

1 Background to Himachal Pradesh

The word *Himachal* is derived from two Hindi words: “*him*” meaning “snow” and “*achal*” meaning “lap.” Thus etymologically Himachal Pradesh is the region that lies in the foothills of the snowy area, or Himalayas.

Himachal Pradesh’s 12 districts cover 55,673 sq.km., approximately 1.7 per cent of the total land area of India and around ten per cent of the total area of the Himalayas. The state of Himachal Pradesh extends from the perpetual snow-covered mountains, which separate it from China in the north, to the plains of Punjab and Haryana in the south and west. It is situated between 30°22' and 33°12' N and 75°6' and 79°4'E. The elevation varies from 350 masl in the foothills to 6975 masl in the high hills. There are many fertile valleys in the foothills, such as Kangra, Paonta, and Nalagarh, as well as important valleys like Kullu, Balh, and Karsog in the higher areas.

1.1 The Land

1.1.1 Climate

The lie of the mountains and the altitude has a profound impact on climate. There are four main climatic zones: the alpine, mountain temperate, sub-tropical, and moist tropical zones. The alpine zone lies above 3,500 masl. The annual precipitation is less than 250 mm and occurs mostly as snow. The mountain temperate zone lies between 2,000 and 3,500 masl and has an annual precipitation of 250 to 1,000 mm. The sub-tropical zone lies between 800 and 2,000 masl. In this zone the

annual precipitation varies considerably with topography, with 15 per cent falling as snow and 75 per cent during the monsoon. The moist tropical zone lies between 350 and 800 masl and receives more than 1,000 mm rainfall during the monsoon.

This part of the Western Himalayas receives south-west monsoons. The level of rainfall differs from place to place depending on the location and direction of the hill slopes. There are wide variations between the rainfall in the dry zone belt and in places like Dharamshala. Rain shadow areas beyond the Pir Panjal ranges of Lahaul and Spiti, Pangi, and Kinnaur, receive less than 500 mm rain annually. In contrast, Dharamshala received nearly 2,500 mm of rain in 1988, the second wettest place in India. Precipitation in the dry zone is mostly in winter as snow, and only light showers occur in the rainy season. In the moist zone, 70 per cent of the total annual precipitation falls during the pre-monsoon and monsoon months (April-June and July to September) and the remainder in winter, mostly in the form of snow.

Approximately 5,000 sq. km. of the state lies above 4,500 masl and is under perpetual snow cover. The snowfall in the higher reaches of the inner Himalayas starts towards the end of August and early September and continues to March, with the bulk falling in January and February. The annual snowfall in this area is very heavy, ranging from 2.44 to 4.57 m. Snow falls from December to March at elevations of 3,000-4,500 masl, with an average annual snowfall of about 3m, and from December to February at

elevations between 1,500 and 3,000 masl, with an average annual snowfall of 0.3 to 1.22m. Although it snows down to an elevation of about 1,500 masl, the snow rarely lasts long below 2,500 masl.

The highest monthly maximum temperatures are experienced in June, and the lowest monthly minimum temperatures in January. The range of temperature is great, varying from sub zero levels in the north, to 40°C in the south during summer. The temperatures in the north drop rapidly from October on after the monsoon.

1.1.2 Agro-Climatic Zones

The state can be divided into four agro-climatic zones, corresponding to the four-physiographic zones, on the basis of agro-climatic conditions. The agro-climatic zones and their characteristics are described in Table 1.1.

1.1.3 Geology and Soil

The main hill and mountain ranges in the state are the Siwaliks, Dhauladhars, Pir Panjals, great Himalayas, and the Zaskar. In all these hill ranges, the relief increases from west to east and south to north. The outer range lies in the Kangra, Una, Bilaspur, Hamirpur, Solan, and Nahan districts and comprises the Siwalik hills, which run from northwest to south with small peaks and gentle slopes and elevations up to 1,250 masl. The Siwalik hills gradually merge into the lesser or middle Himalayas, with rugged peaks from 1,800 to 3,000 masl. This is the main coniferous forest belt. The inner and great Himalayan ranges start beyond these. This area contains predominantly coniferous forests, often inaccessible, and a large tract above the tree

line part of which is cold desert and part of which is under permanent snow cover.

Based on geological formations, Himachal Pradesh can broadly be divided into three main zones, the Northern Zone, the Central Zone, and the Outer Zone.

The Northern Zone (covering parts of Kinnaur, Chamba, and Kangra districts) is mainly composed of continuous, highly fossiliferous, marine sedimentary rocks such as quartzite, sandstone, shale, and limestone, ranging in age from earliest Palaeozoic to Eocene. Other rock types include granite, slates, quartzite, schists, and limestone.

