

# Customized Optimization: Need of the Hour for the Himachal Pradesh Apple Industry

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In this study, which is essentially exploratory in nature, an attempt has been made to understand the apple industry of Himachal Pradesh by studying the two largest apple producing districts of the state- Shimla and Kullu. The aim is to objectively analyse the basic orchard constitution of the two districts and explore whether there is a significant difference in the basic unit of production 'the orchard'.

This was done by carrying out a onetime survey. It was assumed that the outcome would uncover some controllable areas which if augmented by customized training would lead to an overall improvement of skills in such areas thereby improving productivity and profitability of the orchards. The ultimate aim of the study is to indicate those factors in Himachal Pradesh which if optimally manipulated have the potential to prolong the life cycle, productivity, profitability and sustainability of Himachal Pradesh apple industry.

A survey was conducted in 2009 in both the districts. The sample size was 100; 50 from each district. The findings of the survey were further supplemented with secondary data. In addition to this, expert opinion and an extensive survey of literature was carried out. The techniques used were 'mean or average and percentage' for quantitative data and the "T" test for testing the significance of the differences.

**Keywords:** Apple industry, Himachal Pradesh, Skill management, Customized training, Optimization, Sustainability.

## Introduction

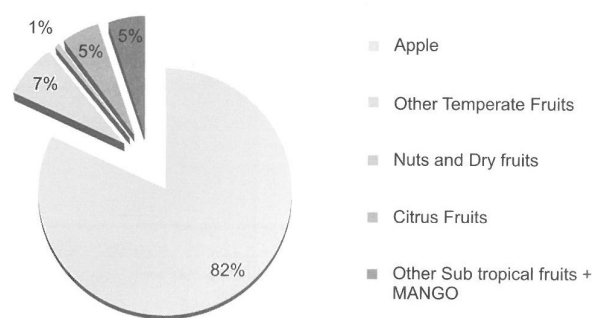
In a developing country like ours, the growth of the agricultural sector assumes crucial importance due to an ever-increasing demand for agricultural products generated by the world's second highest population.

However, in the hilly states of India like Himachal Pradesh, Jammu and Kashmir, Uttarakhand, etc, agriculture suffers from certain limitations especially in the production of traditional crops and food grains. A major restriction is that the area under cultivation cannot be extended to any appreciable extent. The topography of steep hills brings in its wake additional problems like soil erosion, non feasibility of mechanized farming to name a couple. Lack of supplementary irrigation is also a significant limiting factor which is exceptionally tricky to manipulate due to the terrain. Yet, we are predominantly an agricultural economy and this study is an attempt at highlighting those factors whose better management may lead to a better utilization of limited resources and challenging situations. In other words, may lead to 'optimization' and sustainability of this industry.

## Importance of Apple in Himachal Pradesh

Apple dominates the fruit industry of the state and according to the figures of (2003-04) covers an area of 84,112 hectares which constitutes about 47per cent of the total area under fruits and 72 per cent of the area under temperate fruits. (Kishore, 2006)

**Table 1. PRODUCTION of FRUITS in HIMACHAL PRADESH (2003-04)**



**Source:** (Department of Environment, Science & Technology, Govt. Of Himachal Pradesh)

Clearly, apple dominates all the fruits in the state and Himachal Pradesh has earned the name as "Apple state of India" (Annual Report, 2000)

Of late the apple industry of Himachal Pradesh is facing a number of challenges which if not overcome strategically may lead to a crisis in the

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near future. The challenges highlight the importance for this study and are presented here under the sub-heading 'Importance of the study'.

### Importance of the Study

- Area for plantation is limited
- Land holding size is progressively declining due to mutation
- Maximum orchards in the state are mature and have started the decline process
- Since new orchards are going to be planted and the old ones would be getting new plants now, now is the right time to act
- Productivity is erratic and at best stagnant.
- Climate (an uncontrollable factor) is changing and global warming is beginning to be felt
- Precipitation, which is the main source of irrigation, has become increasingly unpredictable.
- Overall produce is increasing which requires better and dexterous handling
- Increasing competition from both domestic and international quarters
- Higher comparative cost of production
- Educated producers more receptive to knowledge and training
- Overused soil demands scientific handling to maintain/ improve produce
- Consumer becoming more quality conscious and demanding
- Easy availability of imported apples which are marketed strategically.
- Labour availability becoming erratic

### Definitions:

**Customization** is defined as making to order or modifying according to individual requirements (H.W.Fowler, F.G.Fowler, & R.E.Allen, 1994)

**Optimization** is defined as "to make the best or most effective use of (a situation, an opportunity etc.)". (H.W.Fowler, F.G.Fowler, & R.E.Allen, 1994) In the context of the present study, it signifies the most effective use of limited and scarce resources like water for irrigation and human resources. Optimization involves creative manipulation around factors which are largely uncontrollable e.g. global warming, erratic and unpredictable precipitation etc. as well as a proactive approach as opposed to a symptomatic one in various areas like disease and pest management etc.

