grazing rights were clearly defined and the land could not be taken for cultivation. The Undemarcated Protected Forests close to habitation were considered to be a resource available for cultivation and to provide a supply of grazing and tree product needs.

Priority Based Categorisation of Forest Areas

Forest areas have been classified in four categories in order of priority for settlement and demarcation operations.

- Category I Notified Reserve Forests and Demarcated Protected Forests for which there is a revenue record.
- Category II Notified Reserve Forests and Demarcated Protected Forests for which there is no revenue record.
- Category III Undemarcated Protected Forests and other forests areas that have been measured and for which land records are available, but which are not shown as forest in the revenue records.
- Category IV Undemarcated Protected Forests and other areas that have not been measured and for which there is no revenue record.

Current settlement operations relate to Category II and III areas. However, the operations are not being carried out strictly in the order of the priority based categories. New DPFs are being created from both Category III and IV forests.

2.2.2 Early Settlement Activities

In Himachal Pradesh, settlements to codify and prepare a record of rights started in Kangra in 1885 in the form of preparation of *wajib-ul-arz*

under the Forest Conservancy Rules and Modified Rules for Hill States of 1859. Demarcation started in Kullu under the Rules of 1855 and was completed in both units under the Indian Forest Act of 1878. Settlements were also carried out in Chamba and Bushahr (leased forests) under the Indian Forest Act of 1878 and in the States of Sirmour and Poanta under the Rules of 1888 for Shimla Hill States. The process continued in the Kotgarh forests of Shimla district until 1952. A total of 14 forest settlements were carried out up to 1952 (Table 2.14). Rights and concessions were also recorded in revenue land settlements. Under the forest settlement, a record of rights is prepared under sections 28/29 of IFA 1878/1927 and regulated under section 31/32 of the IFA for protected forests and under section 76 for property in trees standing on private lands.

After independence, the pace of demarcation slowed considerably as priority shifted to organisation of the state and the Forest Department.

2.2.3 Legal Rulings and Notifications

During British rule the following notifications were issued pertaining to the areas merged into HP in 1966.

- Notifications No. 57 and 58 were issued in 1897 and amended in 1919 for Kangra district (now Una and Kangra districts).

Table 2.14: Early Forest Settlements in Himachal Pradesh

Division	Forest Settlement By	Notification
Bilaspur	Shri Durga Singh	1949
Chopal	Forest settlement for Keonthal State Forests, Revenue Settlement for Throach state in erstwhile Jubbal	1915, 1950
Kangra	Mr. Alexander Anderson	1897
Kinnaur	Mr. Glover	1921
Kotgarh	Shri HM. Glover	1952
Kullu	Mr. Alexander Anderson	1896
Kunihar	Mr. Alexander Anderson	1897
Mandi	Forest Settlement	1921
Rohru	Forest Settlements in Pabbar Valley and Jubbal forests by Shri AJ. Gibson and Sheer Singh, respectively.	1911 and 1915
Solan	Mr. GG. Miniken, Revenue Settlement by Major Popham Young	1890, 1909
Una	At the time of the First Regular Settlement	March, 1879

They declared demarcated protected forests and trees in demarcated forests to be the property of the government.

- Notifications related to the forests in Kullu and Lahaul and Spiti districts were issued in 1896.

The Government of Himachal Pradesh (GoHP) issued the following notifications for the areas originally included in HP.

- Notification No. Ft.29-241-BB/49, dated 25th February, 1952, under Section 29 of the Indian Forest Act (XV of 1927). This brought forest lands and wastelands that were the property of the government or over which the government had proprietary rights under the purview of Section 29 of the Indian Forest Act, 1927, by declaring these wastelands as protected forests vested in the government.
- Notification Ft.29-24\BC\49, dated 28th February 1952, under Section 30 (a) of the Indian Forest Act, 1927. This declared all trees standing on forest lands and wastelands notified as protected forests as reserved.
- Notification dated 13 November 1963. This modified the deemed date of declaring the trees as reserved to be effective with effect from 1st January 1964.
- In August 1964, the Council of Ministers of GoHP decided to annul the sweeping notification of 1952, and declared that the land classification of all such lands (like *chargah drakhtan*—pasture with trees, *chargah bila drakhtan*—pasture without trees, and *bani*—private forests) prevalent at the time of the respective forest settlements would continue to hold. This decision was held in abeyance and it was decided that since cancellation of the 1952 notification would adversely affect the forests, the notification would not be cancelled until the work of delimitation and demarcation in UP was completed and all areas properly notified under Section 29 of the IFA.

In 1980, a State Forest Policy was formulated which laid down the following provisions for demarcation and settlement.

“Only 1/3rd of the area notified as forests has been properly demarcated and settled under the Indian Forest Act. Steps are required to be taken to settle the remaining 2/3rd of the forest area that is undemarcated and unclassified by proper demarcation and settlement over the next 10 years. Forest and Revenue settlements should be taken up simultaneously so that there is no conflict in the rights to be admitted under the two settlements. Detailed guidelines should be given to the Settlement Officer about the rights which should be defined and regulated by an Act of legislation.”

2.2.4 Cabinet Decisions

Following a Cabinet Memorandum moved by the Revenue Department, a cabinet sub-committee was formed on 18th November, 1985, under the chairmanship of the revenue minister to consider the matter of the notifications issued in February 1952. The state cabinet informally discussed the question of enforcement of the 1952 notification and decided that the legal requirements for these notifications should be completed so that court cases would not fail because of the absence of vernacular translations of the notifications.

In August 1986, the Revenue Department brought an item before the Cabinet: “notification issued by the Forest Department on 25th February 1952 declaring all Govt. Wastelands to be Forest Lands and the trees growing upon them to be reserved trees”. The Cabinet decided “that a fresh joint memorandum be prepared by the departments of Revenue and Forests for a decision. The Department of Law may also be consulted.”

A State Level Committee failed to resolve the impasse between the Revenue and Forest Departments over the fate of the notified forest lands. In 1986, it was agreed that requirements to give effect to the notification would be completed at the earliest.