The Central Zone (covering parts of Shimla, Bilaspur, Mandi, Kullu, Kangra, Chamba, and Sirmour districts) comprises the lesser Himalayas and a portion of the great Himalayas. The rock types here are mostly crystalline and metamorphic: granites, gneisses, schists, and phyllites with non-fossiliferous sedimentary deposits.

The Outer Zone (covering parts of Kangra, Bilaspur, Chamba, Mandi, Solan, Sirmour, Una, and Hamirpur districts) corresponds to the Siwalik range and is composed almost entirely of tertiary and recent river deposits. The rock types include sandstone, conglomerates, shales, clay, siltstone, and limestone. The low lying areas of this zone contain alluvial fans, river terraces, and gravel beds and are mainly composed of loose boulders and pebbles of different size mixed with sand, silt, and clay.

There is a considerable variation in soil type across the state, to a great extent dependent on elevation, which is reflected in the vegetative

Table 1.1: Agroclimatic Zones

Zone	Rainfall (mm)	Range (masl)	% of Area	Main Features
Shiwalik Hill Zone	1500	Up to 800	35	33% of cultivated area in the state
Mid Hill Zone	1800	800 to 1600	32	53% of cultivated area
Dry Hill Zone	1000-1500	1600 to 2700	25	11% of cultivated area
Cold Dry Zone	<200	Above 2700	8	3% of cultivated area

patterns. Five main 'soil zones' can be recognised.

- **The Low Hill Soil Zone** – This comprises areas up to 1,000 masl in Paonta Valley and the Nahan *tehsil* of Sirmour district, the Kunihar area of Solan district, and the lower Bhattiyat of Chamba District. The soils are not very deep and are embedded with stones. These areas are suitable for the cultivation of wheat, maize, sugarcane, ginger, paddy, and citrus fruits.
- **The Mid Hill Soil Zone** – This zone comprises areas between 1,000 and 1,500 masl in the lower parts of the Pachhad and Renuka *tehsils* of Sirmour district, the Arki and Solan *tehsils* of Solan district, the Jogindernagar area of Mandi district, the Kangra and Palampur *tehsils* of Kangra district, and the Dalhousie, Chamba *tehsil*, upper Bhattiyat, and lower Churah of Chamba district. The soils are greyish-brown, loam to clay, with a loam texture, and well-drained. These areas are suitable for growing potatoes, maize, and stone-fruits.
- **The High Hill Soil Zone** – This zone comprises areas 1,500 to 3,000 masl in the upper parts of the Pacchad and Renuka *tehsils* in Sirmour district, the upper Shimla hills, the upper parts of the Kangra and Palampur *tehsils* of Kangra district, and the upper Churah of Chamba district. The soils lie on steep slopes with good drainage, they are quite deep and there are no soil layers. The soil texture ranges from silt loam to clay loam and dark brown loam. This soil is good for seed potatoes and temperate fruits.
- **The Mountainous Soil Zone** – This zone comprises areas between 3,000 and 3,500 masl in Shimla district and the higher parts of Sirmour and Chamba districts. The soils are shallower than in the high hills, and the texture ranges from silt loam to dark brown loam. These soils are not of much agricultural use.
- **The Dry Hill Zone** – This zone comprises the district of Kinnaur and the Pangi sub-*tehsil* of Chamba district.

1.1.4 The Fauna

Himachal Pradesh is bountifully endowed with many varieties of fauna. The important fauna can be classified broadly as inhabitants of the zones above 2,300 masl (the alpine pastures close to the snowline) and below 2,300 masl.

The important game birds and animals found in these two zones are as follow.

- **Animals**
Above 2,300 masl: the Tibetan nian, blue sheep, ibex, thar, serow, musk deer, brown and black bear, snow leopard, Himalayan civets, Himalayan weasels, snow fox, and leopard
Below 2,300 masl: the ghoral, barking deer, sambhar, spotted deer, panther, black bear, common fox, Himalayan palm martin, and nilgai
- **Game Birds**
Above 2,300 masl: the snow cock, tragopan, monal, *plash* or *koklash*, snow pigeons, and partridges
Below 2,300 masl: the *chakor*, *khalij* pheasant, *chir* pheasant, red jungle fowl, black and grey partridges, pigeons, doves, and quails

1.2 The People

After independence in 1948, Himachal Pradesh (HP) was created as a Chief Commissioner's Province by amalgamation of 30 small hill states previously ruled by numerous Rajas. Bilaspur, another princely state, was merged into it in 1954. The State was made a Union Territory on November 1, 1956. In 1996 the Punjab was re-organised, a new state of Haryana was carved out, and hill areas of the Punjab were merged into Himachal Pradesh (the Kangra, Shimla, Kullu, and Lahaul and Spiti districts, the Nalagarh area of Ambala district, parts of Una *tehsil* of Hoshiarpur district, and parts of Pathankot *tehsil* of Gurdaspur district). In December 1970, the bill to grant statehood to Himachal Pradesh was introduced in Parliament, and full statehood was granted on 25 January 1971.

