



## Chapter 4

# Forestry

### Introduction

Himachal Pradesh is a predominantly mountainous state. Consequently, its climate is more congenial to forests. It comprises four forest zones—sub-tropical, sub-temperate, wet-temperate and dry-temperate.

**Sub-tropical forests:** This zone consists of foothills and valleys up to an elevation of about 915 metres above mean sea level with a sub-tropical climate and an annual rainfall of 70-100 cm, of which 75 per cent falls during the monsoon season. The maximum temperature goes up to 40°C. It comprises dry deciduous, chir pine, sal (2140 sq. km.) and thorny forests (43 sq. km.) mostly of *xerophytic* species.

**Sub-temperate forests:** These forests extend from 916 metres to about 1523 metres above mean sea level, has a mild climate and an annual rainfall of 90 to 120 cm, nearly 70 per cent of which is received during the monsoon season. Some upper hills get mild snowfall during winter, which does not stay for long. The maximum temperature in summer remains around 30°C. Various species of pines, oaks and broad-leafed species grow in this zone. There are good pasturelands in this area.

**Wet-temperate forests:** These extend from 1524 to 2472 metres above mean sea level, and have some major forests and pasturelands. The annual rainfall varies from 100 to 250 cm, with snowfall during winter, when the temperature falls to minus 10°C. During summer, the maximum temperature ranges between 15 and 20°C. These forests have been categorised as (a) lower western Himalayan temperate forests consisting of conifers, oaks and various deciduous trees and (b) western Himalayan temperate forests, which consist of firs, oaks and rhododendron species found in alpine zones.

**Dry-temperate forests:** These extend to above 2472 metres. The mean annual temperature is around 10° C and the mean annual precipitation about 25 cm, most of which is received as snow. The area contains scattered trees and bushes such as *chilgoza*, willow, *robinia*, *ailanthus*, poplars and alpine pastures interspersed with bushes such as *ephedra*.

The flora and fauna of varied natural ecosystems constitute the forest wealth of the state. The forest varieties range from soft-wood conifers to hard-wood deciduous flowering plants. Of the 45,000 species of plants found in the country as many as 3,295 are reported in the state. The status of land utilisation for the state is given in Table 4.1.

TABLE 4.1

**Land utilisation in Himachal Pradesh (1999-2000)**

Category	Area (sq. km.)
Geographical area	55673
Forest area (Forest records)	37033
Permanent pastures and other grazing lands including alpine pastures, barren and uncultivable wastes etc.	7549
Fallow lands (current & other fallows)	719
Net area sown	5514
Cultivable wastes	1194
Land under miscellaneous tree crops not included in cultivation	642
Land put to non-agricultural uses	3022

Source: *Himachal Forests, 2002*, Forest Department, Himachal Pradesh.

### Relevance of Forests

Forests in Himachal Pradesh have a very productive ecological niche. Latitudinally, the state falls in the tropical zone, but its geographical location and good forest cover have enriched it, both biologically and

economically. During the immediate post-independence period, planners identified the forests of the state only as a source of timber and other products. This led to large-scale felling and clearing of forest areas. Deforestation, to meet the timber needs of industries set up in the plains and of the flourishing horticulture industry in the state, ultimately created consciousness about the need to protect the forests.

A vast majority of the population of the state is rural and depends mainly for its livelihood either directly on forest products or on those, which are produced by using the resources, conserved or protected by the forests. Unsustainable exploitation of dense forests ultimately led to the gradual loss of the ecological environment suitable for producing different crops, both traditional as well as improved commercial fruit, vegetable and medicinal plants. The damage to the environment and the land is so heavy that certain areas in the mid-hills which 20 years ago were suitable for growing fruit crops, are no longer able to sustain the fruit plants and the farmers are losing interest in growing these fruit crops. This condition of the forests adversely affects the economy of the hill people.

The forests of Himachal Pradesh are not only of importance for the state, but have also a strong influence on the ecology, climate and bio-resources of the neighbouring states of Punjab, Haryana and Rajasthan. Glaciers flowing from the Tibetan hills (China) and the melting snows feed the rivers originating in the state and provide water to other states. The forest cover of Himachal not only regulates the rainfall in the neighbouring areas but also ensures snowfall in the high mountains. A reduction in the forest cover of the state will prevent the formation of glaciers and snow, resulting in less water in the rivers. The summer heat will easily melt the glaciers and the snow and cause flash floods both in the hills and the plains of the neighbouring states.

### Status of Forests in Himachal Pradesh

The strategy for the Ninth Five Year Plan of Himachal Pradesh states: "the degraded forest lands, the village common lands and wastelands will be rehabilitated through various state plans/centrally sponsored and externally aided projects/schemes so that a forest cover of 50 per cent by 2000 AD as per policy of the state government is arrived at". The National Forest Policy, 1988, also has recommended that at least two-third of the total geographical area of Himachal Pradesh should be under forests. This comes to about

37,115 sq. km. However, according to statistics provided by the Department of Forests, Himachal Pradesh, the recorded forest area was 37,033 sq. km. in 2000-01. This amounted to 66.5 per cent of the total geographical area. Nearly 16,376 sq. km., or 29.41 per cent of the total geographical area is under alpine pastures and perpetual snow cover. This leaves only 20,657 sq. km., or 37.10 per cent under some kind of forest cover.

Satellite imagery places the forest cover of the state at 13,082 sq. km., or 23.5 per cent of the total geographical area in 1999, an increase of 561 sq. km., from 12,521 sq. km. in 1997 (Table 4.2). According to the latest data, the forest cover is 14,360 sq. km., which is 25.79 per cent of the geographical area. This includes area under orchards and natural regenerated area.