After the Forest (Conservation) Act, 1980, was passed, it became all the more necessary to know

the exact legal status of the lands loosely classified as forests, and also to carry out a proper survey and measurement of existing government lands—particularly those shown as Undemarcated Forests and other categories of forests based on the notifications issued in 1919 (merged areas in 1952, old areas). A State Level Committee was constituted vide Govt. Notification No. Fts (F) 3-13/83- Loose dated 3rd March, 1987, to look into the whole issue of forest surveys, demarcation, and settlement comprising the FC-cum-Secretary (Forests), the Divisional Commissioner, Shimla, and the Chief Conservator of Forests to consider the following matters.

- Areas that have been settled as Reserved and Protected Forests and are duly covered by a notification may be entered in the revenue record without further loss of time.
- Areas declared as Protected Forests by Himachal and other areas of Himachal Pradesh covered earlier under the Notification of Punjab may be surveyed, measured, and demarcated through the existing revenue agency and additional forest and revenue staff provided for the purpose considering each *tehsil* as a unit of management.
- The classification for survey, measurement, and demarcation may be done in the following categories:
 - fit for afforestation;
 - fit for pasture land; and
 - fit for other usage such as roads, tourist resorts, habitations, and grant of lands to landless for cultivation.

The committee examined the matters in detail and made an effort to assess the present situation of forest areas in Himachal Pradesh, the existing operations being undertaken for settlement works, and the suggested operations, proposed organisational structure, and financial implications of the work required to be completed on implementation of its recommendations.

The committee submitted its report in May 1987. It stated that immediate action was required to be taken on the following major is-

ssues pertaining to proposed Forest Settlement operations.

- In view of the new 20 Point Programme, particularly point No.5 pertaining to enforcement of land reforms, point No.16 new strategy for forestry, point No.17 for protection of environment, and point No.18 energy for villages, it is absolutely essential that the statistics pertaining to forest areas in HP are updated by actual field survey, measurements, and settlement operations without any further loss of time.
- Within six months of the acceptance of the report by the government, action should be taken jointly by the Forest and Revenue Departments to ensure that the existing Reserved and Demarcated Protected Forests with valid legal notifications should be incorporated in revenue records in a coordinated manner to minimise any discrepancies.
- In the on-going revenue/forest settlement operations, there should be complete co-ordination at grass root level as well as at coordination level so that any discrepancies in areas are minimised and correct figures on forest areas become available for future planning.
- While carrying out the proposed forest settlement operations, instructions issued by the government for the grant of *Nautors*, particularly prohibiting the grant of *Nautors* on land with a slope of more than 33 per cent, will be kept in mind and areas will be pointed out during actual survey, measurement, and demarcation.

The Himachal Pradesh Forest (Settlement) Rules, 1965, have been notified vide Notification No. Ft. 162-1/61.II (M) dated 25th August 1966 under Section 76 of the Indian Forest Act, 1927. Subsequently vide Notification No.15-2-73-SF dated 3-10-1975, the Himachal Pradesh Forest (Settlement) First Amendment Rules, 1975 have been notified under section 77 of the Indian Forest Act.

2.2.5 Present Status of Forest Settlements

There are two main objectives in the completion of forest settlements. The first objective is

notification of the constitution of an RF/DPF, which is important for enforcing the provisions of the Indian Forest Act 1927. The second is to have the area entered in the revenue record. This should be done immediately after notification of constitution of an RF/DPF following the procedure laid down for the purpose. This is of major importance as in Himachal Pradesh the presumption of truth is based on the revenue records alone.

Forest Settlement Operations have so far been completed in 2 of the 12 districts in the state, Chamba and Mandi.

Regular Forest settlement work was started in Chamba district in 1962 and completed in 1975. An area of 427,487 ha (about 4,275 sq.km.), comprising 2,579 forests has been notified as DPF. Although the settlement and notification has been completed, the complete entry into the revenue records has not. Table 2.15 shows the progress of forest settlement and entry into the revenue records.

The settlement work in Mandi District started in 1977 and was completed in 1992. Altogether 1,518 forests have been notified as DPFs, and revenue entries made for all except two of them. The progress of settlement operations

in 8 districts during the 3-years from 1992-95 is shown in Table 2.16.

2.2.6 Rights and Concessions

In the forest settlements, people have been granted several rights and concessions to use forestry resources for their bonafide domestic use, either free of charge or on payment of a nominal fee. There is a subtle difference between the terms rights and concessions, although they are often used interchangeably. Whereas rights are unambiguous, and defined and determined in forest settlements, concessions are not. Rights are legal in nature but concessions are not. Most of the concessions are accorded following payment of a fee, although fees may also have to be paid to exercise some rights (for example the timber distribution (TD) fee). Concessions can be withdrawn but rights can only be suspended. Most of the common rights that are admitted in forest and revenue settlements in Demarcated Forests are listed in the Forest Settlement Reports. The rights and concessions include collection of non-timber forest products (NTFPs) (also called minor forest produce or MFP), grazing of cattle, cutting of grass, and grants of timber for bonafide domestic use. The typical rights and concessions enjoyed 'with permission' and 'without permission' are listed below.

Table 2.15: Settlement Categories and Their Area in Hectares

Category of Settlement	Number	Area in ha
Total no. of forests settled and notified as DPFs	2,579	427,487
No. of forests for which revenue entries made	336	333,232
No. of forests for which revenue cases made	2,241	94,255
Cases allowed by revenue authority	2,000	-
Case rejected by revenue authority	241	-

Table 2.16: Settlement Operations during 1992-95

District	Target for Survey and Demarcation	Actual Work Done in the Year		
		1992-93	1993-94	1994-95
Solan	40,792	30,150	5,013	-
Sirmour	60,084	-	31,611	5,639
Lahaul & Spiti	212,050	116,961	-	-
Kullu	121,626	-	1,050	3,341
Bilaspur	30,895	3,406	2,688	12,361
Hamirpur	15,398	-	-	-
Una	4,2737	-	-	-
Kangra	222,889	978	2,585	2,788
Total	746,471	151,495	42,947	24,129

Rights with permission

- Timber to meet bonafide domestic or agricultural requirements, known as timber distribution or TD
- Wood for making charcoal
- Stones and slates
- Water courses and water mills

Rights without permission and concessions

- Grazing of cattle and cutting of grass in the forest
- Collection of fodder for cattle
- Collection of dry, dead, and fallen twigs as fuelwood for domestic use
- Collection of dry fuelwood for cremation
- Collection of pine needles for cattle bedding
- Collection of honey and herbs
- Right of way to water sources
- Right to use existing paths
- Lopping of trees for fuel and fodder to be used for domestic purpose

Each of these rights and concessions has a direct influence on the biomass balance in the forests. Of all the rights and concessions, ubiquitous and uncontrolled grazing by cattle and the grant of timber (commonly called TD) are perhaps the most contentious and deleterious for the sustained productivity of the forests. These are described in more detail below.