1.2.1 Area and Administrative Setup

HP is divided into 12 districts, 45 sub-divisions, and 72 development blocks. The names and areas of the districts are shown in Table 1.2.

Lahaul and Spiti, and Kinnaur districts, and the Bharmour and Pangi sub-divisions of Chamba district are tribal areas. Lahaul and Spiti is the largest district and Kangra the most populous.

1.2.2 Population

Table 1.3 shows the total population and households according to the 1991 census, and the distribution between urban and rural areas and between districts. In 1991, the population of Himachal Pradesh was 5,170,877, with 2,617,467 men and 2,553,410 women (976 women per thousand men). There were 969,000 households, giving an average household size of 5.3. The number of young

people is large. In 1981, 39.7 per cent of the population was less than 15 years old; 52.8 per cent between 15 and 59, and only 7.5 per cent more than 60. The overall population density in 1991 was 93 per sq. km. but with a wide variation across the state. Kangra is the most densely populated district with 205 people per sq. km.; and Lahaul and Spiti district the least with 2.3 people per sq.km.

The vast majority of the population (91%) is rural. Only a few districts have a large urban population, the largest in Shimla (25% urban). In the majority of cases, rural households are almost entirely dependent on wood for cooking, heating, construction of houses and other buildings, and agricultural implements and other tools; whereas the wood consumption in urban areas, except for housing, is minimal.

According to the 1991 census, 25.3 per cent of the population, or 1,310,296 people, belonged

Table 1.2: Districts

Name	Area (sq.km.)	Name	Area (sq.km.)
Bilaspur	1,167	Lahaul & Spiti	13,835
Chamba	6,528	Mandi	3,950
Hamirpur	1,118	Shimla	5,131
Kangra	5,739	Sirmour	2,825
Kinnaur	6,401	Solan	1,936
Kullu	5,503	Una	1,540

Table 1.3: Population and Households in the Districts of Himachal Pradesh

Name of District	Total Population			No. of households		
	Urban	Rural	Total	Urban	Rural	Total
Bilaspur	16,735	278,652	295,387	3,818	48,737	52,555
Chamba	29,889	363,397	383,286	6,758	67,025	73,783
Hamirpur	22,686	346,442	369,128	4,868	64,202	67,176
Kangra	59,349	1,114,723	1,174,072	12,849	205,535	218,384
Kinnaur	-	71,270	71,270	-	16,439	19,439
Kullu	21,001	281,421	302,432	5,513	51,894	57,407
Lahaul & Spiti	-	31,294	31,294	-	6,492	6,492
Mandi	55,769	720,603	776,372	13,138	130,462	143,600
Shimla	126,132	491,272	617,404	33,908	89,613	123,521
Sirmour	38,074	341,621	379,695	8,246	57,448	65,494
Solan	47,279	334,989	382,268	11,864	59,386	71,250
Una	32,272	345,997	378,269	6,511	64,206	70,717
Total HP	449,196	4,721,681	5,170,877	107,573	861,445	969,018

to the Scheduled Castes and 4.2 per cent, or 218,349 people, to the Scheduled Tribes. Overall 93.7 per cent of the total Scheduled Caste population and 97.5 per cent of the Scheduled Tribe population are rural.

The tribal groups inhabit the belt of land comprising the districts of Kinnaur and Lahaul and Spiti and the Pangi and Bharmour subdivisions of Chamba district. The total area of this belt is 23,655 sq. km., with a population of 220,000. The area is inaccessible and the climate very harsh, cold, and dry. There are very few natural resources and the conditions are unfavourable for agriculture. The area has been declared a Scheduled Area under the 5th Schedule of the Constitution of India and the State has had a separate tribal sub-plan since 1974-75. Above average funds flow to the Tribal Sub-Plan, 8-9 per cent of the total in the State Plan for 4 per cent of the population. The tribal areas are developing and the developmental gap between these areas and the rest of UP seems to be narrowing. It seems that the efforts aimed at accelerated growth are having an impact.

According to the 1981 census, there were 36,002 Gujjar and 76,859 Gaddi people (migratory shepherds) living in the state, distributed unevenly across all districts except Hamirpur.

The 1991 census identified 42.8 per cent of the population as 'workers (34.4% men and 8.4% women) and the remainder as 'non-workers'. Of the workers, 63.3 per cent were engaged as cultivators, 3.3 per cent as agricultural labourers, 1.4 per cent as workers in household industries,

and the remaining 32 per cent in other occupations, including employees.

