

## II. AGRICULTURAL PROFILE OF HIMACHAL PRADESH

### Agro-climatic and Economic Factors in Vegetable Growing

In several parts of Himachal Pradesh, which is an important constituent of the Western Himalayan Region, the agro-climatic conditions are conducive to the production of off-season vegetables. Capsicum, tomatoes, peas, beans, cole crops, and cucumbers are the important vegetable crops being successfully grown in the State in the season when their supply from the plains of Northern India is almost nil. This offers a captive market for these crops in the towns and cities of Punjab, Haryana, Western Uttar Pradesh and Delhi itself. Thus the State of Himachal Pradesh has absolute advantage in vegetable production compared to other crops and to other States during the off-season.

On the basis of varied agro-climatic conditions the State can be divided into four zones: sub-tropical, sub-temperate, temperate, and cold/dry. Associated elevation and rainfall conditions are set out in Table 1 together with area coverage and of off-season vegetables grown.

Vegetables play a unique role in developing countries in the economic and social spheres for enhancing income as well as nutritional status of rural masses. The majority of the population in the hills are vegetarian. The consumption of fruits and vegetables estimated in the hilly areas is far below the recommended nutritional standard requirement of 230 grams per day. The low consumption of vegetables and fruits in the hills clearly indicates that the population is suffering from malnutrition. According to the National Commission on Agriculture, the normal requirement of vegetable on the basis of nutritional standard, is 72 kg per capita per annum but the present per capita consumption of India is hardly 15 kg per annum. The Commission has estimated that by 2,000 AD, the country would require about 80 million tons of vegetables which would be raised from an area of about 4 million hectares. This means that vegetable production has to be increased by 5 times from the existing level.

Besides nutritional advantage, vegetable cultivation plays a crucial role in the production pattern of agriculture due to its higher return and employment generation potential per unit of area. For reasons of high population pressure on land, the farming is labour intensive and is likely to continue so because of high rate of population growth. Scale economies are small in labour intensive agriculture and there is not much pressure towards large scale farms.<sup>1</sup> In the hills due to small size of holdings, availability of labour is in abundance and it can be used over a diverse set of enterprises. Vegetable cultivation is one such enterprise. Subrahmanyam (1983) emphasised that adoption of vegetable cultivation by marginal and small farmers not only increases their income but also offers good potential for additional direct and indirect employment.

1. Heady, E. D., Economic and Social Conditions Relating to Agriculture and its structuring to year 2000, CARD Miscellaneous report. The Centre for Agricultural and Rural Development, Iowa State University, Ames, Iowa, 50011:2.

**Table 1: Agro-climatic Zonation for Off-season Vegetable Production in Himachal Pradesh**

Zone	Elevation (a.m.s.l. in metres)	Rainfall	Area covered	Important off-season vegetables grown
Sub-tropical	0365-0914	600-1000	Una, Hamirour, adjoining areas of Kangra, Chamba, Solan Sirmaur and the valley areas of Mandi District.	
Sub-temperate	0914-1543	900-1000	Mid-hills of Kangra, Mandi, Kullu, Solan, Sirmaur, adjoining areas of Shimla with Mandi, Kullu, Solan and Sirmaur districts.	Tomato, capsicum, beans, peas.
Temperate	1523-2742	900-1000	More than 90 per cent of Kullu & Shimla districts. Ten to 20 per cent of Sirmaur Kangra, Mandi, and Chamba	Cauliflower, cabbage, beans, peas, radish, turnip and carrot.
Cold & dry	1523-3656	250-400	Lahaul-Spiti, 98 per cent of Kinnaur, Pangi and Bharmaur tehsils of Chamba, Bara & Chata Bangal of Kangra District.	Peas, cabbage, and onion.

### Structure of Agriculture and Role of Vegetables

The Economy of Himachal Pradesh is dominated by the agricultural sector. More than 80 per cent of the population of the State depends upon agriculture for its livelihood. It provides direct employment to 71 per cent of the working population of the State. The share of the agricultural sector in net domestic product is more than 43 per cent, of which the farm sector alone contributes about 27 per cent. Nearly 77 per cent of the farmers in the State have less than 2 ha of holdings, covering 33.62 per cent of total operated area. Holdings above 2 ha contribute more than 66 per cent of the total operated area. The average size of holding comes to 1.6 ha. The net sown area which is an indicator of effective utilization of land, accounted for 18.5 per cent of the total geographical area and it increased at 0.36 per cent annum during the last 17 years. Foodgrains dominate the scene in the cropping pattern followed by fruits and vegetables. The cropping intensity is calculated at 170.6 per cent. The area under vegetables excluding potatoes increased from 4,692 ha in 1976/77 to 11,490 ha in 1985/86 i.e. about 145 per cent (Table 2).

**Table 2: Change in Area Under Vegetables in Himachal Pradesh, 1976/77 to 1985/86**

(Area in hectare)

District	Years		Percentage change over 1976/77
	1976/77	1985/86	
Lahaul-Spiti	10	343	3330
Mandi	355	2559	620
Kinnaur	40	153	282
Solan	916	2975	224
Sirmaur	189	583	208
Kullu	350	731	108
Shimla	1424	2910	104
Una	221	372	68
Bilaspur	123	143	16
Kangra	473	546	15
Chamba	159	52	-67
Hamirpur	432	123	-71
<b>Himachal Pradesh</b>	<b>4692</b>	<b>11490</b>	<b>145</b>

Source: Directorate of Land Records, Shimla.