The timber distribution (TD) right is perhaps the most important right that people enjoy. TD grants account for 20 per cent of total removals. Every year approximately 150,000 cu.m (1990 figures) of timber with a market value of more than Rs. 145 million, in the shape of the best green standing trees (many of which should be retained as superior seed trees) are given away to people almost free. The TD rates were fixed in the early 1900s at 20 per cent of the then prevailing market rate, and have remained unchanged—mainly because of the politically sensitive nature of the grant and the potential for social turbulence. Liberal grants of TD, and the price differential vis-à-vis the market rate, have also led to excessive (mis) use and even smuggling. The problems have been particularly acute

in Shimla district although considerable checks are now being exercised there.

Because of the economic importance of the TD right, the government has reiterated that it has no intention to curtail, withdraw, or modify this right. However, it has been trying to find ways to rationalise the grant and timber use. The DFFC's traditional view of considering TD as a big drain on forest resources needs to be changed and TD seen as a beneficial economic activity in rural housing, but one that needs to be properly regulated, for example by appropriate tree selection. TD can also be used as a strength in the Joint Forest Planning and Management (JFPM) process. Several instructions and orders have been issued by the Forest Department regulating TD rights.

In 1992, the population of grazing animals in HP was estimated to be 5.1 million (census). Almost all these animals depend upon forests to meet their fodder and grazing requirements. The entire forest floor is subject to heavy grazing, and the problems are compounded by the tendency of farmers to restrict grazing on their own and common lands but not in adjoining forests.

Grazing and fuelwood problems are more of a social issue than a management issue. Efforts to control excessive fuelwood removals and unabated grazing in forests and pasture lands have failed for socio-political reasons. The Forest Department is often asked to provide alternatives before imposing any kind of restrictions on fuelwood removal and grazing. The pressure is such that even closed plantation areas and regeneration areas are raided for grazing. These 'biotic' pressures can only be managed if people willingly restrict these activities. Participatory processes need to be introduced in order to educate people and solicit their cooperation.

2.2.7 Encroachment

Forest land has been 'eaten up' in a variety of ways over the years, legal and illegal. The legal title of forest areas not entered in the revenue records is unclear, leading to problems between the DFFC and the Revenue Department. In the past, much Class III Forest was turned into agricultural and

BOX 2.1

Case Study on TD Utilisation in Shimla Circle

Realising the sensitivity of TD in the relations between the DFFC and local people, SIDA commissioned a study on TD in Shimla in 1994, "HP – Timber for Dwelling", as part of the preparation for a sector strategy analysis. The objectives of the study were to assess the timber distribution scenario for rural housing; assess the sustainability of TD supply and demand; and identify essential factors that seem to facilitate or impede land use management as a result of felling under TD.

The study analysed the timber utilisation pattern, settlement pattern, house construction techniques, quality of timber used, and thermal efficiency of the houses in Shimla Circle.

The main findings were as follow.

- 10 cu.m of timber is used in the construction of an average house.
- TD demand is likely to go up from 46,000 cu.m/year between 1981 and 1991 to 56,000 cu.m/year between 1991 and 2001.
- The utilisation efficiency of TD timber is only 70%; 30% is wasted as a result of lack of treatment and using traditional sawing methods.
- The demand for TD timber can be reduced by up to 40% by improving house designs and use of upgraded skills and technology.
- TD is a management issue concerned with the equitable distribution of biomass resources.

The study recommended the following.

- Setting up of Building Centres at Block level to serve as technology transfer centres for propagating cost effective building technologies to ensure rationalisation in the use of TD timber
- Adoption of new housing designs developed by the Forest Research Institute (FRI), Dehra Dun, and the Central Building Research Institute (CBRI), Roorkee, to enable small sizes of timber to be used in roofs, walls, and flooring
- Use of salvage timber to meet the TD demand instead of felling green trees
- Change in TD distribution norms: the volume of TD should depend on the size of family and the grantee's economic status
- Introduction of TD pass books in the name of the head of the family
- Exploration of possibilities for providing processed timber instead of standing trees
- Development of long- and short-term strategies to deal with the type of subsidies involved in the TD system. The cost of subsidy should be passed on to the beneficiaries.

other types of land through the granting of *Nautor* rights by the Revenue Department. This practice encouraged people to take advantage of disputed land titles by encroaching upon other forest land, especially Class III land.

There has been a general tendency to encroach on forest land all over India. The official records in HP show only 2,052 ha of forest area to be encroached, but the real figure is estimated to be closer to 18,000 to 25,000 ha. In Rohroo and Jubbal, forestry records

show an area of 271 ha under encroachment, but the ongoing revenue settlements have already identified 3,480 ha of encroachment in UPFs. The problem is serious throughout HP, but particularly so in Kullu and Shimla districts, and perhaps most acute in Shimla circle. Much land in the Himalayas used to be thought of as unsuitable for agriculture because of steep slopes and distance from habitation. But the adoption of apple cultivation has become a source of new-found wealth and encouraged the use for farming of previ-

ously rejected (forest) areas. Horticulture (orchards) has encouraged the encroachment of gentle slopes in the Beas Valley and apple orchards have developed in a big way throughout the area. Potato cultivation under kail forests is a common sight in Jubbal and Rohroo.