The 1981 census identified four main religions in the state: Hindu (95.8% of the population), Muslim (1.6%), Buddhist (1.2%), and Sikhs (1.2%). Christians comprised 0.1 per cent and Jains 0.02 per cent of the total population.

1.2.3 Population Growth

The growth in population per decade since 1900 is shown in Table 1.4.

The rate of population growth has increased fairly steadily, reaching a peak of 2.3 per cent per annum between 1971 and 1981, and dropping slightly to 2.1 per cent per annum in the last decade for which figures are available. The population doubled in the last fifty years, although the overall population density remains low. The population growth rates of Scheduled Castes and Scheduled Tribes between 1981-91 were slightly more (2.4%) and much less (1.1%) than the average for the state, respectively.

1.3 Socioeconomic Conditions

Over 91 per cent of the population lives in rural areas and is heavily dependent on natural resources for its livelihood. There are 19,383 villages in the state, 16,997 inhabited and 2,391 uninhabited, and 58 notified towns. Shimla is the capital, and there are a number of other towns like Kullu-Manali, Dharamshala, Dalhousie, and Chamba that are well known as tourist hill resorts. Settlement

Table 1.4: Population Growth Per Decade

Year	Population	% growth
1901	1,920,294	--
1911	1,896,994	- 1.22
1921	1,928,206	+ 1.65
1931	2,029,113	+ 5.23
1941	2,263,245	+ 11.54
1951	2,385,981	+ 5.42
1961	2,812,463	+ 17.87
1971	3,460,434	+ 23.04
1981	4,280,818	+ 23.71
1991*	5,170,877	+ 20.79

* Source: Government of India Census Handbook series, 1991

patterns vary widely across the agro-climatic zones. In the interior areas, there are only a very few villages. Outside, the towns are expanding at a very rapid rate. The settlement pattern is becoming highly dispersed with entire hillocks in the lower and middle hills now dotted with hamlets. Settlements along roadsides are becoming urbanised, and new, small townships are emerging. Industrial belts are being established in the valleys in the Shiwalik zone.

The literacy rate is 63.9 (1991 census), the second best in India after Kerala. On 15th April 1996, Himachal Pradesh was declared a fully literate State.

As a result of the greater emphasis since the 1970s on employment generation and development of infrastructure in rural areas, great strides have been made in all round development and improving the economic conditions. The per capita annual income (at 1993-94 prices) is Rs. 6519, compared with Rs. 6,929 for all India. There is a potential work force in the state of more than 2.1 million (in the age group from 15-59 years). Every year more than 100 million people-days of employment is generated for people through different development schemes. In the forestry sector alone, 5.3 million people-days were generated during 1992-93, 9 million people-days during 1993-94 and 6.4 million people-days during 1994-95, in addition to more than 5 million people-days generated each year indirectly through self employment of people in allied forestry activities like collection of seeds, medicinal herbs, and saw mills.

All the villages in HP have been electrified, and 86 per cent had been provided with drinking water by 1988-89, a feat which few States in India have emulated. Himachal Pradesh has a potential of 20,000 MW capacity of hydro-electric (hydel) power, and could supply electricity to all of north India if this potential were exploited. At present, 25 per cent of this potential is being harnessed. Joint ventures are being set up with other state governments, the Government of India, and various international institutions and firms, to develop the hydropower potential. A large number of mini- and micro-

hydel power projects are being set up on smaller rivulets and *nallah* to meet local domestic demands.

A large network of all weather roads now links almost every part of the state, including formerly inaccessible areas. In 1950, there were only 180 km of roads in the state, this increased to 9,443 km by 1970 and 19,415 km, or 35 km of road per 10 sq.km; by 1994-95.

Development of horticulture, especially of stone fruits in the lower hills and apples in the middle and higher hills, has helped greatly to transform the economic conditions of the people in this region.

1.4 Land Use, Agriculture, Horticulture and Livestock

1.4.1 Land Use Classification

Land use classification is the systematic arrangement on the basis of certain defined characteristics of the types of land used or suitable for certain activities. The Revenue Department carries out a cadastral survey of land use; based on nine major land use categories, using the primary records maintained by each village accountant or *patwari*. These are the records maintained by the Director of Land Records. Overall only 23,134 sq. km. (3,395,434 ha), or 61 per cent of the total area of the state, is recorded in the village revenue records, however, and much of the land area is not included, in particular areas of forest away from villages. The Department of Forest, Farming, and Conservation uses a different system of land-use classification for its 'Forest Statistics' covering the entire land area of the state. The definitions in the two systems do not correspond completely. Table 1.5 shows the land use in HP according to the two systems.