**TABLE 4.2**  
**Forest Cover Assessment in Himachal Pradesh**  
**Based on Imagery**

Year	Area (sq. km.)
1997	12521
1999	13082
<b>Change</b>	<b>+561</b>

*Source: Himachal Forests, 2002, Forest Department, Himachal Pradesh.*

The difference between the recorded and actual cover is because the actual forest cover takes into account only areas that bear a tree cover and ignores areas which may legally have the status of forests but have no tree cover.

Reserved forests:	An area so constituted under the Indian Forest or other state Forest Acts.
Protected forests:	A legal term for an area subject to limited degree of protection under the provisions of the Indian Forest Act or other state Forest Acts.
Unclassed forests:	Forest land owned by government but non-constituted into a reserved or protected forest.
Dense forests:	All land with a forest cover of trees with canopy - density of 40 per cent and above.
Open forests:	All land with a forest cover of trees with canopy - density between 10 and 40 per cent.
Scrub forests:	All land with poor tree growth, chiefly of small or stunted trees with canopy - density less than 10 per cent.

Table 4.2 shows the classification of forests by legal and ownership status. Nearly 94.3 per cent of the forest area of the state has been classified as reserved and protected forests. The remaining 5.7 per cent falls in other categories. Within the protected forests, 34.3 per cent of the area has been demarcated. Private individuals own only 2.9 per cent of the total forest area, the rest is state-owned and only 0.1 per cent belongs to cantonments and municipalities. However, a part (about 30%) of private individual forests is looked after by the Forest Department and 748 sq.km. are managed by municipalities, cantonment boards or other organisations including private individuals (Table 4.3).

TABLE 4.3

**Classification of Forests in Himachal Pradesh (2000-01)**

Category	Area (sq. km.)	Percentage
<b>Legal Status</b>		
Reserved forests	1896	5.1
Demarcated protected forests	11341	30.6
Undemarcated protected forests	21702	58.6
Unclassed forests	977	2.7
Managed by Forest Department	369	1.0
Not Managed by Forest Department	748	2.0
<b>Ownership Status</b>		
State-owned forests	35916	97.0
Cantonment and municipal forests	42	0.1
Private individual forests	1075	2.9
<b>Total</b>	<b>37033</b>	<b>100.0</b>

Source: *Himachal Forests, 2002*, Forest Department, Himachal Pradesh.

According to the distribution of forests by crown density (Table 4.4), 24.6 per cent of the forest area is under dense forests, with a crown density of 40 per cent or more. Another 10.7 per cent is termed as open forests with a crown density ranging from 10 to 40 per cent and 20.5 per cent of the total forest area falls in the category of scrub forests. Afforestation work is possible on the scrubs, with low-density forests and the rest of the area where no forests exist. As on 31 March 2003, afforestation has been carried out in an area of 8798 sq.km. and only about 3739 sq. km. is available for raising new plantations under open and scrub forests.

Forest classification shows a decline in the total forest area during 1995-96 over 1990-91. This is because of a decrease in unclassified forest area and protected forest area. Nevertheless, in 2000-01, the total forest area exceeded that of 1995-96 but still remained below what it was in 1990-91. This increase/decrease has occurred because of the change in the needs of the State Forest Department, which enjoys the

legal power to alter and notify a particular forest area as protected or unclassified (Table 4.5).

TABLE 4.4

**Distribution of Forests by Crown Density (CD): 2000-01**

Category	Area (Sq. km.)	Percentage to Forest Area
Recorded forest area	37033	<b>100</b>
Actual forest cover	13082	<b>35.3</b>
Dense forest (CD above 40%)	9120	24.6
Open forest (CD 10-40%)	3962	10.7
Scrub forest (CD below 10%)	7575	<b>20.5</b>
Uncultivable barren land (alpine pasture, snow area etc.)	16376	<b>44.2</b>

Source: *Himachal Forests, 2002*, Forest Department, Himachal Pradesh.

TABLE 4.5

**Changes in Various Classes of Forests in Himachal Pradesh (1990-91 to 2000-01)**

Particulars	Area in sq. km.		
	1990-91	1995-96	2000-01
Reserved forests	1896	1896	1896
Protected forests	33448	31453	33043
Unclassed forests	868	680	977
<b>Total</b>	<b>37591</b>	<b>35427</b>	<b>37033</b>

Source: *Forest Statistics* (different issues), Forest Department, Himachal Pradesh.

The actual forest cover of Himachal Pradesh shows an increasing trend over the years. This is the result of the ban on green felling in the state and inclusion of horticulture trees into the forest cover. Despite this, the decadal rate of increase in forest cover is slow and shall need a long time to achieve the target. (Table 4.6).

TABLE 4.6

**Change in Actual Forest Cover of Himachal Pradesh (1991 to 2001)**

Forest Composition	Area in sq. km.			
	1991	1995	1999	2001
Dense forest (CD above 40%)	8911	9565	9120	10429
Open forest (CD 10 to 40%)	2869	2936	3962	3931
<b>Total</b>	<b>11780</b>	<b>12501</b>	<b>13082</b>	<b>14360</b>
<b>As a per cent of geographical area</b>	<b>21.16</b>	<b>22.45</b>	<b>23.50</b>	<b>25.79</b>

Source: *Himachal Forests* (different issues), Forest Department, Himachal Pradesh.

Table 4.7 shows the percentage of forest area and cover in selected states of India in 1991 and 1999. The percentage of forest cover to recorded forest area is 133.6 in Arunachal Pradesh and 101.3 in Jammu & Kashmir. In Himachal Pradesh it is only 35.3 per cent, the lowest among all the Indian states, barring the Union Territory of Chandigarh, and much lower than the national average of 83.1 per cent. The per capita availability of forests in Himachal at 0.24 hectare is, however, higher than the national average and the highest in the country (Table 4.8).

