CHAPTER VII
CHAPTER - VII

Horticulture

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Fruits are natural sources of vitamins and minerals. These also supplement carbohydrates and proteins to varying degrees depending upon their composition. One of the easiest and cheapest ways to fortify the average daily diet with vitamins and minerals and some of the essential amino-acids for millions of people in India could be to ensure a certain minimum level of intake of fruits in preference to medicated pills and tonics.¹

The normal daily requirement of fruits for an individual according to nutritional standards is two ounces.² Again, consumption in this country is low as it is confined mostly to the urban sector, while people in the villages who form the bulk of the population, hardly take any fruit. All this shows that production has to be increased considerably to meet the basic requirement of the nation.


2. Ibid, p. 266.
According to their natural distribution, the various kinds of fruits are broadly classified as temperate, subtropical and tropical. A particular fruit grows best under conditions very similar to those in which it originated in nature. It is, however, possible to evolve varieties and develop cultural practices that would make its cultivation successful under varying conditions. Some fruits are known to thrive well under different climatic conditions without any special treatment.

**Horticulture in the Hilly Areas:** The population in the hill areas is comparatively thinly spread, density of population being 57 per square kilometre as against 144 for the country as a whole. Yet there is a heavy pressure on land as proportion of agricultural land is very much limited i.e. only about 4.8 percent of the geographical area and population inhabiting it is primarily rural. Due to the population pressure, ruggedness of terrain, fragmented plots coupled with altitude and distance and primitive methods of agriculture, the production per unit area is low. As such

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there is severe under-employment of manpower. The economic conditions of the people living in these areas is poor as compared to the people living in the plains because of small, scattered and un-economic holdings.\footnote{S.L. Katyal, op. cit. p.83.}

**Horticulture in Himachal Pradesh:** Himachal Pradesh is situated in the extreme north-west of India. Physiographically, the territory can be divided into two regions; southern and northern. The southern region of the Pradesh is as hot as the plains of Punjab, while the northern region has a temperate summer and winter with extreme cold and heavy snowfall. The Districts of Simla and Sirmour have alluvial soils while the remaining area has forest and hill soils.

Agriculture and horticulture are the most important occupations of the people of the Pradesh and more than 90 percent of the population of this State is directly or indirectly dependent on these occupations. The following table will indicate the occupational distribution in Himachal Pradesh as per last census.
### TABLE NO.7.1

**Occupational Distribution in Himachal Pradesh.***

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Item</th>
<th>No. of persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cultivators</td>
<td>9,03,273</td>
</tr>
<tr>
<td>2.</td>
<td>Agricultural Labourers</td>
<td>53,344</td>
</tr>
<tr>
<td>3.</td>
<td>Agricultural workers (total of 1 &amp; 2)</td>
<td>9,56,617</td>
</tr>
<tr>
<td>4.</td>
<td>Livestock, Forestry, etc., and allied activities</td>
<td>34,424</td>
</tr>
<tr>
<td>5.</td>
<td>Mining and Quarrying</td>
<td>1,344</td>
</tr>
<tr>
<td>6.</td>
<td>Household Industry</td>
<td>33,199</td>
</tr>
<tr>
<td>7.</td>
<td>Other than Household</td>
<td>20,176</td>
</tr>
<tr>
<td>8.</td>
<td>Construction</td>
<td>51,183</td>
</tr>
<tr>
<td>9.</td>
<td>Trade &amp; Commerce</td>
<td>31,748</td>
</tr>
<tr>
<td>10.</td>
<td>Transport, Storage and Communication</td>
<td>15,773</td>
</tr>
<tr>
<td>11.</td>
<td>Other services</td>
<td>1,34,168</td>
</tr>
<tr>
<td>12.</td>
<td>Total workers</td>
<td>12,78,632</td>
</tr>
<tr>
<td>13.</td>
<td>Total population</td>
<td>34,60,434</td>
</tr>
</tbody>
</table>