Encroachment and eviction from encroached land are dealt with under the Himachal Pradesh Public Premises and Land (Eviction and Rent Recovery) Act 1971. There are evident difficulties in enforcement of the law. The forests are extensive and lines of communication are poor, and the Undemarcated Protected Forests are honeycombed with agriculture so it is not easy to detect encroachment. The invisibility of the terrain to the gaze of government officials, whether Forest or Revenue Department, and the power of encroachers to deal with lower officials, have prevented any cognisance of encroachment. Most detection results because villagers report on their opponents. In general the village elite are not affected and poorer people and small encroachments are targeted. The absence of demarcation has made the task even more difficult. In those encroachment cases that come to court, the courts have been helpless in establishing the question of rights since the lands were not surveyed and demarcated. If a person enjoys quiet possession for a certain number of years, the courts can only concede the right of the person to the land. Although some progress has been reported in the eviction of the encroachers under the Act, given the magnitude of the problem it will take time before it has a marked effect.

2.3 The Effect of Land Reforms and Land Tenure

Before the establishment of the new order in the 1950s, agrarian relations were characterised by sharecropping and other forms of tenancy and by the exaction of services known as *beggar*. Although the agrarian structure in hill areas was generally characterised by a lesser degree of inequality than in the plains, it was not an equitable system.

Beggar was formally abolished in 1948; subsequently, the government introduced liberal land

polices and enacted major land reforms. The most important were the:

- 1953 Himachal Pradesh Abolition of Big Landed Estates Land Reform Act;
- 1972 Himachal Pradesh Tenancy and Land Reform Act;
- 1972 Himachal Pradesh Ceilings on Land Holdings Act; and
- 1974 Himachal Pradesh Village Common Land Vesting and Utilisation Act.

The government divested large landowners of their estates, the land ceiling being set at 24 *bigha* (2 ha) for irrigated land, 36 *bigha* (three ha) for unirrigated land, and 72 *bigha* (6 ha) for orchards. The reform of 1974 vested Village Common Lands (sometimes known as "*shamlat*") in the State. Much of the nationalised land was redistributed to landless or near landless households, with a target provision of five *bigha* (0.4 ha) per household. Similarly, under the law of *Nautor*, a landless farmer was allowed to cultivate government land, including UPF or Class III land, and expect to be granted secure title in due course.

These reforms have been effective in reducing the level of inequality in the agrarian structure in the state. Absolute landlessness is now rare at the district level, although wholly owned and self-operated holdings still constitute only 68.4 per cent of the total, and part-owned and part-leased holdings a further 19.7 per cent. Most households still only have access to very small landholdings. Further, beneficiaries under the land reforms mostly received only marginal lands. The average landholding size is 1.2 ha.

While this liberal land policy has helped reduce landlessness and rural inequalities, it has been largely unplanned and undirected, with adverse implications for the rational utilisation of land in some areas and, in particular, creating problems for the Forest Department over the management of Class III/UPF land.

Nautor Rights

Nautor is the name given to the breaking up of government wasteland and Class III land for

cultivation and construction of houses, cattle sheds, and water mills. The forest settlement rules define it as a grant on payment of a *nazrana* (premium) of an interest in the land in undemarcated waste owned by the government. Until 1896, the village headman or *negi* had the power to assign *Nautor patta*. After the forest settlements began, the right was given to the Assistant Commissioner. These rules were superseded in 1946.

The problems of awarding *Nautor* became apparent quite early. The original concern of the British Government in defining Class III (Undemarcated Protected) forest land was not to claim the land but to ensure forest conservation. The people had a right to extend cultivation as long as it did not lead to soil erosion and forest destruction. But the settlement report noted that *Nautor* grants had already been given on all available land. The Forest Department was perpetually complaining of the depletion of forests. As a result of the limited rights in Class I and II forests, all the pressure was on Class III forests.

In 1968, realising the problems resulting from the ad hoc allotment of *Nautor* in all types of lands by the revenue authorities, the government passed the Himachal Pradesh *Nautor* Land Rules. These stated that *Nautor* grants were only to be given on government land other than Reserved and Demarcated forests, i.e., in Undemarcated Forests. The State Government could grant *Nautor* in Demarcated Forests and in exceptional and special circumstances in Reserved Forests, but these were to be subject to the Forest Act. *Nautor* could be given for agriculture, horticulture, threshing floors, and construction of houses or public buildings. Priority was given to landless people, marginal land holders, scheduled castes and tribes, families of people who had died in military service, ex-servicemen, and others. The *Nautor* Rules provided detailed procedures for receiving applications, field visits by revenue officials, receiving objections, and clearance from the *gram panchayat*. It also contained a provision for an assessment by the Forest Department of the tree resources on the plot. There were some ecological re-

straints, for example *Nautor* could not be given for agriculture on steep slopes, but the main purpose of the Forest Department assessment was to know the value of the trees which must be felled and charged to the grantee. The main thrust was to allot land to the target groups. In the course of allotting *Nautor*, the revenue officials prepared a map indicating the location of the patch and record of rights in favour of the grantee. Thus by the *Nautor* grants the patch was carved out of the category of unclassified protected forest and thrust into private agricultural land to be governed by the Revenue Department under the revenue laws. Many *Nautor* grants were made, particularly in the seventies.

With the shrinking of the land available for agriculture and other purposes, grants of *Nautor* became more restrained and more focused on the poorer and weaker sections of the community. In the eighties the approach changed radically. The Forest (Conservation) Act 1980 clearly prohibited the state governments from diverting forest land for non-forest purposes without prior approval from central government. Although the practice of granting *Nautor* continued for sometime, it became clear that since Class III forests were protected 'forests', prior clearance from the centre was actually necessary. The amendment in 1987 further stipulated that forest land could not be granted to an agency other than the government without prior permission. Thus by the mid-eighties grants of *Nautor* to ordinary people had almost ceased, and proposals for approval for development work in *Nautor* land, like making roads and schools, were submitted to central government.