'Skill' may be defined as " Ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas (cognitive skills), things ( technical skills), and / or people (interpersonal skills)." (H.W.Fowler, F.G.Fowler, & R.E.Allen, 1994)

Apple cultivation when seen in the light of the areas where it is undertaken especially in India highlights the importance of efforts for its sustainability and support.

The present study seeks to critically examine the 'orchard constitution', of the two highest apple producing districts of Himachal Pradesh i.e. Shimla and Kullu. The attempt is to explore the similarities and differences in the above to try and discover any unique attributes or problems emanating from the same. Finally if the differences between the two districts emerge significant, advocate training areas which deserve customized programs specific to each district in order to optimize their production and potential productivity. The scope of the present study is limited to examining critically the current situation in the two districts vis a vis that recommended by government agencies and experts. This should delineate the basic differences in the smallest unit of production in the apple industry of Himachal Pradesh i.e. 'an apple orchard'.

### The Study

About 92 % production of apple in Himachal Pradesh is contributed by the districts of Shimla and Kullu with their share being 64 and 28 per cent respectively. (Chand, 1997)

### Objective

To explore whether or not the training needs of apple orchardists in the two highest apples producing districts of Himachal Pradesh are the same and can be addressed by a common training program or whether they are distinct enough to advocate a 'Customized' approach to achieve 'Optimization' in productivity and profitability.

### Hypothesis

The nature of the basic unit 'the orchard' and therefore the problems faced by the orchardists of the two districts of Shimla and Kullu are different. Hence a general approach towards an overall skill up gradation and training is insufficient to optimize apple productivity. A customized approach

addressing the unique problem areas is the call of the day.

### **Research Design**

In this study, the universe includes all apple orchardists of districts Shimla and Kullu of Himachal Pradesh. The population refers to the apple growers of the largest apple producing blocks of the respective districts. These are Jubbal- Kotkhai block of district Shimla and Nagar block of district Kullu. It happens to be a finite population since data regarding the elements is present at the respective district and block offices.

### **Sample Size:**

The sample size for the present study is 100, 50 each belonging to Shimla and Kullu districts and out of these 50, 25 each have been taken from two different randomly selected Patwar circles in the largest apple producing development blocks of the two districts.

### **Sampling Frame**

For the purpose of this study, the list of apple growers obtained from the largest apple producing development blocks of the largest apple producing districts i.e. Shimla and Kullu forms the sampling frame. The development block chosen in district Shimla is Jubbal-Kotkhai and that in district Kullu is Nagar.

### **Sampling Design**

Non probability- quota sampling design was used for the present study.

### **Sampling Unit**

It consists of apple growers who are interchangeably called apple orchardists belonging to the two largest apple producing blocks of two largest apple producing districts of Himachal Pradesh. Care has been taken to ensure the proportionate representation of marginal, small, medium and large category growers.

### **Sources of Data**

The objectives of the study have been satisfactorily analyzed by the use of both primary and secondary data.

### **The Questionnaire**

The main source of primary data and the instrument of data collection for the study was the

questionnaire. A structured type of questionnaire has been used.

### **Collection Presentation of Data**

Data collected from the field through the questionnaire and personal interviews with the apple growers and technical staff of the state department of horticulture are presented through simple tables and graphs.

### **Analysis of Data**

Simple tabular analysis has been carried out for arriving at the conclusions

### **Statistical Methods**

The statistical method used to analyze most questions is the "Mean". Data has been converted into percentages in many areas to give a clearer picture. The "T" test has been conducted to test the significance of difference of responses in many questions.

### **Limitations of the Study**

It would have been ideal had the study been carried out in all the apple growing districts of Himachal Pradesh. However, it is beyond the means of an individual researcher to carry out a study on such an extensive scale. Moreover, the current paper deals with only one aspect i.e. the differences in the basic 'orchard constitution' of the two districts. Although sufficient differences in 'orchard constitution' indicate that the average sample orchards of Shimla and Kullu are two very different entities, a close critique of merely orchard constitution is not sufficient to conclusively prove the above fact. At best it can be considered as an important argument proving a part of the whole argument.

**Reference period:** The survey was conducted in the year 2009.

### **Findings, Results and Discussions**

Similarities and differences in the 'orchard constitution' of districts "Shimla" and "Kullu" were worked out by addressing the following three parameters:

1. Land utilization pattern
2. Variety-wise proportion of plants
3. Age-wise proportion of plants

## 1. Land Utilization Pattern

Table 1. Land Utilization Pattern of An Average Sample Orchard

PARAMETERS	SHIMLA	KULLU
Area of an average orchard:	.84 hectare	0.96
Rainfed area	0.78	0.85
Area under supplementary irrigation	.06 ha (7.1 per cent)	.11 ha (11 per cent)
Area under apple	94 per cent	100 per cent
Total number of trees in an average orchard	239	241
Density of plantation	303 Trees/Hectare	251 Trees/Hectare
Total number of non bearing trees	41 (17.5 per cent)	48 (20 per cent)
Total number of bearing trees	198 (82.5 per cent)	193 (80 per cent)

**Size:** The size of an average orchard has been arrived at by adding the total reported orchard area of the district and then dividing it by 50. It is observed that an average Kullu orchard is marginally larger (.96 ha) than an average sample orchard of district Shimla (.84 ha). The representative average sample orchards of both the districts fall under the marginal (below 1 hectare) category.