The agro-climatic conditions prevailing in the Pradesh are entirely different from the one existing in the plains. The need, therefore, was felt to evolve a strategy to make the best possible use of the limited land resource available. With the advance of horticulture in the Pradesh, it has been established that it gives higher return per unit of area as compared to the basic agricultural crops. It was, therefore, felt by the state Government that instead of concentrating on cereal production alone, more efforts should be made to accelerate the pace of development of horticulture, vegetables, vegetable seeds production and allied items, etc. As a result of these efforts, in the recent past, the production of temperate fruits, especially apples, has gone up which has gone a long way towards ameliorating the economic condition of the farmers. Keeping all these developments in view, a separate Department of Horticulture was set up in 1970 to bring at least one-third of the culturable area in the Pradesh under horticulture. The main

6. Also refer S.L. Katyal, "Agricultural and Horticultural Development", op. cit p.84.

advantages from horticulture are: (a) higher income per unit of area (b) utilisation of areas unsuitable for ordinary crops, (c) conservation of soil etc. (d) utilisation of nature's gift, (e) indirect economic benefits.9

Himachal Pradesh has immense scope for development of horticulture because of its varied topography, soil and climatic conditions. Though the Pradesh has vast natural resources, the cultivable land resources are, however, very very limited due to geographical reasons and the net sown area comes only to 10 percent of its total geographical area of the Pradesh.9 The majority of the farmers of the Pradesh therefore, cannot hope to improve their level of living by merely depending on cultivation of ordinary cereal crops. Though the high yielding varieties programme has opened up new vistas in food-grain production, but even such radical biological innovations are likely to have limited impact on the economy of farmers in non-valley areas. Thus the capacity of the Pradesh to intensify its land use through traditional agriculture is very much limited. However, horticulture

which is very suitable to the terrain is ideal for the Pradesh as almost all kinds of fruits can be grown here. As such, it is the core sector of the economy of the people of the Pradesh. It is also most intimately concerned with the economic uplift of the major farming population.  

The basic objective of horticulture development in the Pradesh is to increase production of quality fruits from the existing orchards through the application of the modern technology on a wider scale. The programme also aims at tapping of potential areas for horticulture development in the backward areas for removal of the regional imbalances and to strengthen the infrastructure for the economic disposal and utilisation of the produce, reduction of disparities in income and consumption of fruits at all levels.  

The horticulture zones in Himachal Pradesh have been indicated in Table No.7.2

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### TABLE NO. 7.2

**Horticulture zones in Himachal Pradesh**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Particulars</th>
<th>Approx. range of elevation (above sea level)</th>
<th>Important fruits that can be successfully grown</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Low Hills and Valleys near the plains</td>
<td>365 to 914 metres</td>
<td>Sub-tropical fruits like litchi, loquat, citrus fruits etc.</td>
</tr>
<tr>
<td>2.</td>
<td>Mid hills</td>
<td>914 to 1523 metres</td>
<td>Stone fruits like peach, plum, apricot, persimmon, pear (hard &amp; soft varieties), pomegranate etc.</td>
</tr>
<tr>
<td>3.</td>
<td>High hills and valleys in the interior.</td>
<td>1523 to 2742 metres</td>
<td>Apple, cherry, pear (soft types) walnut, chestnuts etc.</td>
</tr>
<tr>
<td>4.</td>
<td>Cold and Dry Zone</td>
<td>1523 to 3656 metres</td>
<td>Raisin grapes, prunes, dry varieties of apricot, almond chilgoza and apple.</td>
</tr>
</tbody>
</table>

**Horticulture in Tribal Areas of Himachal Pradesh:** The tribal areas of Himachal Pradesh have a large potential for development of horticulture, especially for fruits falling in the category of dry-fruits. Considerable

emphasis continued to be laid on the development of horticulture in these areas, ever since the initiation of planning era. For development of economically and climatologically backward areas, a number of institutions were set up for research and extension work. In Kinnaur District, a Dry Fruit Research Station was established in 1954 at Boktu which was further strengthened and converted into a station of Intensification of Research on Dry Fruits and Nuts during 1960. In addition, Dry Fruit Research Sub-station was started at Gialong. In order to encourage the cultivation of grapes on scientific and commercial lines, the Raisin Grapes Research Station at Sharboo was started in 1959.13 Progeny orchards and mobile units were also set up at various places. The cultivation of fruit trees in compact areas was encouraged by advancing long term loans at liberal terms and garden colonies have been established. The research work also covered almond, walnut, peanut, hazelnut, apricot, plum, apple, cherries, etc.