1.4.2 Agriculture

Agriculture is the main occupation of the people of Himachal Pradesh and has an important place in the economy of the state. It provides direct employment to about 71 per cent of all

Table 1.5: Land Use (in sq. km.)

Category	Land Records 1992-93	Forest Statistics 1993-94	
	Area	Area	% of Total
Geographical area (professional survey)	55,673	55,673	
Area by village records	23,134	-	
Forest Area	10,380	37,591	67.5
Barren and uncultivable land	1,460	-	
Land put to non-agricultural uses	2,013	1,932	3.5
Cultivable waste	1,204	1,252	2.3
Net Area sown	5,726	5,828	10.5
- Area sown more than once	(4,001)	-	
- Total cropped area	(9,726)	-	
Current fallow	485	-	
Other fallow land	228	601*	1.1
Land under miscellaneous tree crops not included in cultivation	428	483	0.9
Permanent pastures and other grazing land including alpine pastures, barren and uncultivable waste etc.	1,210	7,986	14.3

* includes current fallow

workers, and income from agriculture and allied sectors accounts for 36 per cent of the total State Domestic Product. The agricultural census of 1990-91 (provisional), showed the area of holdings used for agriculture to be about 1,014,00 ha, held by 844,000 farmers, an average holding size of 1.2 ha. The distribution of landholdings according to size is shown in Table 1.6.

Prior to the 7th Five Year Plan, 1985-90, the main emphasis was on increasing the production of cereals and cash crops through adoption of an improved package of practices like using high-yielding varieties of seeds, fertilizers, plant protection measures, distribution of improved

implements, soil and water conservation measures, and effective dissemination of technical know-how to farmers.

In the annual plans for 1990-91, 1991-92, 1992-93, and the 8th Five Year Plan, 1992-97, emphasis has been laid on the production of vegetables, potato, pulses, and oilseeds, as well as increasing the production of cereal crops through timely and adequate supply of inputs, bringing more area under irrigation, and demonstrations and effective dissemination of improved farm technology. In 1993-94, 1,240 thousand tonnes of food grain were produced. Targets of 1,530 and 1,550 thousand tonnes were set for 1994-95 and 1995-96, respectively.

Table 1.6: Land Holding Sizes in Himachal

Size of Holding (ha)	Category of Farmer	No. of Holdings (in '00s)		Area ('00 ha)		Average Size of Holdings (ha)
		Total no.	% of total	Total area	% of total	
Below 1.0	Marginal	5,380	63.7	2,180	21.5	0.4
1.0-2.0	Small	1,680	19.9	2,285	22.5	1.4
2.0-4.0	Semi-medium	961	11.4	2,611	25.7	2.7
4.0-10.0	Medium	366	4.3	2,069	20.4	5.7
10.0 & above	Large	55	0.6	1,001	9.9	18.1
Total		8,442	100.00	10,146	100.00	1.2

The agro-climatic conditions in many parts of the state are suitable for the production of cash crops like fruit, potatoes, ginger, mushrooms, and off-season vegetables, as well as allied activities like bee-keeping. In tribal areas, traditional patterns of agriculture are undergoing a change, and crops like apples, hops, seed potatoes, *kuth*, and off-season vegetables are being introduced.

As a result of the higher productivity and income per unit area from fruit crops, horticulture is playing a vital role in improving the socioeconomic conditions of the rural population in the state. Considerable incentives are provided to the horticultural sector by the State Government, including provision of fungicides and pesticides at subsidised rates under plant protection measures and schemes. At present, apples are the main fruit crop, but mango, citrus, and stone fruits are also increasing. The total area under different horticultural crops has increased steadily, reaching 170,568 ha in 1990-91. Fruit production increased from 148,000 tonnes in 1970-71 to 460,000 tonnes in 1989-90 and was projected to reach 587,000 tonnes in 1994-95. The major increase has been in the production of apples; output nearly trebled between 1970 and 1995. Wild fruit trees are available in abundance in many parts of the state. These are being top-worked with improved varieties of fruits. During 1994-95, 133,000 wild fruit trees were top-worked. Horticulture has a great potential in the state, which has already earned the nickname '**apple bowl of India**'.

Special efforts are being made to diversify the horticultural industry through promotion of other horticultural crops of economic importance like olives, figs, hops, kiwi fruit, and strawberries. Efforts are also being made to promote ancillary horticultural activities like mushroom production, bee-keeping, and flower production. By the end of 1994, 10 ha had been brought under flower cultivation and 18 Flower Growers' Cooperative Societies had been registered. In 1998, there was a record production of 130 tonnes of hops (dried). A hop drying and processing unit with a capacity of 18 tonnes (wet) per day has been set up in

the tribal areas. Pasteurised compost for mushrooms is produced at two departmental mushroom development projects located at Chambaghat and Palampur and distributed regularly to mushroom growers. The Himachal Pradesh Marketing Cooperation, a state government undertaking, processes fruit and markets various products like squashes, juices, and jams all over India and in international markets.