**TABLE 4.7**  
**Forest Area and Cover in Selected States of India**  
**(1991 and 1999 Assessment)**

State	Percentage of Forest Cover to			
	Geographical Area		Forest Area	
	1991	1999	1991	1999
Arunachal Pradesh	82.1	82.2	133.4	133.6
Assam	31.6	30.2	80.6	77.1
Manipur	79.2	77.9	116.7	114.7
Jammu & Kashmir	9.0	9.2	99.5	101.3
<b>Himachal Pradesh</b>	<b>21.2</b>	<b>23.5</b>	<b>31.3</b>	<b>35.3</b>
<b>India</b>	<b>19.4</b>	<b>19.4</b>	<b>83.0</b>	<b>83.1</b>

Source: State of Forest Reports (FSR), 1991 and 1999.

The data on annual prescribed yield and growing stock of commercially important species (Table 4.9) reveal that fir/spruce, followed by deodar, are the important species which the state government exploits for different purposes. *Sal* is the least prescribed species

for harvesting because of its lowest commercially available growing stock.

**TABLE 4.8**  
**Per Capita Availability of Forests in**  
**Selected States of India (1997)**

Name of the State	Forest Area (sq. km.)	Per Capita (ha.)
Arunachal Pradesh	68602	7.93
Assam	23824	0.11
Manipur	17418	0.95
Jammu & Kashmir	20440	0.26
<b>Himachal Pradesh</b>	<b>12521</b>	<b>0.24</b>
<b>India</b>	<b>633397</b>	<b>0.07</b>

Source: Statistical Outline of India, 2000-2001, Tata Services Limited, Department of Economics and Statistics, Mumbai.

**TABLE 4.9**  
**Growing Stock of Commercially Important Species**

(Standing Volume in 000 cu. m.)

Name of Species	Annual Prescribed Yield			Growing Stock of Commercially Important Species		
	1990	1995	2001	1990	1995	2001
Deodar	1100	1100	1255	13288	14215	15219
Kail	940	1122	1122	12996	13616	12964
Fir/Spruce	2300	4083	2316	39026	41012	38700
Chil	960	1011	993	8644	10053	12080
Sal	190	190	190	2563	2563	2563
Others			N.P.	20312	12052	13736
<b>Total</b>	<b>5490</b>	<b>7516</b>	<b>6120</b>	<b>96839</b>	<b>102511</b>	<b>95262</b>

Source: Himachal Forests, various issues, Forest Department, Himachal Pradesh.

Note: N.P.- not prescribed.

**TABLE 4.10**  
**District-wise Forest Cover of Himachal Pradesh (1999 assessment)**

District	Geographical Area (sq. km.)	Forest Area (sq. km.)	Forest Cover (sq. km.)	Change Compared to 1997 (sq. km.)	% of Forest Cover to Geographical Area	% of Forest Cover to its Area
Bilaspur	1167	428	235	+77	20.1	54.9
Chamba	6528	4917	2301	+240	35.2	46.8
Hamirpur	1118	219	188	-35	16.8	85.8
Kangra	5739	2842	1639	-105	28.6	57.7
Kinnaur	6401	5093	649	+17	10.1	12.7
Kullu	5503	5065	1974	-70	35.9	39.0
Lahaul & Spiti	13835	10133	150	+67	1.1	1.5
Mandi	3950	1860	1539	+224	38.9	82.7
Shimla	5131	3418	2390	-35	46.6	67.7
Sirmaur	2825	1843	1108	+84	39.2	60.1
Solan	1936	728	492	+70	25.4	67.6
Una	1540	487	417	+27	27.1	85.6
<b>Himachal Pradesh</b>	<b>55673</b>	<b>37033</b>	<b>13082</b>	<b>+561</b>	<b>23.5</b>	<b>35.3</b>

Source: H.P. Forest Statistics, 2000, Forest Department, Himachal Pradesh.

District-wise percentage of the forest cover to the total geographical area of Himachal Pradesh in 1999 varies from as low as 1.1 per cent in Lahaul & Spiti to 46.6 per cent in Shimla (Table 4.10). The low percentage in Lahaul & Spiti is because of the extreme climate of the region, i.e., snow-bound area. There are four districts, namely, Kangra, Kullu, Hamirpur and Shimla, where the forest area has declined since 1997. This could be because of the expansion of towns, road network, infrastructural development, housing and tourism.

### Natural Regeneration and Afforestation

Regeneration of forests becomes essential as more and more forest areas become degraded because of social and economic causes, besides forest fires and other natural phenomena. Currently, the forests of Himachal Pradesh need scientific management. Large-scale afforestation programmes undertaken by the state Forest Department in selected areas in the recent past, also involving such institutions as Joint Forest Management, have yielded good results. If such small-scale efforts are earnestly made throughout the state, one can be assured of an increase in the forest cover in Himachal Pradesh, to achieve the prescribed limit of 66 per cent. The equation between forest degradation and forest regeneration should be maintained, to ensure that the forest cover does not get depleted.

#### Methods for Regeneration

##### Natural

Local factors are important for natural regeneration of forest species. Natural regeneration of khair, chil,

shisham, eucalyptus and bamboos has been going on in the state. Natural regeneration of shisham is being encouraged, as it helps soil conservation. Eucalyptus regenerates naturally through coppice. In 1998-99, an area of 14.74 sq. km. was regenerated through this method. Natural regeneration is not the only way of afforestation and should be supplemented with artificial regeneration.

##### Artificial

Artificial regeneration is the main method adopted to increase the forest cover of the state. Plants of economically as well as ecologically important species, viz., chil, khair, deodar, robinia, poplar, fir/spruce, kail, etc., are being planted. Seeds of some of these species are also being developed by the state. In 1998-99, an area of 137.33 sq. km. was regenerated mainly through artificial methods, as compared to only 14.74 sq. km. mainly through natural methods.