As a sequel to the extension and research effort, almond growing has caught the imagination of the growers. Temperate areas with lesser rainfall have been found to be ideally suited for growing this fruit. Kinnaur District has made a mark in producing thin-shelled almond of good quality which is gradually reducing the dependence on imports. Chilgoza, which is the main cash crop, grows like wild shrub in Kalpa and some parts of Pooh and Nichar Sub-divisions of Kinnaur District and Pangl Sub-division and some parts of Bharmour Sub-division of Chamba District. Most of the area of Bharmour Sub-division is suitable for apple plantation. Dry fruits can be taken up in the areas like Kugti, Hadsar, Supa, Tundah, etc., as the rainfall in these areas is comparatively much less. The Khani and Camhauta areas are suitable for growing almonds. In areas having an elevation of 2743 metres above sea level and where means of communication are not very developed, apple plantation is not economical at present and almond plantation might not be suitable. The cultivation of

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15. Ibid. .


dried apricot, walnut and grapes can be tried in those areas. Pangi Sub-division is also suitable for the development of horticulture. Due to lack of communication facilities in this Sub-division, apple plantation has not made much headway nor it is economical there at the moment. However, development of almond, dried apricot, walnut etc. can be made. The chilgoza and thangi can also be developed.16

The main objective of horticulture development in these areas would be:

(i) to narrow the gap between the level of horticultural development in these areas and other areas in the State.

(ii) to develop cash crops for amelioration of economic condition of the people.

(iii) to provide conditions for involving tribals in fruit production programme by creating the necessary infrastructure for production, marketing and utilisation of horticulture produce.17

In order to achieve these, a two-pronged strategy was adopted. Long term strategy was evolved for achievement of the desired results by preparing perspective plans


for these areas. Within the framework of these plans, the short-term strategy comprised formulation of co-
ordinated production goals for every horticultural area, concentration on the resources for the acceleration of production, development of technology for the maximization of production, expansion programmes for the extension of technology and adequate credit facilities for helping the farmers to take up horticulture in right earnest. 18

**Organisation**: During the first three Five Year Plans horticulture was only a part of the then erstwhile Department of Agriculture. During this period the general strategy for development of horticulture comprised of giving help for development of commercial crops in only such areas where cereals could not be grown. However, keeping in view the necessity of horticulture development, a separate department was created in 1970. At present, the Department of Horticulture consists of the following functional divisions: 19

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1. General Administration Division.
4. Fruit Technology and Cold Storage Division.
5. Horticulture Information Division.
6. Plant Protection and Nursery Registration Division.
8. Bee-keeping Division.
9. Floriculture and Land Scaping Division

The Department is headed by a full time Director. He is assisted by a Joint Director. The Pradesh is divided into a number of regions each headed by a Deputy Director. There is one District Horticulture Officer (D.H.O) in each District. Below him there are a number of Inspectors and Sub-Inspectors.

The field work of the Horticulture Department is executed through the Community Development Blocks. To assist the B.D.O. in executing the horticulture development programmes, Horticulture Inspectors and/or Sub-Inspectors have been provided at the Blocks. The day to day control over the Inspectors lies with the B.D.O. However, the Inspectors are also responsible to D.H.O. at the District.
head quarter. Thus, the Horticulture Inspector acts as Extension Officer of the B.D.O. At present, there are two such Inspectors in Bharmour Sub-division, one at Bharmour and the other at Garola. In Pangi Sub-division there is one Inspector at Kilar. In addition there is provision for Sub Inspectors, Mechanics and Malis as well. The organisational chart of the department has been given in Chart No. 7.3 and Chart No. 7.4

CHART NO. 7.3

Organisational Chart of Horticulture Department for Tribal Areas of Chamba District

Deputy Director (Palampur)

D.H.O.