Nautor has now come to an end, but only after granting land wherever feasible for agriculture. The Forest Department always objected to the grant of *Nautor*, but the Revenue Department saw allotment of *Nautor* as a state welfare programme. The main cause of disagreement between the Forest and Revenue Departments was the problem of Undemarcated Protected or Class III Forests. The Revenue Department considered these lands not to be forests, because the revenue records don't contain en-

tries for such lands as forests. They considered Class III Forest to be a bank of land which could be used to make allotments to the landless and poor as per the policy of the government. Even Demarcated Forests for which revenue records did not exist were considered to be revenue lands from which they could allot *Nautors*. At least 26 classifications have been issued in the form of executive instructions since 1968.

Although *Nautor* grants have been suspended, no new land policy has been announced.

2.3.1 Forest Land Tenure

Land tenure legislation varies between Districts: in Kullu District, for example, the Forest Department is responsible for virtually all land except private agricultural land; in Mandi District the Revenue Department is responsible for government grazing land and government wasteland.

In law, the Forest Department is responsible for Reserve Forest, Demarcated Protected Forest (Classes I and II), Undemarcated Protected Forest (Class III), and for trees on government grazing land. Utilisation of trees on private land is regulated by the Forest Department under the Land Preservation Act of 1978.

Throughout Himachal Pradesh, common land was vested in the state under the Village Common Land Vesting and Utilisation Act of 1974, except for some land along rivers, roads, and paths, and common tree groves near temples. However, government wasteland, grazing land, and Undemarcated Protected Forest/Class III forest land are widely treated as open access resources. UPF/Class III land is regarded very differently by the Forest Department, the Revenue Department, and various groups of local people. The Forest Department view UPF/Class III land as part of the forest estate, to be protected from encroachment and, where possible, planted (typically with chir pine) and brought under settlement as DPF. Virtually all the land in this category in Mandi Forest Circle has now been demarcated and classified as New Demarcated Protected Forest. In contrast, the Revenue Department views UPF/Class III land as a bank of land on which to draw to meet the needs

of *Nautors* and others for land to cultivate. Not surprisingly, most villagers find this the more congenial view and, legally or not, continue to break such land for cultivation or for planting as orchards. However, both the extension of cultivation and the increased area planted under trees and declared DPF, reduce the land available for grazing livestock, thus placing pastures under increased pressure. This affects both local flocks and flocks belonging to transhumant grazers.

All of these activities reflect an unplanned, un-directed, and frequently irrational approach to land management. A more coherent approach is required which harmonises, at least at local level, the conflicting interests of the key departments and the various groups of local people who use or wish to use the land.

2.4 Common Property Resources

Communities regard water channels (*khuls*), springs, village common lands, and temple groves as common property resources (CPR), and in most cases this is officially sanctioned. They may also regard some forest to be a CPR.

Temple groves are considered to be the property of the Deity (*devta*). The management of the groves is often done by a village committee. The communities have very strict rules for the conservation of temple groves. Infringement of rules often leads to imposition of fines and may even lead to social, economic, and religious boycott of the culprit families from the village community.

In most parts of the state, local people tend to follow, by common consensus, management practices for land and forest that are traditional and customary in nature. Such management practices often have a social, religious, or economic origin and can have a significant impact on the health and sustainability of forests. Effectively, they are treating the areas as CPR. The use of forests as a CPR by communities is, however, subject to the classification of forests as Reserved, Demarcated Protected (Classes I and II), or Undemarcated Protected (Class III) Forest. Reserved Forests

cannot be considered CPRs as people have practically no rights or privileges in them.

In addition to formalisation of forest lands as CPRs, forest settlements also delineated a buffer zone between forest lands and villages. These buffer zones were the village common lands, or *shamlat*, and common grazing lands. These village common lands were also CPRs but the ownership was vested in the village communities. Creation of Class III Undemarcated Protected Forests and recognition of village common lands created a balance between the use of forestry resources for national and other needs and meeting the bonafide domestic requirements of the locals.

2.5 The Role of Forests in the Rural Economy

Himachal Pradesh, is a hill state and its economy is dependent on the forests. Nine tenths of the population live in villages and the lives of these people and of the situation of the entire rural economy are intimately interwoven with the forests. Most villages are surrounded by forest, and the health of the forest is an index of the prosperity of the local population.

The basic forestry needs of people are fuelwood, fodder, and timber. People grow their own trees and graze animals on their own land, but they are still to a large extent dependent on nearby common forests to fulfill their demands. The overall dependence of rural households on public forests for fodder, fuelwood, and timber is estimated to be about 49, 50, and 61 per cent respectively. The value of the forest products that an average rural household receives is estimated to be Rs. 7,254 per annum. The forests contribute a significant share (28%) to the family income of rural people. Herbs and other medicinal plants collected from the forests contribute more than 25 per cent of this income.

It is difficult to value the goods and services provided by the forests. Even so, it is clear that the economic returns far outweigh the investments. In HP the output of goods is estimated to be at least fourteen times the di-

rect investment. Even this may be a gross underestimate of the true economic return.

2.5.1 Agriculture

Crop production, animal husbandry, and forestry are the three main components of the farming system in hill areas and are closely interlinked and interdependent. Forests are an integral part of the system. They supply fuelwood, fodder, compost, timber, staking, fencing material, and food. The number of livestock kept per household is mainly determined by the available forest and grazing land. The forest contributes almost half the total cost of production of livestock in the form of feed and bedding material, and 19, 20, and 26 per cent, respectively, of the total cost of production of food grain, fruit, and vegetables. An average household collects 13,250 kg of dry weight fodder in the form of grass and leaves from forest lands annually, 70 per cent of this by grazing. Forests fulfill more than 90 per cent of the domestic energy requirements of hill people, of which public forests provide 50 per cent.

2.5.2 Fuelwood

As a result of the climatic, social, and economic factors, overall wood consumption per capita in HP is higher than the national average. According to studies conducted by the FSI, the annual per capita fuelwood requirement in HP is about 800 kg at higher altitudes and 600 kg at lower altitudes, an average consumption for a household of 5-6 of between 3 and 4 tonnes. The Agro-economic Centre of HP University calculated a similar overall requirement.