##### Afforestation

Artificial regeneration can also be employed for afforestation. Progress in this regard has been indicated separately in Table 4.11. During 1998-99, the Department of Forests carried out afforestation in an area of 297.96 sq. km., under different schemes. In all, an area of 450.03 sq. km. was regenerated and afforested during 1998-99. The area covered has declined from 524.62 sq. km. in 1990-91.

##### Plantation

Himachal has so far (as on 31 March 2001) carried out plantation activities in a total area of 8,799 sq. km. as part of its afforestation programme. Trees are planted

TABLE 4.11  
Progress of Regeneration and Afforestation (1990-91 to 1998-99)

(Sq. km.)

Name of the Circle	Regenerated Area						Afforested Area			Total Area		
	Mainly Natural			Mainly Artificial			1990-91	1995-96	1998-99	1990-91	1995-96	1998-99
	1990-91	1995-96	1998-99	1990-91	1995-96	1998-99						
CCF Wildlife	—	—	—	—	2.16	2.07	—	2.76	5.60	—	4.92	7.67
Bilaspur	4.24	—	—	67.01	—	30.21	59.82	23.49	31.59	131.07	23.49	61.80
Chamba	4.53	0.77	6.31	10.10	3.67	—	24.78	53.27	43.36	39.41	57.71	49.67
Dharamshala	0.45	0.45	1.10	54.39	19.23	41.59	17.27	27.34	22.99	72.11	47.02	65.68
Kullu	—	1.16	1.60	15.61	28.88	28.62	12.67	27.60	30.37	28.28	57.64	60.59
Mandi	6.03	7.24	1.27	25.25	7.57	1.28	90.62	43.98	41.06	121.90	58.79	43.61
Nahan	—	—	—	—	—	24.45	46.24	44.14	46.69	46.24	44.14	71.14
Rampur	—	1.08	2.54	1.50	4.69	—	34.53	24.85	22.40	36.03	30.62	24.94
Shimla	6.42	1.52	1.92	19.94	6.00	9.11	23.22	26.33	25.20	49.58	33.85	36.23
<b>Total</b>	<b>21.67</b>	<b>12.22</b>	<b>14.74</b>	<b>193.80</b>	<b>72.20</b>	<b>137.33</b>	<b>309.15</b>	<b>302.29</b>	<b>297.96</b>	<b>524.62</b>	<b>386.71</b>	<b>450.03</b>

Source: Annual Administrative Report (different years), Forest Department, Himachal Pradesh.

mostly on forest land and on community lands to supplement regeneration efforts and to increase the forest cover. Both the government and foreign donor institutions fund this activity. As the framework of a particular project being carried out determines plantation, it may sometimes result in heavy planting of the same species, ignoring its cost-benefit to society. It also causes concentration of plantation in selected areas at the cost of other areas and priorities.

The planting activities of selected species are often undertaken on specified targeted areas. Due to lack of adequate fencing and indiscriminate visits of scrub animals in the planted areas, the damage often is large and is rarely recorded. Even the community participation in newer plantings and their conservation is lacking which often results in patchy growth of trees. In fact, the entire planting process including the choice of tree species be worked out in consultation and help of the local community, so that they are fully involved in the management of planting.

Table 4.12 shows the plantation achievements in Himachal Pradesh from 1950-51 to 2000-01. On an average, an area of 172.5 sq. km. was planted every year. Recent trends show a continuous decline in the area planted each year, because of paucity of funds and a ban on silviculture and working plan operations in the state under an order of the Supreme Court dated 12 December 1996, except for the right-holders. However, dry and fallen trees (salvage) can be removed through the HP State Forest Corporation. Chil is the single largest species with about 30 per cent of the area planted by the department. Deodar forms only 12 per cent of the total area planted during this period. Recently, a large number of broad-leaved species, including walnut, poplar, shisham, etc., were planted under different projects. Cultivation of Bamboo has a great potential for the state as it is highly versatile, lending itself to distinct and unique furniture designs, to new generation building materials, and to a vast range of items, thereby generating countless jobs. Since the state has a lot of degraded soils, bamboo holds the promise for their regeneration. At present, two bamboo species namely, *Bambusa bambos* and *Dendrocalamus strictus*, are widely found in the state, whereas new fast growing species suitable to specific agro-climatic regions could be introduced based on the requirement of end objectives such as, making paper pulp, furniture, building material etc. The National Mission on Bamboo Technology and Trade Development has elaborated upon the use of bamboo for cultivation in different regions of the country and has given suggestions for its commercial and environmental benefits.

TABLE 4.12  
Plantation Achievements in Himachal Pradesh  
(1950-51 to 2000-01)

(Hectare)

Species	Area Planted From 1950-51 to 1998-99	Plantations Raised During		Total Area of Plantation as on 31.3.2001
		1999-2000	2000-01	
Deodar	101011	6218	3631	110860
Kail	11065	210	168	11443
Fir/spruce	16361	289	151	16801
Chil	261105	4394	3871	269370
Other Conifers	113	—	—	113
Walnut	3612	63	88	3763
Willow	8789	331	204	9324
Khair	147745	3769	3728	155242
Shisham	12560	1264	1592	15416
Bamboos	3230	293	702	4225
Mulbery	1378	—	—	1378
Poplar	12730	722	344	13796
Robinia	41068	1770	1206	44044
Other B L Species	204755	10123	9237	224115
<b>Total</b>	<b>825522</b>	<b>29446</b>	<b>24922</b>	<b>879890</b>

Source: Himachal Forests, 2002, Forest Department, Himachal Pradesh.