Bharmour

Pangi

Inspector

Mechanic

Inspector

Sub-Inspector

Malis

Sub-Inspector

Malis
Programmes: The programmes for horticultural development consist of: (a) development of fruit production, (b) establishment of mobile units, (c) bee-keeping development, (d) plant protection, (e) training of orchardists, (f) development of hops, (g) development of horticulture by grant of subsidy, and (h) grant of subsidy to panchayat orchards, etc. In addition, some special (package) programmes for the tribal areas relate to (a) dry fruits, (b) apples with high density plantation, (c) grapes, (d) hops, (e) currants (f) establishment of garden colonies (g) grant for production, procurement and transportation of plants and materials in government nurseries, etc.

The basic goal is to increase fruit production per unit area in the tribal sub-divisions of Bharmour and Pangi. It involves proper meshing of diverse activities such as plantation, production, processing, storage and marketing. However, up to now no steps have been taken for storage, transport, marketing and preservation of fruits in these sub-divisions. The programmes up to now are limited to providing fruit plants and pesticides at subsidised rates, pruning and spraying of orchards,
training of orchardists, etc. Not much headway has been made in high density plantation, construction of irrigation kulhs, garden colonies, etc.

Table No. 7.5 indicates the number of fruit plants distributed in Bharmour and Pangi Sub-divisions during various plan periods.

**TABLE NO.7.5**

**Fruit Plants Distributed in Bharmour and Pangi Sub-divisions**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Item</th>
<th>Unit</th>
<th>1st Plan</th>
<th>2nd Plan</th>
<th>3rd Plan</th>
<th>4th Plan</th>
<th>5th Plan(1974-</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td>No</td>
<td>nil</td>
<td>5,349</td>
<td>10,368</td>
<td>18,875</td>
<td>70,130</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td>No</td>
<td>nil</td>
<td>1,020</td>
<td>952</td>
<td>467</td>
<td>3,900</td>
</tr>
</tbody>
</table>

The fruit plants are arranged by the District Horticulture Officer at Chamba and sent to Bharmour and Pangi Sub-divisions through Inspectors for further distribution to the orchardists and other interested.

20. Figures collected from District Horticulture Officer, Chamba.
persons there. However, in order to meet the demands in time, progeny orchards and nurseries have been established in these areas. The following table indicates the details of progeny orchards and nurseries in Bharmour and Pangi Sub-divisions.

### TABLE NO. 7.6
Progeny Orchards and Nurseries

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-division</th>
<th>Progeny Orchard</th>
<th>Nurseries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td>Ulansa</td>
<td>Garola</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td>Kilar</td>
<td>Kilar</td>
</tr>
</tbody>
</table>

The fruit plants produced in these orchards during the various plan periods are as follows:

### TABLE NO. 7.7
Plants Produced in Existing Nurseries

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-division</th>
<th>1st Plan</th>
<th>2nd Plan</th>
<th>3rd Plan</th>
<th>4th Plan</th>
<th>5th Plan(up to 78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td>-</td>
<td>-</td>
<td>28,529</td>
<td>29,410</td>
<td>30,837</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1,500</td>
</tr>
</tbody>
</table>

21. Figures collected from District Horticulture Officer, Chamba.
The next important programme is spraying of orchards which is necessary for augmenting production and keeping trees and fruits disease free etc. The following table indicates the plants sprayed in Bharmour and Pangi Sub-divisions.

**TABLE NO. 7.8**

**Plants Sprayed**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-division</th>
<th>1st Plan</th>
<th>2nd Plan</th>
<th>3rd Plan</th>
<th>4th Plan</th>
<th>5th Plan (up to 1978)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td>-</td>
<td>151</td>
<td>5530</td>
<td>22876</td>
<td>37315</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>875</td>
<td>846</td>
</tr>
</tbody>
</table>

Besides, accelerating the pace of horticulture development through expansion of direct plantation in the potential areas, the programme of top working of fruit trees is also carried out in these Sub-divisions. Upgrading of the wild fruit trees growing abundantly

22. Figures collected from District Horticulture Officer, Chamba.
in these Sub-divisions are likely to increase production of fruits. The details of top working done in these two Sub-divisions have been given in Table No. 7.9

Pruning of fruit trees is also essential for better production of fruits. The trees pruned in these two Sub-divisions during various plan periods are as follows:

**TABLE NO.7.9**

Top Working on Wild Trees

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-division</th>
<th>1st Plan</th>
<th>2nd Plan</th>
<th>3rd Plan</th>
<th>4th Plan</th>
<th>5th Plan (up to 1978)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td></td>
<td></td>
<td>715</td>
<td>4442</td>
<td>5481</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td></td>
<td></td>
<td></td>
<td>242</td>
<td>442</td>
</tr>
</tbody>
</table>

**TABLE NO.7.10**

Fruit Trees Pruned

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-division</th>
<th>1st Plan</th>
<th>2nd Plan</th>
<th>3rd Plan</th>
<th>4th Plan</th>
<th>5th Plan (up to 1977-78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td></td>
<td></td>
<td>12911</td>
<td>21832</td>
<td>32510</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td></td>
<td></td>
<td></td>
<td>346</td>
<td>435</td>
</tr>
</tbody>
</table>

23. Figure collected from District Horticulture Officer, Chamba.

24. Ibid.
Training: The importance of training to the farmers in improved horticultural practices cannot be minimised. The orchardists have to be trained in the use of pesticides, pruning of trees, spraying, grading of fruits, their marketing etc. as well. The training to the orchardists are being imparted by the Horticulture Department in collaboration with the C.D. Blocks. The training camps organised in these two sub-divisions during various plan periods are as follows:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-division</th>
<th>1st Plan</th>
<th>2nd Plan</th>
<th>3rd Plan</th>
<th>4th Plan</th>
<th>5th Plan (1974-78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bharmour</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

25. Figures collected from Block Development Officer, Bharmour and Block Development Officer, Pangi.
During the year 1973-74, 277 hectares of land were under horticulture in Bharmour Sub-division. It gradually increased to 293 hectares (74-75), 309 (75-76) and 386 during 1976-77. The major area is under apple growing. As compared to this, the total area under horticulture during 1973-74 in Pangi Sub-division was 22 hectares. It gradually increased to 27 hectares (74-75), 28 hectares (75-76) and 31 hectares in in 1976-77. The major area is under nuts and dry fruits in Pangi Sub-division.

The production of fruits in Bharmour Sub-division during the year 1973-74, 1974-75 and 1975-76 are as follows:
TABLE NO. 7.12

Area and Production of Fruits in Parumur Sub-division

<table>
<thead>
<tr>
<th>Fruits</th>
<th>1973-74</th>
<th>1974-75</th>
<th>1975-76</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area Production (Hect.) (Tons)</td>
<td>Area Production (Hect.) (Tons)</td>
<td>Area Production (Hect.) (Tons)</td>
</tr>
<tr>
<td>1. Apples</td>
<td>248</td>
<td>260</td>
<td>270</td>
</tr>
<tr>
<td></td>
<td>385</td>
<td>65</td>
<td>585</td>
</tr>
<tr>
<td>2. Other Temperate Fruits</td>
<td>16</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>3. Nuts and Dry Fruits</td>
<td>13</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>22</td>
<td>33</td>
</tr>
<tr>
<td>4. Other Sub-Tropical Fruits</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>277</td>
<td>293</td>
<td>309</td>
</tr>
<tr>
<td></td>
<td>448</td>
<td>90</td>
<td>630</td>
</tr>
</tbody>
</table>

The production of different types of fruits in Parumur Sub-division is as indicated below.

26. Figures collected from District Horticulture Officer, Chamba.
Table No. 7.13
Area and Production of Fruits in Pangi Sub-division

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Area Production (Hect.)</th>
<th>Area Production (Tons)</th>
<th>Area Production (Hect.)</th>
<th>Area Production (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1973-74</td>
<td>1974-75</td>
<td>1975-76</td>
<td></td>
</tr>
<tr>
<td>1. Apples</td>
<td>4.5</td>
<td>2</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>2. Other Temperate Fruits</td>
<td>5.5</td>
<td>-</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>3. Nuts and Dry Fruits</td>
<td>12.0</td>
<td>25</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>4. Other Tropical Fruits</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22.0</strong></td>
<td><strong>27</strong></td>
<td><strong>27</strong></td>
<td><strong>11</strong></td>
</tr>
</tbody>
</table>