2.5.3 Wood for Packing Cases

The development of the apple industry in Himachal Pradesh has led to a requirement for wood for apple packing cases. This led to over-exploitation of most of the fir forests in Shimla between 1983 and 1990, leaving significant areas of forest in a bad state. The government has now banned the use of high altitude conifers for making apple packing cases, and

cases are now made with wood imported from Punjab and Haryana where there is a surfeit of eucalyptus.

2.5.4 Timber for New Houses, Repairs, and Agricultural Implements

The demand for timber is increasing steadily as a result of both the number of houses needed (a result of increasing population and the separation of joint into nuclear families) and the creation of new infrastructural facilities in rural areas like primary health centres, hospitals, educational institutions, and banks. The estimated future demand for timber for new houses, repairs, and agricultural implements is shown in Table 2.17.

2.5.5 NTFPs

NTFPs, in particular plants and medicinal herbs, are a source of supplementary income for rural households. Typical examples are bhabar grass, *katha*, and resin. Bhabar grass is important in the lower hills. Local people have collection rights, but it is also an important source of revenue for the DFFC. M/S Ballarpur Paper Mills obtained exclusive rights to collect this grass for paper making in the early 70s on payment of a royalty to be decided yearly. *Katha* is important in the lower and mid-hills. It is extracted from khair wood, which is grown on cultivated fields as well as being planted on a large scale in forestry plantations. Local people can fell trees growing on their fields under a 10-year felling programme applicable to private lands. In forests, khair is cut in accordance with working

plan prescriptions. At present, the HPFSC carries out khair extraction in government forests. Resin collection (from chir pine) is the exclusive right of the HPSFC, and although private individuals may extract resin from trees growing on private land they must sell it to the HPSFC.

A large number of NTFPs are extracted in the mid and high hills. The exact contribution of these to the rural economy is not known, but in 1992-93, 4750 tonnes of medicinal herbs and shrubs valued at Rs. 23.5 million were exported out of the state (estimates from the DFFC, which regulates export). The valuation is likely to be a gross underestimate as there are no reliable data on market rates.

Exploitation of NTFPs tends to be unregulated and indiscriminate with little control by the DFFC. Moreover, until recently propagation was not considered. No worthwhile research has been done to ensure conservation of the NTFP base, particularly medicinal plants and aromatic plants. Between 1990 and 1997, a Government of India scheme for propagation was carried out. But the scheme was operated to augment funds for tree plantations capable of yielding fruit, gum, and resin (like chir, khair, and bamboo) rather than being a true NTFP scheme. It had no significant provision for developing cultivation and nursery techniques or for marketing of NTFPs.

2.5.6 Transhumant Grazing

Transhumant grazing has been blamed for degradation of alpine pastures and absence of regeneration in high fir forests. Overgrazing is not a recent phenomenon, controlling grazing has

Table 2.17: Timber Demand for New Houses, Repairs and Agricultural Implements

Year	Population '000	No of Rural Hhs '000	Timber Requirement '000 cu.m			
			New construction	Repair	Agricultural Implements	Total
1991	5171	861	150	86	29	265
1996	5682	947	167	95	32	294
2001	6271	1041	185	104	35	324
2006	6937	1149	202	115	39	356
2011	7673	1263	220	126	43	389
2016	8486	1388	247	139	47	433

been considered important since the end of the nineteenth century. The limited evidence indicates that there has been a decline in the diversity and productivity of grass lands and in forest regeneration, resulting in soil erosion and a negative impact on wildlife.

The transhumant grazers in Himachal Pradesh have developed a complex set of strategies to maximise the available pasture and forest lands at higher and lower altitudes. Much of the pastoral cycle has been codified into shepherds' and Gujjars' rights to grazing, the migration routes, and the number of animals kept. The transhumant grazers continue to adjust their flock management practices to optimise resources.

2.6 Forest Management

Management practices or silvicultural operations are activities that are required to be carried out in different portions of the forests at different times to increase productivity and ensure the forest is used in a sustainable way. Some management practices are common to all silvicultural systems and some are specific to a particular silvicultural system. Management practices can consist of both mandatory activities and imposed restrictions. The entire do's and don'ts prescribed for the benefit of forest crops constitute the 'management practices'.

In most parts of the state, local people tend to follow, by common consensus, a set of management practices that are traditional and customary in nature. Such management practices often have a social, religious, or economic origin. Technically, these management practices are not construed as silvicultural management practices in working plans, and although recognised informally are not sanctified. In practice, however, these customary practices have a significant impact on the health and sustainability of forests.

2.6.1 Traditional Forest Management Approaches and Systems

Forest settlements clearly define and identify which group of villages has rights and concessions in which particular forests. These areas

are often further sub-divided by consensus. These informal agreements are generally most successful in resource poor areas. Traditional systems of management are designed to ensure that all rightholders are able to obtain the whole range of forest products that they need, in contrast to silvicultural systems that focus on timber, and generally include systems for distribution of products as well as prescriptions for forest management.

Traditional forest management approaches include inter-village and intra-village arrangements related to the imposition of restrictions on grazing in a particular forest or for a particular period, restrictions on cutting and lopping of trees, division of forest or common land for cutting of grass, maintenance of public rights of way, bans on hunting and fishing at times important for reproduction, restrictions on cutting of grass and collection of NTFPs before seed fall, bans on the cutting of tree species and climbers with a religious or social value, restriction of TD rights to defined portions of forests, preservation of temple groves (through 'Devata Committees'), protection of plantations by persons selected by the community (the *rakha* system), collective collection of firewood for the cremation of the dead, and protection of village forest resources from the people of other villages. In some places, people from the village community take turns in taking all the cattle from the village to the nearby forests. This arrangement is most common amongst Gaddis.

The way in which forest products are distributed may also be regulated locally after the official forest settlement process is complete. Impromptu committees may be formed to send representatives to meet government officials to discuss problems related to forest protection like forest offences, the need for closure of an area for plantation or for opening of an existing plantation, and the distribution of TD. In cases of dispute, communities often decide who should get TD for how many trees.