## Forest Produce

### Timber

Most of the villages in the state are situated on steep slopes and are connected by tracks rather than concrete roads. Moreover, the villages are either adjacent to or enclosed by forests, which are thus deeply integrated with the livelihood of the local people. They depend on the forests for timber for the construction of houses, firewood, agricultural implements, fodder and a variety of other products and services, including certain medicinal herbs. Some of the users of forest products feel equally responsible for their conservation and ensure proper protection and regular regeneration of forests.

The government of Himachal Pradesh constituted the Forest Corporation in 1974, the only agency responsible for the harvesting and exploitation of forests, including resin extraction. Earlier, private contractors carried out all activities related to forests. This resulted in unscientific harvesting and over-exploitation of the forest resources.

Timber distribution (TD) allows local people to harvest timber legally in forests near their place of habitation, for constructing their own houses. It currently accounts for, on an average, an annual harvest of timber of over 1,00,000 cubic metres. In terms of value it amounted to about Rs. 56 crore in 1998-99. The

current market value of this timber is more than one thousand times the nominal price paid by the villagers under TD. The state exchequer's share is negligible.

TD scheme dates back to 1880's which has been widely exploited by a large number of influential people at the cost of needy, for personal economic gains. The regulations need to be updated to plug the economic losses and to identify the genuine and needy users of timber. The communities and groups involved in forest management and conservation may be actively involved in identifying the genuineness of the needs of the local people.

Timber distribution is more of a harvesting policy. In 1999-2000, the share of right-holders in the total timber production of the state was 31 per cent, and if timber distribution to the free grantees is added, it comes to about 33 per cent. Thus, one-third of the total timber produced in the state is consumed under timber distribution. The major effect of timber distribution of forests is the selective harvesting of certain species. Deodar and kail are best suited for the construction of houses because of their durability. But the main focus of the government in the past has been on harvesting fir/spruce to meet the fruit growers' demand for boxes. In 1999-2000, more than 45 per cent of the total wood extracted by the right-holders was deodar and about 25 per cent kail. The Himachal Pradesh State Forest Corporation concentrated on chil (39%) and fir/spruce (30%) (see Table 4.13).

**TABLE 4.13**  
**Forest Produce (1991-2000)**

Year	Government Extraction	Forest Corporation	Right Holders	Free Grantees	Other Agencies	Total
<b>Timber (M<sup>3</sup>)</b>						
1991-1992	2521	227699	113735	7693	4731	<b>356379</b>
1995-1996	907	325220	96274	2981	402	<b>425784</b>
1998-1999	824	244842	100310	9316	161	<b>355453</b>
1999-2000	1779	206750	96572	7181	149	<b>312433</b>
<b>Firewood (qtl.)</b>						
1991-1992	49	1346	152	91	490	<b>2128</b>
1995-1996	27	834	6	350	5	<b>1222</b>
1998-1999	12	281	118	—	—	<b>411</b>
1999-2000	11	506	313	122	121	<b>1073</b>
<b>Charcoal (qtl.)</b>						
1991-1992	176	295	—	350	—	<b>821</b>
1995-1996	605	364	—	—	—	<b>969</b>
1998-1999	96	8	—	—	—	<b>104</b>
1999-2000	66	8	—	—	—	<b>74</b>

Source: Forest Statistics (different issues), Forest Department, Himachal Pradesh.

The most valued forest product in 2000-01 was timber, followed by medicinal plants and herbs and resin. The total forest produce was worth Rs. 231.30 crore (Table 4.14). It would be interesting to have a look at the revenue of the state from these products. Until 1970, timber removal from the forests was more than the annual prescribed yield, which was unsustainable. To overcome this shortcoming, the government of Himachal Pradesh established the Himachal Pradesh State Forest Corporation which was entrusted with all harvesting operations in the forests. As a result, since 1975, the annual removal from the forests has always remained below the prescribed yield (Table 4.15). Timber measuring 4,70,000 cubic metres were extracted annually from the forests of the state during the last five decades of the previous century (1950-2000). The average timber removal was the highest in the decade 1980-90.

**TABLE 4.14**  
**Value of Forest Produce in  
Himachal Pradesh (2000-01)**

Name of Produce	Unit of Measurement	Quantity	Estimated Value (Rs. in lakh)
Timber	'000 cu. M.	341766	21791.5
Firewood	Tonnes	2696	76.9
Charcoal	Tonnes	60	3.4
Resin	Qtls.	73567	475.0
Bhabbar Grass	Qtls.	400	0.2
Grazing Fodder	Qtls.	—	13.4
Medicinal Plants	Qtls.	19719	667.2
Other minor products	Qtls.	2150	70.6
Khair	Qtls.	21630	31.5
<b>Total</b>	—	—	<b>23129.7</b>

Source: Himachal Forests, 2002, Forest Department, Himachal Pradesh.

**TABLE 4.15**  
**Timber Removal from the Forests of  
Himachal Pradesh**

(Standing volume in '000 cu.m.)

Year	Growing Stock	Annual Prescribed Yield	Removal from Forests
1970	82076	5410	6806
1975	98861	7500	4706
1980	99458	7220	4637
1985	95843	4860	4602
1990	96839	5490	4356
1995	102511	7516	4500
1998	103344	7767	3555

Source: State Environment Report, Himachal Pradesh.

### Other Forest Products

Besides timber, the forests of Himachal Pradesh are rich in fodder, grass and other grazing plants, organic manure and fibre, gum, resins, medicinal plants/herbs and other products including fruits. The Himachal Pradesh State Forest Corporation is the only agency responsible for extracting resins from the state forests. The state Forest Department issues permits for the collection of other non-timber products. Medicinal and aromatic plants are of special value. Table 4.16 details various non-timber products. Such produce was worth Rs. 12.29 crore in 1999-2000, of which medicinal herbs alone accounted for 57.43 per cent, i.e., Rs. 7.06 crore. Some of these herbs are found only in Himachal Pradesh and many might still have remained undiscovered. The main concern at present is the unscientific harvesting and excessive and ruthless exploitation of these resources by private pharmaceutical companies, whose sole motive is to maximise their profits. These companies have no or very little interest in the regeneration and management of the forest. This has resulted in several species of medicinal and aromatic plants either becoming extinct or being listed as endangered species. *Pinus Gerardiana*, which yields chilgoza nuts, is facing extinction and has already been listed as endangered species.