Efforts have been made to introduce modern technology in orchard management to improve the productivity of horticultural crops. These include things like drip irrigation systems in orchards, to maximise the benefits of available irrigation water, and greenhouse technology to increase the quality and production of fruit, vegetables, and flowers. Subsidies ranging from 10 to 50 per cent are given to farmers for the adoption of these new technologies. Besides this, plastic crates have been provided at a 50 per cent subsidy to orchard farmers for picking and carriage of fruit under the National Horticultural Board's assistance scheme.

The State Government provides a 50 per cent subsidy to farmers for soil conservation measures on agricultural land. An area of 1.650 ha was covered under soil conservation measures on agricultural land in 1993-94 and 1.850 ha in 1994-95.

1.4.3 Livestock

The role of livestock is intimately interwoven with the livelihood of all rural people in the hill economy of the state. Rearing, tending, and harvesting of livestock is a way of life for almost all the rural population, and the transhumant Gaddi and Gujjar tribes are almost solely dependent on livestock for their livelihood. The Gaddi are semi-nomadic. They have small landholdings not sufficient for subsistence and raise sheep and goats for income. The Gujjar are mostly found in Chamba, Kangra, and the upper parts of Shimla. They are nomads who have no landholdings and they keep buffalo and cattle for subsistence. Both groups follow a system of migratory grazing using high alpine pastures or fir forests in the summer

months after the snow has melted and forests in the lower areas in winter. The semi-nomadic cycle is dictated by the climate and the availability of grazing. The flocks travel more than 600 km every year on their migratory journeys.

In Gaddi communities, men do most of the management of the migratory flocks. Households often share the duties with two or three members working in rotation, or together if it is a big flock, and often joining with other flocks for all or part of the grazing cycle. The women are responsible for all agriculture, apart from ploughing, and for non-migratory livestock. In Gujjar communities, the women migrate with the men to the lower hills in winter. Gujjar communities also migrate to the plains in Punjab, Haryana, and Uttar Pradesh where they have winter grazing rights.

The grazing rights granted to transhumant groups can be classified into three categories:

- the right to hold a flock;
- the right to graze an area; and
- actual access to an area.

The right to hold a flock is given by the Forest Department through permits, which are inherited. Shepherds pay a grazing tax or *tirni* of Rs. 40 per 100 goats and Rs. 20 per 100 sheep. No new permits are given and the number that a grazer may have is restricted to 1971-72 levels. These restrictions are not always respected—shepherds without permits have been found to indulge in migratory grazing. The right to graze an area comes from inherited customary rights that were given by the erstwhile kings of princely states. The right to graze an area and actual access were codified in Anderson's forest settlement of 1896-1897 of Kangra and Kullu. The actual access specified the names of pasture lands allotted to individuals and groups of grazers.

Although the right to graze continues without much restriction in high pastures and forests, the right to graze in the lower hills and on the plains that continue into Uttar Pradesh, Haryana, and Punjab has suffered increasingly

from restrictions imposed by the Forest Departments of Himachal Pradesh and by private landlords. It has also been affected by the lack of *shamlat* and community lands and the shrinkage of private lands resulting from the fragmentation of agricultural holdings. This often leads to conflict over grazing between the nomadic Gaddi and Gujjar and local communities.

The State government has set up a Gujjar and Gaddi Advisory Board and initiated several schemes to promote the permanent settlement of transhumant grazers. In Chopal and Kangra, some Gujjar and Gaddi have now settled on the lands allotted to them, but most prefer to remain nomadic.

The Overall Situation in HP

The grazing livestock population in 1992 was estimated at 5.09 million (census figures). The distribution by animal type and district is shown in Table 1.7. These animals are dependent on forests for fodder and grazing. The Department of Forest Farming and Conservation (DFFC) estimates that forest floor and pasture lands now provide about 7.2 million tonnes of grass to 5.2 million grazing animals and account for 80-85 per cent of the total fodder requirements. The remaining fodder is obtained as cut grass and leaf litter from the farmers' fields, *ghasnies* (grasslands), common lands, and other places. The entire forest floor is subject to heavy grazing. Almost all large livestock graze for varying periods in the forests without any restrictions. As a result there is virtually no natural regeneration. Even plantations are grazed recklessly.