2.6.2 The History of Forest Management

The history of forest management in the state can be divided into three phases.

Phase 1: The Era of Princely States

Little is known about forest management in early times. There is no record available to show if the Aryans cleared many areas for habitation in the mountainous tracts, although it is occasionally mentioned that the forests of Punjab were affected by the early Aryan invasion. During the Mughal Period, the forests were not preserved (although some Hunting Reserves were). As a result of the Muslim invasion, several small rulers migrated to the remote hills in the Himalayas and established their own states after overpowering the local chieftains. These rulers had complete authority over forests. They did not appreciate the value of forest wealth, and forests were destroyed during the wars with the Gurkhas and other wars between hill states as well as for cultivation. Forest utilisation practices were highly wasteful, and valuable wood like deodar was even used for smelting iron in parts of Bushahr. There was no management of any kind, and clear felling and general destruction was the rule. The forests were plentiful and the rulers paid no attention to forest conservation or management.

Phase 2: The British Era

Forest management activities were started by the British rulers of India. Prior to the middle of the last century, the rulers in the hill states could only transform the forest produce into money in exceptional circumstances. With the advent of British rule and the establishment of cities and cantonments, large quantities of timber were required. Initially only deodar was considered to be of any value. The first major commercial exploitation started around 1850 when the Bushahr forests in the valley of the Sutlej were worked for export of deodar timber to the plains. The forests were leased to Indian and foreign traders; on payment of a fee to the local Raja permission was granted to fell any number of trees in any place. Between 1850 and 1864, havoc was created in the most accessible parts of these forests by these traders. The most accessible forests of Mandi, Suket, and Bushahr, overlooking streams along which logs could easily be floated, were targeted for harvesting. As a result of overexploitation, the forests receded into the interior.

Lord Dalhousie, the Governor General of India, recognised the need to ensure forest conservation in the Himachal Pradesh area and took steps for forest conservation as early as 1849. Realising the heavy pressure on the accessible deodar forests, he appointed Captain Longden to explore and report on the forests of the western Himalayas in 1852-53. On his recommendations, a timber agency was established in Chenab, and Captain Longden was appointed agent in 1854. A memorandum issued on 3rd August 1855 by Lord Dalhousie, marked the beginning of official policy towards forest conservation. In the same year, the Chief Commissioner of the Punjab, Sir John Lawrence, developed rules for forest conservation in the hill districts. In 1859, Major Lake, the commissioner of the Trans-Sutlej States, submitted rules that Bailey, the Deputy Commissioner of Kangra, had prepared for the district and suggested that they should be adopted in other areas with some modifications. The rules forbade the felling of trees without the prior permission of the Deputy Commissioner, with the exception of inferior trees required for subsistence for which permission of the village headman was sufficient. Ancient rights like the grazing of cattle and collection of dry wood and leaves were allowed to continue, but one third of each forest was to be closed entirely for three years in a rotation system.

Forest development in Himachal Pradesh is also associated to some extent with the development of the town of Shimla which was established in 1819. The town developed rapidly, and Dr. Falconer, the Superintendent of the Botanical Garden of Calcutta, visited Shimla in 1853 to look into the problem of ensuring a sustained supply of fuelwood. His report described the disregard of local chieftains for the preservation of forests, and the cutting down for fuelwood to gain agricultural land. Forest depletion was leading to problems of firewood supply in Shimla, Kasauli, Sabathu, and Dagshai. Dr. Falconer proposed the establishment of plantations throughout the hills to preserve the existing forests. A technique was evolved to raise deodar artificially by sowing and planting and a technique for natural regeneration was also developed. The earliest systematic

attempts to raise plantations were made with a small plantation of 1,500-2,000 deodar plants on the banks of the River Chenab in 1853. In view of the deteriorating conditions of the forest around Shimla, the superintendent of the Shimla Hill States issued a letter in 1886 requiring rulers to introduce forest conservation in their respective states.

In 1861 the Punjab Railway Company deputed Mr. Strong to examine and report on the forests of Bushahr State with a view to extending their operation for procuring sleepers from the region. It was reported that by 1862 there was massive exploitation of deodar trees especially in areas within three miles of the Sutlej and Baspa rivers. The interior of these areas was covered with a belt of finest deodar forest commencing at Nichar in the upper parts of the northern slopes, and terminating near the Hangrang ridge, which forms the northern limit of the species. Mr. Cleghorn said that the forests were sufficient to supply the needs of the railways and the Public Works Department and the requirements of the local inhabitants if they were worked on a sustained yield basis. However, waste resulting from unscientific and primitive methods of felling was appalling. Mr. Cleghorn visited the valleys of Giri, Pabur, Sutlej, Ravi, and Beas during 1862 and 1863 and made valuable maps and notes. He strongly recommended economy in the use of fuel by employing closed stoves and improved kitchen ranges. He urged careful preservation of the deodar forests and advised that seeds of trees indigenous to a locality be sown before the rains wherever the natural forests belonging to the government were thin.

In the early 1860s, with the appointment of Dietrich Brandis, a trained German forester, as the first Inspector General of Forests of India, management of forest lands became the responsibility of newly created Forest Departments all over the country. The Forest departments were given the following tasks:

- exploration and exploitation of forest resources;
- classification of forests by demarcation of resources;
- protecting forests from fires;

- assessment of growing stocks and prescription of yields.

The modest beginning of systematic management of forests in Himachal commenced when the forests of Chamba and Bushahr were leased to the British Government in 1850 and 1864 by the respective states. In 1877, a revised lease stipulating payment of a fixed yearly rent of Rs. 10,000 to the Raja of Bushahr was executed with the British government for 50 years. This revised lease took over all the forests of Bushahr State, including those situated in the valleys of the Pabbar and Giri rivers and the tributaries of the Jamuna. The lease stipulated free supplies of the forest produce required by the state and the inhabitants of Bushahr. After the execution of the lease, the forests were managed by the Forest Department on the same lines as forests of the British territories. Sir Brandis visited Bushahr in 1864 and 1872 to prepare an evaluation survey of the deodar forests and draft a preliminary report for a working plan. Ribbentrop, Stenhouse, and Batchelor prepared a report for the management of the Bushahr forests in 1874, along the lines drawn up by Brandis in 1872. Systematic management was started elsewhere in Chamba and working plans were prepared for the forests of upper Ravi and Pangi by D'Arcy in 1886 and Smith in 1891.