In fact, medicinal and aromatic plants, wild fruits and spices have not been suitably utilised. To preserve the therophytic value of these plants, such packaging practices are to be adopted, as would help retain their potency, fragrance, smell, aroma and efficacy for making by-products.

Medicinal and aromatic plants have the potential of earning foreign currency and these need to be exploited scientifically using modern management methods. A total of 21,982 quintals were exported outside the state in 1998-99. The main products were *muskbala/nihani*, *patlain*, *rakhal*, *dorighas* and *neoza*.

Recently, the state has introduced Lavender which yields high value aromatic oil at Salooni in Chamba district along with setting up of an oil extraction unit. A Lavender bush remains productive for 15 years and starts yielding flowers for oil extraction in the second year of its cultivation. The processing of Lavender oil and its consequent use in production of agarbati, dhoop, cosmetic creams, etc. could earn additional income, as current Indian demand for Lavender oil is 40 tonnes annually. Seabuck thorn is another wild plant, which is of immense medicinal and environmental value

that can be grown in abundance in Lahaul & Spiti, Pangi and Kinnaur. China has successfully utilised its Seabuck thorn treasure.

Other medicinal plants of value which can be propagated in the state are *Chirata* and *Katki* (used for liver disorders), *Jatamani* (used for nervous ailments), and *Indian Barbbery* (used for digestive disorders), for which the climate and topography is suitable. However, the state has to work hard to conserve their germ plasm, develop economic package for cultivation and their processing and marketing. As such, some of the medicinal plants, which are not regularly cultivated are being collected from the wild and are becoming scarce in availability besides being threatened with extinction.

TABLE 4.16  
Minor Forest Produce from 1995-96 to 1999-2000

(Quantity in Tonnes and Value in '000 Rs.)

Name of Forest Produce	1995-96		1998-99		1999-2000	
	Quantity	Value	Quantity	Value	Quantity	Value
1. Resin	8733	62644	7201	53739	8725	49024
2. Bamboo	—	—	—	—	—	—
3. Bhabbar grass	536	1988	511	343	671	337
4. Fodder/Grazing	—	908	—	1590	—	709
<b>5. Medicinal Herbs:</b>						
a. Dhoop	202.5		69.2		78.0	
b. Muskbala/Nihani	148.7		162.4		93.9	
c. Chukri/Rewardchini	83.2		49.1		40.9	
d. T/Patters	59.2		15.3		27.4	
e. Dorighas	56.1		100.8		142.3	
f. Brahmi	50.0		—		6.3	
g. Kaur/Karu	43.0		12.0		4.6	
h. Guchhie	36.3		16.0		10.6	
i. Tej Patra	30.8		53.4		45.9	
j. Thuth	25.9		10.9		13.6	
k. Bankakri	22.4	59621	1.1	89823	0.9	70579
l. Kuth/Diascorea	26.4		0.1		14.2	
m. Efdra	12.7		60.2		—	
n. Barberries roots	11.1		7.0		—	
o. Birch/Bhoj Patra	6.5		5.3		15.6	
p. Banafsha	3.9		0.9		0.5	
q. Kakarsingi	2.6		0.4		2.4	
r. Chora	1.2		12.3		43.0	
s. Baryan	8.0		11.0		3.0	
t. Mithi Patties	5.2		14.3		16.9	
u. Bhutkesi	3.2		8.0		5.9	
v. Others	646.9		1588.3		835.6	
6. Other Produce	—	94	—	113	—	2245
<b>TOTAL</b>	—	<b>125255</b>	—	<b>145608</b>	—	<b>122894</b>

Source: Forest Statistics, 2000, Forest Department, H.P.

## Natural Hazards

### Forest Fires

Forest fires are the main cause of degradation. Very often these fires are natural, accidental and sometimes intentional. In all cases they destroy valuable timber, grazing ground, bio-diversity and wild life. Forest fires are of three kinds, of which crown fires are the most dangerous, followed by ground and surface fires. The most harmful effect of forest fires is on the ecology of the area concerned. Characteristics of the soil are greatly altered and there is erosion. The microclimate and the flora and fauna are also adversely affected. During 1994-95, 1706 forest fires were recorded, involving about six hectares per fire. In 1997-98, there were 67 reported fires, and each fire damaged more than 32 hectares. Forest officials can reduce the loss per fire with the help of good management practices. Intentional fires are a source of fraudulent gains by the local mafia or communities. Alertness of forest rangers and good intelligence can minimise the number of these fires. At the same time, the genuine needs of the communities and tribes living in or around the forests should be taken note of and alternatives suggested to them for better conservation of forests. Prevention of forest fires should obviously be an important task of the Forest Department, which should act as an enforcement agency to control the sources of fires and to educate the communities living in and around the forests. The Forest Department staff should also be provided with necessary equipment and orientation in forest-fire prevention.

There are other hazards, which include landslides and flashfloods mostly during the monsoon season, avalanches, unauthorised mining and encroachments, etc.

## Revenue and Expenditure

The economic value of the forest stock of the state has been estimated at over Rs. 1,00,000 crore, taking into account both direct and indirect benefits. The value of growing stock is about 38 per cent of the total economic value of the forests. In contrast, the revenue realised by the Forest Department is very meagre (Rs. 29 crore in 2001-02). On the other hand, the expenditure on forestry in the same year was Rs. 219 crore. In fact, the expenditure on forests has been increasing since 1971, the year Himachal Pradesh acquired statehood.