Most of the animals belong to nondescript indigenous breeds with very low productivity. As a result of various livestock improvement programmes, the quality of livestock has marginally improved over the years. At present 10 per cent of cattle, 32 per cent of buffaloes, and 13 per cent of sheep in the state belong to improved breeds. These cattle are stalled. The productivity level of the pasture land is also very low as a result of unrestricted and over grazing. In many places, unpalatable grasses have replaced the fodder grasses. Heavy grazing has also resulted in accelerated soil erosion

Table 1.7: Livestock Census of Himachal Pradesh by District, 1992

District	Number of Animals						
	Cattle	Buffalo	Sheep	Goats	Horses & Ponies	Other	Total
Bilaspur	60,461	86,858	24,615	63,472	655	496	236,557
Chamba	238,988	34,832	258,490	175,268	2,355	2,578	712,511
Hamirpur	60,671	94,089	49,498	30,719	1,355	309	236,641
Kangra	398,558	147,386	155,432	205,024	8,638	711	915,749
Kinnaur	20,937	3	57,720	28,622	1,371	4,289	112,942
Kullu	157,448	670	109,835	56,384	1,195	73	325,605
Lahaul & Spiti	8,910	--	42,766	11,445	1,451	3,954	68,526
Mandi	430,331	107,676	196,041	203,270	4,621	317	942,256
Shimla	329,055	23,258	126,531	95,831	4,478	645	579,798
Sirmour	235,557	40,108	27,616	115,915	2,059	463	421,718
Solan	143,491	74,349	19,713	82,541	1,440	621	322,155
Una	67,209	91,694	6,088	47,100	515	291	212,897
Total	2151,616	700,923	1074,345	115,591	30,133	14,747	5087,355

and compaction of the soil. As a result the productivity and carrying capacity of such pastures has been reduced considerably. As yet, however, no special survey has been performed of the carrying capacity of pasture, grazing land, and common wasteland.

There are two distinct types of grazing pattern depending on the altitude and climate. In the lower and middle hills (e.g., Shimla) the predominant livestock are cattle, whereas in the pastures of the higher hills and alpine areas most of the grazing animals are sheep and goats. According to DFFC records, every year grazing permits are issued for around 880,000 sheep and goats (approximately half each) in the alpine pastures. Permits for buffalo grazing are issued to Gujjar. During 1993-94, the DFFC issued alpine pasture grazing permits for approximately 26,000 large animals (17,300 buffalo, 1,800 cows, 2,000 horses, and 4,800 calves), and a field survey showed slightly more than 22,000 animals to actually be grazing.

Despite licensing, grazing is indiscriminate and heavy. And this heavy grazing is also having a negative impact on the medicinal herbs and shrubs that are an important feature of the alpine pastures.

The State Land Use and Wasteland Development Board has studied the carrying capacity of selected pastures and grazing lands in the Palampur and Shimla hills and extrapolated the results to estimate the carrying capacity of the pasture land in the whole state. The pasture land in the state was divided into three zones: the lower hills, the mid hills, and the high hills and alpine zone. The total area of pasture and the estimated carrying capacity in each zone is shown in Table 1.8, and the total number of grazing animals in the state in Table 1.9 (1987 census).

The weighted average carrying capacity for the state was 1.28. Thus the total area of pasture of 1.2 million ha could sustain the equivalent of about 1.55 million cattle equivalent units. But

Table 1.8: Pasture Land in Himachal

Zone	Area Available		Carrying Capacity (per ha per annum)	
	Million Ha	Per Cent	Animal Units	Cattle Units
I- Lower Hills	0.317	26.2	2 Cattle	2.0
II- Mid Hills	0.543	44.8	6 Sheep	1.2
III- High Hills and Alpine	0.352	29.0	2 Sheep	0.4
Total	1.212	100.00		1.28

Table 1.9: Grazing Animals in Himachal Pradesh (1987)

Category	Number (million)	Cattle Equivalent Units	Total Cattle Units (million)
Cattle	2.25	1.0	2.45
Buffalo	0.79	1.5	1.19
Sheep	1.11	0.2	0.22
Goat	1.12	0.2	0.22
Total	5.27		4.08

there are more than 4 million cattle equivalent units of animals grazing, more than two and a half times the carrying capacity.

As yet, no satisfactory way has been found to mitigate the problem of overgrazing. Efforts made towards pasture management and the propagation of medicinal herbs are still on a miniscule scale and have yet to show any tangible results. In 1968, the Government of Himachal Pradesh constituted a Grazing Advisory Committee. This Committee submitted its report in 1970 and made several recommendations including freezing the number of cattle, setting controls on migratory and nomadic herds and flocks (registration and enumeration of flocks, fixation of routes to be followed by nomadic herds), levy of uniform grazing fees, closure of not more than 1/3rd of the grazing area allotted to a particular grazer at any given time, levy of a tax on goats and buffaloes, and reduction of the excess number of goats and buffaloes in a phased manner. But instead of decreasing, the number of grazing animals increased from 4.2 million in 1966 to 5.2 million in 1987, with only a slight reduction to 5.1 million in 1992. The grazing advisory committee restricted its recommendations to management issues only. But what is really needed is a better assessment of the carrying capacity of forests and pastures.