**Performance:** Table No. 7.13 indicates the horticultural zones in Himachal Pradesh and various fruits that can be successfully grown in different areas. A comparison with Jammu-Kashmir and Uttar Pradesh reveals that percentage of area under fruits to total geographical area is more in Himachal Pradesh (0.62) as compared to Jammu Kashmir (0.12) and Uttar Pradesh (0.13). The percentage of area

*Figures collected from District Horticulture Officer, Chamba*
under fruits to total cultivated area in this Pradesh (5.82) is also greater than Jammu and Kashmir (3.59) and Uttar Pradesh (2.22). Among the Districts in Himachal Pradesh, the maximum area under fruits is in Simla followed by Kulu, Mandi, Solan, Chamba, Kinnaur etc.

In Bharmour and Pangl Sub-divisions, the total area under fruits was only 293 hectares and 27 hectares respectively during 1973-74. Thus in these Sub-divisions, 5.26 percent and 0.11 percent of the total crop area is under fruit plants. The percentage of area under fruit plants to total crop area in Bharmour Sub-division is more than that in Pangl Sub-division and Chamba District (2.49). The percentage of area under fruits in Pangl Sub-division is lowest in the State whereas the area under fruits in Kinnaur District (12.07) is one of the highest in the State. Though the agro-climatic conditions in Bharmour and Pangl Sub-divisions are largely similar to that of Kinnaur District, the pace of horticultural development in these two Sub-divisions thus seems to be lagging much behind, as compared to that District.

The yield of apples per hectare in Bharmour Sub-division is 2.7 tonnes which is higher than that of Pangl Sub-division (0.3 tonnes), Solan District (2.2 tonnes) and is comparable to that of Chamba District (2.8 tonnes).
The percentage of area under fruits to total crop area in
Shamour Sub-division is 5.26 and that of Chamba District
2.49. The climatic conditions in Shamour Sub-division
are very conducive for growing apples. Thus it can be
concluded that there is more scope for development of apples
in this Sub-division. It is, thus, clear that though in
Shamour Sub-division there is some impact of horticultural
programmes, in Pangi Sub-division it is almost negligible.

Table No.7.14 indicates the area under fruit in the
selected villages in Shamour and Pangi Sub-divisions.

| TABLE NO.7.14 |

Details of Selected Villages

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sub-divisions</th>
<th>Name of village</th>
<th>Population (No.)</th>
<th>Area under fruits(Hect.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Shamour</td>
<td>(a) Shamour</td>
<td>771</td>
<td>82.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Tundah</td>
<td>263</td>
<td>8.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Holli</td>
<td>512</td>
<td>15.0</td>
</tr>
<tr>
<td>2.</td>
<td>Pangi</td>
<td>(a) Dharwas</td>
<td>396</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Malet</td>
<td>294</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Saichu</td>
<td>113</td>
<td>1.5</td>
</tr>
</tbody>
</table>

28. Figures collected from Naib Tehsildar, Shamour and
    Tehsildar, Pangi.
Thus, it is clear that among the three sub-valleys in Shamour Sub-division, the area under fruit is highest in Shamour followed by Holi and Tundah. In Pangi Sub-division, the area under fruit is highest in Bharwas followed by Malet and Saichu.

Though there are provisions for bee-keeping development, development of hops, setting up of garden colonies, high density plantation, etc., no work has been done. Development of irrigation facilities is also one of the programmes but nothing has been done in this regard as well, in these two sub-divisions.

**Assessment:** The reason for shortfall in horticultural development in the tribal sub-divisions of Chamba District can be due to various reasons. In Shamour Sub-division the inadequate impact may be mainly due to lack of extension agencies, lack of general and horticultural educational programmes and the migratory nature of the inhabitants. Poor communication facilities in some parts of the Sub-division and poor marketing infrastructure also contributes to this inadequate development. The horticulture development in Pangi Sub-division is almost negligible mainly due to non-existence of communication facilities, lack of training in horticulture, lack of extension agencies and inadequate
supervision and follow up. Moreover the Government orchards in Killar are also in bad shape and do not enthuse the local people to take up horticulture.