The contribution of the Forest Department to the total revenue of the state has also been declining since

1993-94. This was about 37 per cent in 1999-2000, when money was raised through capital bonds.

TABLE 4.17

### State Revenue from Expenditure on Forests

(Rs. in lakh)

Year	Revenue	Expenditure	Difference (3-2)
(1)	(2)	(3)	(4)
1990-91	1451.30	5569.06	4117.76
1991-92	2430.16	6724.88	4294.72
1992-93	2343.47	7599.77	5256.30
1993-94	6535.61	7567.31	1031.70
1994-95	4711.37	8524.17	3812.80
1995-96	4493.87	9606.94	5113.07
1996-97	4119.33	10928.11	6808.78
1997-98	4114.61	11588.05	7473.44
1998-99	998.01	18299.43	17301.42
1999-00	66936.66	20632.27	(-) 46304.39

Source: Himachal Pradesh Forest Statistics, 2000, Forest Department, Himachal Pradesh.

TABLE 4.18

### Per cent Contribution of Forest Revenue to the State Revenue Excluding Grants-in-aid from Central Government

Year	State Revenue	Per cent Contribution of Forest Revenue
1990-91	24263.77	5.98
1991-92	29946.31	8.11
1992-93	32458.12	7.22
1993-94	42231.66	15.80
1994-95	48349.51	9.74
1995-96	53775.47	8.36
1996-97	62647.60	6.57
1997-98	79336.93	5.19
1998-99	87814.33	1.14
1999-00	179447.65	37.30

Source: Himachal Pradesh Forest Statistics, 2000, Forest Department, Himachal Pradesh.

In the light of the increasing pressure on forests through multiple stakeholders, and the national policy of conserving the forests for maintaining ecological balance and development, allocation to this sector should have been increasing in successive five-year plans. On the contrary, it has been declining continuously. In the Seventh Plan, allocation for this sector was 7.44 per cent which came down to 6.47 per cent in the Eighth Plan. It further declined to 5.12 per cent in the Ninth Plan. This has affected the pace of afforestation in the state.

According to the work plan of the Forest Department, the state government can earn about Rs. 250 crore annually by felling trees under silviculture. The state has put a ban on green felling in view of conserving and increasing its forest cover in accordance with the national policy. The Finance Commission should duly compensate the state in this regard.

The impact of forests, besides providing economic gains to the owners (state and other individuals) has several indirect benefits through the users of forest-related activities at far-off places. For instance, a 10 to 20 per cent reduction in the forest cover of the Himalayas will cause climatic aberrations in the neighbouring states of Punjab, Haryana, Rajasthan and parts of Uttar Pradesh. Agriculture being the mainstay of these four states, any change in the soil and water resource would affect their economic base. It is therefore imperative that the states that control the Himalayan forests should conserve them for the sake of the neighbouring states, which in turn should contribute economically to sustainable forest management in the hill states. This visible interdependence and interconnectivity between the user and producer states will go a long way in developing a sustainable environmental relationship and mutual economic benefits. A long-term view will have to be taken by state and central finance commissions to develop this concept of interdependence and interconnectivity.

### **Joint Forest Management**

Joint forest management which aims at involving local communities and voluntary agencies in regeneration of degraded forests was initiated by Government of India in 1990. In Himachal Pradesh also, this concept has been adopted by formulating village level forest development committees. With the introduction of the new legislation empowering Panchayati Raj Institutions for forest management, the task of village level committees has been now entrusted to PRIs.

One of the essential components of forest management and conservation is active participation of the stakeholders living in or around the forests. The communities generally oppose imposition of rules and regulations for the development of the forests. But, when development programmes for the forests are planned with their participation, it will result in their involvement and co-operation in the management of the forests. Such participatory/joint involvement has yielded excellent results in the Kandi areas of the state and needs to be extended to all forest management activities of the state.

A study conducted by the Centre for Research in Rural and Industrial Development (CRRID), Chandigarh, in 30 villages of Kangra district analysed the pattern of forest fuel-wood consumption in the households. Based on this study, the project encouraged the housewives to undertake such economic activities as weaving of carpets, foot-mats and other related activities, which generated enough income to enable them to use such alternative fuel as kerosene. Secondly, as these women were kept busy during the day in economic activity, they had no time to collect fuel-wood from the forests. Consequently, illegal forests felling had stopped due to economic empowerment of the housewives.

The Forest Department has adopted the approach of 'participatory forest management' and is building further on the experience gained in this respect from the implementation of externally-aided projects. It has launched a participatory forest management scheme named 'Sanjhi Van Yojana' aimed at empowering local institutions to plan, execute and further maintain forestry operations on their own, with the department only playing the role of a facilitator. The scheme is designed to be a tool of social engineering to empower communities to plan and execute various activities for the conservation and development of these resources through Village Forest Development Societies (VFDSs) consisting of local residents. Under the scheme, funds are placed with a society and utilised according to the approved micro-plan prepared by the society itself. The scheme was launched on 25 December 1998, and is a big step forward in empowering the local communities and ensuring sustainable management of forest resources in the vicinity of the villages.

Women being the primary gatherers of forest produce, their participation is crucial to the success of any forestry programme. The government has taken a policy decision to recruit women forest guards so that the outreach of the Forest Department to this important stakeholders' group is increased. This will not only rectify the gender imbalance in the Forest Department but also facilitate their active interaction with the forest staff.

However, this scheme needs to be reviewed to gauge its success for its replication to other areas of the state.