The efforts of the Animal Husbandry Department are limited to providing animal breed improvement services. Little is being done by NGOs and other agencies, although a cattle improvement programme has been included in the Forest Department under the World Bank aided Kandi Programme, and in the GTZ assisted Changer Programme. Under these programmes farmers are given a subsidy to discard scrub cattle and buy

improved breeds, and helped to build *go-sadans* (animal sheds). These projects are programme and area specific and have not contributed significantly to reducing the population of grazing animals. Similarly, the DFFC pasture improvement schemes have not led to the desired improvement in the productivity of pastures because of poor range management experience and socio-political resistance to closure of areas to grazing.

Within the state, the Animal Husbandry Department is responsible for livestock improvement and providing fodder. Animal husbandry has an important role to play in boosting the rural economy. The development programme of the Animal Husbandry Department includes: (i) animal health and disease control; (ii) cattle development; (iii) sheep breeding and development of wool; (iv) poultry development; (v) feed and fodder development; and (vi) veterinary education. Several schemes are being implemented. These are: (a) the key village scheme; (b) the hill cattle development programme; (c) the intensive cattle development project; (d) breeding facilities through hospital/dispensaries/bull centres; and (e) artificial insemination centres.

With the aim of improving the quality of sheep and wool, government sheep breeding farms at Jeori (Shimla), Sarol (Chamba), Nagwain (Mandi), Tal (Hamirpur), and Karchham (Kinnaur) are supplying improved sheep to farmers in the state. The flock strength in these farms is 1,900. About 600 rams were planned to be distributed to farmers in 1994-95. In view of the increasing demand for pure hoggets, and the established popularity of the Soviet Merino and American Rambouillets in Pradesh, the state has switched to pure breeding at the existing government farms. Five sheep extension centres

are in operation in Kothikohar (Kangra), Swar (Mandi), Bagipul (Kullu), Dodra-Kawar (Shimla), and Choori (Chamba). Under the special livestock production programme for sheep development, sheep are supplied at subsidised rates and loans are also provided for this purpose to the small and marginal farmers and agricultural labourers in Sirmour district. Improved sheep are also being distributed, dipping and drenching facilities provided to breeders, and pastures being improved, under an intensive sheep development project in operation in the Bharmour, Chamba, and Bhattiyat *tehsils* of Chamba district. Programmes have also been organised for mass drenching of sheep and training progressive sheep breeders. Wool production in 1994-95 is likely to be in the order of 1,6 million kg.

Other initiatives include the establishment of angora rabbit farms at Palampur (Kangra) and Nagwain (Mandi) for distribution of rabbits to breeders, and of 14 poultry farms/centres to provide improved poultry birds and hatching eggs. High milk-yielding breeds are conserved by providing high quality feed and fodder with rich nutritional value. Breeders are supplied with good quality fodder roots, fodder seeds, and fodder trees at nominal prices. The fodder is grown on agricultural lands and the roots and seeds also used to improve pastures.

1.4.4 Fisheries

Himachal Pradesh is blessed with vast and variegated fishery resources in the shape of networks of rivers, sprawling reservoirs, and

much fast-flowing cold water harbouring a wide range of temperate, sub-temperate, and tropical fish species. The state waters are mainly classified into riverine, lacustrine, recreational, and pond waters, and offer considerable potential for the development of fisheries. About 12,000 fisher families in UP depend directly or indirectly on these waters and earn their livelihood by fishing. The production of fish seed was made a priority in 1994-95, and as a result 18.2 million carp seed and 3,630 tonnes of fish were produced. A trout seed farm is under construction (the Holi (Chamba) and Cooperative Seed farm, Sultanpur (Chamba)). An agreement was signed with the Royal Government of Norway and the Government of India provided a grant of Rs. 2.5 million for a Trout Farming Project at Katrain in Kullu. The adoption of modern fish culture/capture practices in the management of reservoir fisheries in the state has increased production considerably. In 1994, Gobindsagar reservoir showed a record production of 929 tonnes compared with 758 tonnes in the previous year, an increase of 22.5 percent. The Department of Forest Farming and Conservation has also initiated a Fisherman Accident Insurance Scheme and Fishermen Risk Fund Scheme to help mitigate losses incurred during natural calamities. Centrally sponsored schemes offer subsidies of up to Rs. 20,000 for the construction of new ponds, Rs. 8,000 for the renovation of derelict ponds, and Rs. 2,000 for the construction of running water fish culture units, with the aim of boosting pisciculture in rural areas and generating employment for young people.