The First Indian Forest Act was passed in 1865, but did not restrict existing rights. It was supplemented by the Punjab Forest Act of 1872, which imposed certain restrictions. In 1871, Wild submitted proposals for the working of Shimla Municipal Forests which clearly recognised that user rights only belonged to landowners living in the neighbourhood of the forests. Demarcation of forests and settlement operations began in the 1870s and 1880s. The first Forest Policy was formulated in 1894 and formed the basis for later forest management and working plans. In 1904, special rules known as the 'Shimla Forest Conservancy Rules' were formulated by the government of Punjab following this policy. Most forests were brought under working plans by the 1930s.

The First World War led to unregulated felling in most forests. At the same time 'kail' came into

prominence and a demand developed for fir and spruce forests. The general slump after the war threw fir timber out of the market, and it became difficult to make a marginal profit even on deodar sleepers. Chir pine forests did not attract much attention until the late twenties when the resin industry developed in the Punjab.

Phase 3: The Post Independence Era

Himachal Pradesh was formed in 1948 by the integration of some 30 princely states. It inherited the traditions of scientific forest management introduced a century before. A new National Forest Policy was enunciated in 1952 based on the 1894 Forest Policy. It prescribed the maintenance of forests over 66 per cent of the total area of hill states. This policy has been helpful in the formulation of management plans for state forests. A State Forest Policy was then formulated in 1980 to meet the requirements of Himachal Pradesh. The Government of India revised the National Forest Policy in 1988. The 1988 Policy lays special emphasis on environmental stability and the maintenance of ecological balance and on meeting the needs of the local people living near forests.

Summary

The following stages of forest development can be discerned.

- Primeval or undisturbed forests
- Shifting cultivation and clearing of forests
- Increase in population leading to excessive demands for forest products, and clearance for cultivation, habitation, and other needs
- Selective removal of valuable timber like deodar, sal, and boxwood, and impositions of local taxes or levies by local rulers on produce removed
- Advent of British rule and continued demands for timber, especially deodar, and overexploitation of accessible forests
- Recognition of the need for conservation—leasing out of forests for the sustained supply of wood for railway sleepers and civil

construction; creation of a Forest Department in the province of Punjab, governed by the British, followed by similar measures in the more progressive princely states

- Survey, demarcation, and consolidation of forests, commencement of regeneration activities, and drawing up of working plans
- Excessive working of all forests during the two world wars, including exploitation of accessible areas, and utilisation of new species hitherto considered inferior like chir, kail, fir, and spruce
- Indian independence, the integration of princely states with areas formerly under British rule, reorganisation of the states and re-orientation of work on a large-scale under the Five-Year Plans

2.6.3 Silvicultural Management Systems

Most silvicultural management systems have the aim of encouraging natural regeneration and maintaining forests to maximise the sustained production of timber. Modern systems aim at developing an even-aged uniform crop. The type of silvicultural system used to manage the forests in the lower parts of the Himalayas for timber production has changed over time. Broadly, two types of silvicultural management system have been used to obtain natural regeneration: the selection system and the uniform shelter wood system. In the selection system, trees above a certain diameter or girth are felled without creating any permanent opening in the forest canopy. It proved difficult to close the felled areas to protect young regeneration, however, so these systems were replaced wherever feasible with a uniform or uniform/shelterwood system, in which all trees in a certain area are felled regardless of size, with the exception in the shelterwood system that a few are left standing to act as seed trees and provide shelter for the regeneration. This system leads to the creation of even-aged forests. Adoption of the uniform system has increased the efficiency of harvesting but it has not eased the problem of ensuring natural regeneration, as in practice it has been found impossible to close the forests to grazing and other human interference for the

long periods required (10-15 years). There is also a tendency for people to plant felled areas immediately after felling.

The silvicultural system to be used in a forest is prescribed in a forest working plan. The history of working plans dates back to 1872-74 when Brandis drafted the first preliminary report for preparing a working plan for the Bushahr forests and Ribbentrop drew up the management plan. The first working plan for Kullu forests was prepared by Fisher in 1897, and for bamboo forests in Bilaspur State by Coventry in 1900. In the early periods, the working plans only prescribed clear felling. Proper silvicultural systems of management were only introduced after 1902. By 1935, most forests had been declared Reserved and brought under working plans. At present, there are 31 working plans in operation in the State in 38 territorial divisions and four working plans (schemes) for cantonment areas. Some plans cover more than one Forest Division. The plans cover 20,744 sq.km. of forest (55%

of the total legal forest area, or 98% of actual forest cover). The main types of silvicultural system used in forest management and prescribed in forest working plans over the years are summarised in Table 2.18.

Most of the conifer and sal forests situated on accessible slopes are now managed under a modified shelterwood system or uniform system, although some forests, mostly fir-spruce, are still managed under the selection system. Even these forests are being brought under uniform systems as their working plans are revised. In general, the rotation period for fir, spruce, kail, deodar, and chir is fixed at 120 years and the regeneration period at 30 years. The rotation period for sal forests is 100 years. Forests situated on inaccessible or precipitous slopes are managed under protection working circles and normally no silvicultural system is prescribed. Oak, khair, and miscellaneous scrub forests are managed under a coppice with standards' system, and bamboo forests under a three-year felling cycle.

Table 2.18: The Preferred Systems of Management at Different Times

Period	Systems of Management
1860-1900	Clear felling system
1902	Selection system introduced
1908	Group shelterwood system adopted
1915	Uniform system introduced in deodar forests of Kullu
1925	Punjab shelterwood system introduced in chir forests
1932	Uniform system applied to sal forests of Nahan
1940-60	Widespread introduction of the uniform system in Bilaspur (1954), Rajgarh (1961), Solan (1961), and others