### **Wildlife**

Wildlife is a heritage of the state. Some species are found only in the western Himalayas. There are 32 wildlife sanctuaries and two national parks in the state, covering an area of about 7002 sq. km., which is about

12.5 per cent of the geographical area. A large variety of wildlife is found in the state, including 64 species of mammals, 463 species of birds, 44 species of reptiles and 516 species of aquatic fauna. A category-wise detail of the protected and threatened species is given below:

#### *Protected Wildlife*

**Mammals:** Himalayan black bear, brown bear, musk deer, ghoral, ibex, thar, snow leopard, lynx, spotted deer, flying fox, leopard, barking deer, Indian wild boar, sambhar, serrow, Kashmir stag, etc.

**Birds:** Cheer pheasant, monal, snow cock, tragopan, koklas, khaleej, chukor, red jungle fowl, hornbill, siberian white crane, whistling teal, mountain quail, white spoonbill, partridges, martins, pea-fowl, mallards, pochards.

**Reptiles:** Common indian monitor lizard, yellow monitor lizard, indian python, etc.

#### *Threatened Wildlife*

Himalayan brown bear, cheer pheasant, mountain quail, western tragopan, monal pheasant, snow-cock, snow leopard, leopard cat etc.

As a result of various measures taken by the Forest Department for wildlife protection and conservation, the population of leopards has increased.

To attract wildlife enthusiasts, the sanctuaries and parks in the state need improved internal management on scientific lines.

Mixed sanctuaries and animal/bird-specific sanctuaries for endangered species should be encouraged for wildlife protection, conservation and their multiplication.

The state government has already taken a policy decision to develop the parks, sanctuaries, zoos and other water bodies by facilitating both private and public sector investments. This is a bold step taken by the government for the first time in the country, which will reduce the pressure on the wild life. Further, in order to reduce the social tensions because of the wild life, the state intends to re-demarcate the boundaries of various parks, sanctuaries etc.

### **Suggestions and Recommendations**

Till recently, commercial objectives had determined the management of forests, as commercial exploitation of timber had been the main concern. In contrast, conservation and regeneration dominate modern management of forests. Involvement of the communities

and others living in and around the forests has become important from the point of view of modern forest management.

A holistic approach is required to reduce the dependence of communities on forests, by providing them with direct and indirect opportunities; directly, by encouraging the use of locally available and renewable energy sources to fuel-wood and timber, e.g., solar, wind and hydel energy sources. Currently biomass is extensively used because of its ready availability and cheapness. Communities, however, may be encouraged to help produce more biomass per unit area so that their production exceeds requirement. Indirectly, by increasing their economic status through skill-oriented vocational training, so as to give them an opportunity to join either the mainstream economy or forest-related activities, such as afforestation, nurseries, fodder cultivation, etc.

Monoculture should give way to multiple species culture so as to encourage biodiversity at different levels of forest regeneration. For instance, monoculture of chil or eucalyptus is less economical and destructive to regeneration of ground vegetation, whereas, mixed plantations of willow, poplar, oak, fir, bamboo, wild fruit species and others are both economically viable and allow ground vegetation. In other words, a policy framework has to be developed to encourage mixed plantations of adaptable species, which are economically useful.

Traditionally, the *Gujjar* communities migrate along with their cattle to the high alpine pastures during summer and return to the lower hills during winter. Their perennial movement leads to degradation and destruction of pasturelands and forests, which have a great impact on soil erosion. Efforts were made by the government to rehabilitate them in permanent settlements, by providing them with free houses, opening schools and dispensaries for them and stall-feeding arrangement for their cattle. Unfortunately, the mindset of the *Gujjars* could not be transformed. There is need for an attitudinal change, through training, exposure and vocational skill-upgradation. Residential, health and educational services for their women and children, coupled with a collection mechanism for their produce, such as milk, milk products, meat and handicrafts, should be developed, so that they are motivated to settle down permanently. Inter-sectoral approaches, with forward and backward linkages with forests, should be adopted for making the economy vibrant, so as to provide rich economic dividends to the local communities.

In Himachal Pradesh's biodiversity, medicinal and aromatic plants are of special value, since these are localised and very few of them are available elsewhere. Conservation of such plants through a detailed inventory would be the first step towards determining the plant wealth of the state. Medicinal and aromatic plants in common use need to be listed and their multiplication techniques perfected, so that their exploitation does not lead to their extinction. Naturally-growing morels and slow-growing plant species should be protected with care so that they can regenerate naturally.

The role of the Forest Department should be more in preserving and conserving the rich biodiversity of such a resource, and private and community lands should be allowed to grow this on scientific lines for multiplication and mass propagation for commercial exploitation.

Primary processing units at the local level are a must, not only from the point of view of employment, but also for preserving their inherent values.

However, a strong modern research-based organisational support is necessary to extend the forests, preserve the dwindling plant and animal species and develop quick regeneration and multiplication technologies for medicinal and aromatic plants etc., with support from extension agencies, laced with modern information and communication technologies for making all concerned aware of the wealth that the forests represent.

In the changing conditions of global trade, timber assumes special importance, as efficient forest management alone can assure leadership in timber export to other countries. India already faces such a challenge, as timber imported from Malaysia and Thailand is of better quality and is priced lower than the indigenous product. This has serious implications for the forest policy of Indian states.

The Central Finance Commission should take cognizance of the concept of interdependence and interconnectivity of the forest-producer states and the user states in developing a sustainable environmental relationship and mutual economic benefits.

All the schemes and projects should have inter-sectoral linkages for better results.

The *Panchayats* need to be strengthened so that they can monitor forest development, check illegal encroachment and destruction, and remove bottlenecks and defects of a centralised administrative system.

Forest development activities are dependent upon management planning and efficient administration with the support of well trained executives and field workers. The research component is essential in developing suitable technologies in forest development and forest produce utilisation. Participatory involvement of juniors and field staff along with local communities is a must for increasing managing the forest cover on a sustainable basis.

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