During the last ten years, the area under vegetables increased in all the districts of Himachal Pradesh except Chamba and Hamirpur. Lahaul-Spiti, which hardly grew any vegetables in the mid-1970s, recorded the highest increase in the area of vegetables in relative terms (more than thirty times) during this period. In the case of Mandi, the increase was more than seven times and five other districts more than doubled or trebled their areas cultivated with vegetables during the reference period. The leading districts in 1985/86 were Solan, Shimla, and Mandi (each having more than 2,500 ha) followed by Kullu, Sirmaur, and Kangra. These very considerable and widespread increases were achieved as a result of concerted efforts by the Government and the university in educating the farmers in off-season vegetable cultivation and supporting these efforts through research and development activities.

### Research and Development in Off-season Vegetables

#### *Historical Overview*

At the time of the formation of Himachal Pradesh in 1952, vegetable crops were grown for domestic and local markets only. Mr. Edward Buck (1984) had chronicled in his book 'Shimla, Past and Present' that only a very few farmers around Shimla grew vegetables then and that, they sold them to the Britishers who lived in Shimla in those days. Even during 1962, only a few hundred tons of fresh vegetables were taken to Shimla for marketing. By 1966, vegetable production had come to be acknowledged as a good cash crop in the mid-hills and about 30,000 tons of fresh vegetables were produced in the State in that year. By 1987/88 vegetable production had increased to 0.35 million tons.

Keeping in view the importance of the European type of vegetables, the Government of India in 1949 started the Central Vegetables' Breeding Station in Kullu Valley which is now known as I.A.R.I. Regional Station, Katrain. This station is located about 25 kms from Kullu Town on the Kullu-Manali road at an altitude of 1500 metres a.m.s.l. Three farms namely, Naggar, Bara gaon, and Sarasi are in the purview of this centre. These three farms are isolated from one another by a distance of about 2-3 kms. The Centre and the farms contributed greatly to the expansion of off-season vegetables' production in Kullu District and solved many of the problems of the vegetable growers in the fields of entomology and pathology. The Centre has also developed a large number of improved varieties of off-season vegetables, either by using traditional breeding techniques or the selection of new strains based on germ plasm collected from various places.

The Himachal Government on its part established a vegetable research station at Parala, Theog Tehsil, Shimla District in 1957. This station was headed by a Vegetable Botanist and its main aim was to evaluate vegetable crops suitable for the agro-climatic zones of Himachal Pradesh. In 1959, another research station was started at Solan with the aim to produce, test, and disseminate suitable varieties of vegetable crops. In 1961, a centrally sponsored scheme entitled, 'Production of Foundation Seeds of Temperate Vegetables at Kalpa' was started. In 1973, the research work was transferred to the Agricultural University and during the last one decade the University Scientists have worked on the various aspects of vegetable production, new varieties, disease and pest control, water management, etc.

#### *Development of New Varieties and Seed Production*

The Vegetable Department of the University has been able to make selections and develop suitable varieties of temperate and sub-temperate vegetables such as peas, tomatoes, cauliflowers, beans, cabbages, carrots, turnips, radishes, etc. The new varieties recommended for cultivation on the basis of the research conducted by the University are as follows:

Peas: Lincoln - is a dwarf, high yielding variety having dark green colour, sworck shaped, and well filled grains.

French beans: SVM 1 is resistant to angular leaf spot and high yielding.

Tomatoes: *Yashwant* is fairly field resistant to Buck eye rot. It resembles *Solan Gola* in other characters.

Chillies: Pachhad Yellow - is field resistant to Anthracnoss and is high yielding.

Okra: Selection 6-2 - is fairly field resistant to yellow vein mosaic and is high yielding.

Seed production techniques in temperate vegetables have been standardized in cauliflowers, cabbages, carrots, sugarbeet, and chickory. New varieties are replacing the old varieties grown by the vegetable farmers in the State.

Besides this, the Department of Agriculture of the State as well as the University are actively involved in the production of breeder seeds and their multiplication. At present four Government farms in the State are involved in vegetables seed production.

### *Pest and Disease Control and Extension Services*

In the field of pest and disease management, the University has been able to solve many problems of vegetable farmers. Buck-eye-rot (*Phytophthora nicotianse ver pasasitica*) is an important fruit disease of tomatoes. This disease is controlled by adopting cultural methods and spraying with mancoreb (0.25%) + Benzimidazola (0.02%) or Bordeaux mixture at 8 to 10 days interval. Similarly, diseases of capsicums, beans, cauliflowers and peas are being effectively controlled by the farmers based on the research conducted by the University.

Keeping in view the nature of vegetable crops and the cost structure, the Department of Entomology has developed a new system of Integrated Pest Management (IPM) which is becoming popular among the vegetable growers.

To disseminate modern techniques of off-season vegetable production and to solve problems regarding the control of pests and diseases in the vegetable growing areas, the Government of Himachal Pradesh has appointed two Agricultural Inspectors in each block. One of these has the responsibility of providing technical knowledge on agronomic practices and the supply of fertilizers and improved vegetable seeds, the second inspector is wholly and solely responsible for providing guidance to the vegetable growers in the field of plant protection and for the distribution and sale of plant protection materials. Recently, the Government has also started paying more attention to marketing aspects but much remains to be done in this area.