In addition to this, there is a chronic problem of non-availability of suitable personnel which impedes posting of personnel to implement the horticultural development programmes. This to a great extent might impede spraying and pruning which reduces the yield.

In Fangi Sub-division at present more stress may be given to plantation of almond, dried apricot, walnut, pears of hardy varieties, chilgoza etc. Alongwith these, the wild kainth and apricot grown there can be improved by top working with superior varieties. The plantation of apples, pears, plums may be co-ordinated with the development of roads.29

On the organisational side, the Horticulture Development and Extension Division may be strengthened at the District level. The District Horticulture Officer should undertake frequent visits in these two tribal Sub-divisions. As these two Sub-divisions are a part of the Chamba District, the officers are more interested in visiting the

29. Refer Approach to Tribal Development in Sixth Plan, A Preliminary Perspective (New Delhi, 1977) and Draft Tribal Sub-Plan (1976-81), Himachal Pradesh (Simla, 1978)
non-tribal areas due to better communication facilities in those areas. Therefore, either an additional officer should be posted to look after these sub-divisions or it should be mandatory on the part of the District Officer to visit these areas regularly and spend a prescribed number of days and nights in these sub-divisions. At present the Sub-divisional Officer (S.D.O) has no administrative or financial control over the developmental officials working within the Sub-division. The introduction of Single Line Administration as recommended by Shilka Commission may also be examined.\(^{30}\)

In order to popularise horticulture in Pangi Sub-division the cost of transportation of plants upto the distribution centre should be subsidised. The cost of plants in both of these sub-divisions may also be subsidised which may be withdrawn later in a phased manner.

Areas for horticultural development should be specifically demarcated in these areas on the basis of findings of preliminary studies and surveys particularly

\(^{30}\) Refer Report of the Study Team on Tribal Development Programmes, Himachal Pradesh (New Delhi, 1989), p.35.
those relating to types of fruit plant suitable for soil and agronomic conditions. Adequate credit facilities should be provided to horticulturists, especially by way of preharvest credit, for marketing of their produce. A condition precedent would be a detailed survey of the overall credit needs and the agencies required to extend such credit.

A strong research base has to be created for expansion of horticulture in the entire Pradesh in general and these areas in particular. The following points need consideration in this regard:

i) Evolving high yielding, disease-free plants suitable for these localities.

ii) Evolving plants which during certain seasons have little effect of the short sunlight hours.

iii) Improve orchard management practices, such as tillage and soil management, and standardise these.

Since the horticultural marketing is the concern of more than one governmental agency, coordination is most essential particularly in the marketing of horticultural produce. Production of some of the quality horticultural produce can be accelerated by proper grading. Since grading, under the law at present, is voluntary only,
every effort should be made to encourage voluntary grading
of such produce. The marketing infrastructure for horti-
cultural produce needs to be improved and expanded on a
large scale. The money now spent on such infrastructure
is hardly commensurate with the total turn over of trade
in horticultural produce. Further, some ratio of
"infrastructure to turn over" should be established to
develop marketing facilities.

Progeny orchards and nurseries should be raised
in these areas to meet the requirement of the two sub-
divisions. The extension staff should provide ample
guidance and training to the orchardists. Demonstration
plots should be organised and the orchardists may be taken
on a study tour to other horticultural growing areas of
the Pradesh. As the inhabitants are poor, Government
should provide adequate funds and implements for convert-
ing the cultivable wastes into orchards. The means of
transport for marketing of fruits may be provided. Till
then small processing and canning units may be set up.

There is a need to ascertain the reason for failure
of panchayat nurseries and community orchards and to take
remedial measures. Evaluation committee may be revived
for mid-term appraisal of the development programmes.
including schemes for the promotion of horticulture. Arrangement should also be made for periodical inspections of all important schemes in order to apply correctives in time. With a view to taking plant protection measures, a survey should be undertaken to determine the incidence of root-rot and hail some areas where orchards cannot flourish.

Wild animals destroy crops in Pangi and Bharmour Sub-divisions. Once the orchards are developed, the depredation by these animals will increase manifold. The proposal of allowing the farmers to have muzzle loaded guns to protect their crops may also be examined.

The impact of ceiling laws and land holding tax on the size of fruit groves and orchards requires to be considered at this stage because it is an important factor which would exert an influence on the farmers' decisions to take to the cultivation of fruit crops. The fruited season of apple commences in West Uttar Pradesh hills in the first week of June, in Himachal Pradesh a fortnight later and in Kashmir valley after another fortnight. The seasonal supplies reach the market latest up to early November and whatever is sold thereafter is only the fruit stored in cold storages. Therefore keeping quality of
apple assumes a very great importance. Except for ambri, which is indigenous to Kashmir region, many of the well known varieties, especially of the exotic delicious group have a very poor keeping quality. The supply of ambri is gradually dwindling even within the season because of general neglect of the crop and spreading of mildew and scab diseases, more virulently the latter. Owing to this, the only sweet varieties which remain in the market to meet the taste of northern and central parts of the country are those of the delicious group. But since this group does not keep long, the northern and central parts of the country are not left with any other suitable variety of comparative apple in the off season. It is also not prudent to rely only on one type because there is always the danger of widespread failure due to weather or epidemics. It is thus necessary to broaden the genetic base and the possibility of utilizing wild germ plasm has also to be explored in this connection.

At present, apple cultivation is concentrated between 1,500 to 2,000 metres. This is because most of the varieties were introduced in India from temperate regions and suit this range on considerations of longer dormancy...
and low temperatures. Apple cultivation, to be successful below 1,500 metres, needs varieties which have a shorter dormancy period and are accustomed to milder temperatures. Such varieties are not available at present. If this defect can be removed, apple cultivation might be possible at lower elevations of these sub-divisions where more area is available.

There is experimental evidence to show that apple cultivation can be taken up with success even beyond 2,000 metres. Fruit setting and colour, etc., have been found to be satisfactory but because of the colder conditions, ripening has not been to the desirable extent. If suitable varieties could be found for higher elevations, this could lead to further increase in the area under apple. However, the economics of successful cultivation at such higher elevations will have to be examined.

The following two techniques are available for affecting improvement in apple: (a) top working as a technique for improvement is applicable in this crop. Scientists are aware of it and it has already been applied to ambri in Kashmir with satisfactory results. (b) The latest trend in some of the horticulturally advanced countries is for giving preference to dwarf varieties. The plants grafted on dwarfing rootstocks are found to
give high yields and better quality of fruits. Dwarf
trees with compact canopies allow a higher density of
plant population per unit area, which is an important
consideration in their favour. Vertical development in
this method of cultivation is prevented by training the
branches to take to horizontal positions through tying
these by wires, strings, etc. It is observed that the
bearing in this way takes place within two to three years
of planting as against about ten years required for the
usual trees. The technique has given encouraging results
under experimental conditions and the same may be tried at
least in Shamour Sub-division on trial basis so that the
orchardists can expect an early return.31

Walnut also needs special attention because it has
good potentiality of earning foreign exchange and they
grow in these areas. The problems, which need attention,
are production techniques and care of plantations in
general and making available walnut grafts for replacing
the suckling trees. More attention is required to be given
to tillage aspects of orchards. There should also be

31. Rakesh N. B. Singh, "Dwarf Apple Cultivation", Farmers'
Bulletin No.3 (Simla, 1968).
provision for irrigation and adoption of plant protection measures. The problem of residual toxicity will also need attention when the use of plant protection chemicals becomes popular in orchards and groves.

Improving production through top working should be extended to as many fruits as practicable in Pangi and Sharmaur Sub-divisions. The technique of top working should be standardised for different crops for large scale adoption. Model orchards are required to be established in both Pangi and Sharmaur Sub-divisions to determine the economics of fruit production. These orchards could also be used as centres of practical demonstration in better methods of cultivation.

Horticulture development depends very much upon proper and timely input distribution and post harvest marketing system. Thus it is essential that efforts should be made to provide plants, pesticides etc. in time to the orchardists and arrangements should be made for training the farmers regarding pruning, spraying, grading of apples etc. With the improvement of communication and marketing facilities there is a bright chance for the development of horticulture in these two tribal Sub-divisions of Chamba District which will go in a long way to improve the economic conditions of the people of these areas.