**Irrigation:** 92.9 per cent area of a sample orchard in Shimla and 88.5 per cent in Kullu is exclusively rain fed. Land under supplementary irrigation is negligible in both the districts, yet a Kullu orchard scores more in this aspect due to the location of 'Kuhls' as a source of water in district Kullu.

**Area under apple:** 100 per cent orchard area is under apple cultivation in Kullu whereas 94 per cent in Shimla.

**Area under other crops:** In an average sample land holding in Kullu, 100 per cent area is devoted to apple, whereas in Shimla 3.6 per cent area is under other crops.

**Area under intercropping:** 30.2 per cent area in a representative orchard in Kullu is utilized for intercropping whereas the same is 8.9 per cent in Shimla.

**Vacant landholding:** In an average Kullu orchard, there is no un-cultivated area, whereas 2.4 per cent area in Shimla is un-cultivated.

### Shimla

The commercial variety mix in district Shimla is absolutely dominated by a single variety; 'Royal Delicious'. 92 per cent of trees reported in the sample belong to this variety. 'Red Delicious' with a proportion of 7 per cent comes a distant 'second'. This is followed by 'Other commercial varieties' which in all represent just 1 per cent of all plants.

Three main **pollinizer** varieties are being grown in Shimla. The most dominant pollinizer variety is Red Gold with 60 per cent representation followed by Golden Delicious (30 per cent) and a couple of other varieties totaling up to 10 per cent. Kullu

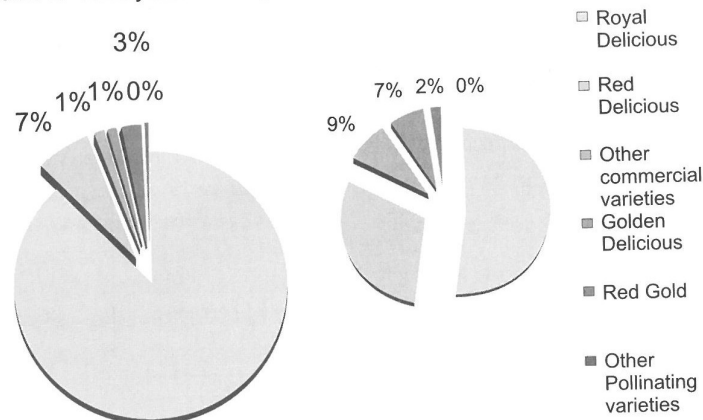
The **commercial** variety mix in district Kullu is also dominated by "Royal Delicious" (52 per cent), though to a relatively lesser extent. Similarly, "Red Delicious" is the second most popular variety but has a better representation in Kullu (30 per cent). 'Other commercial varieties' have a representation of a mere 9 per cent. The **pollinizer** plants constitute a slightly better 9 per cent segment in the Kullu apple pie.

The 'Delicious' group of fruits which are the mainstay of the Himachal Pradesh apple industry are self unfruitful and need cross pollination for a proper fruit set. At least 33 per cent plants of pollinizing varieties should be provided. Suitable varieties are Red Gold, Golden Delicious, Tydeman's Early Worcester, Summer Queen, Crab apples and McIntosh.

It can be inferred that the pollinizer percentage of both the districts is dismally low which may be a leading cause of relatively low productivity and therefore profitability of the apple in the state. (Jindal, K.K., & Sharma R.C.).

## 2. Variety-wise Proportion of Plants

Table 2. Variety Mix of Sample



## 3. Age-wise Proportion of Plants in the Sample

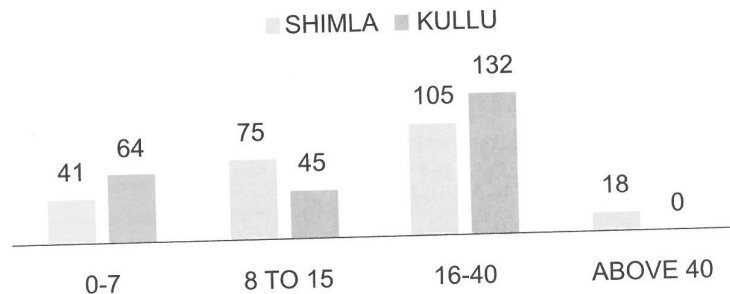


Table 3. Age-wise Proportion of Plants in the Sample

There are two broad categories according to the age of plants. 'Non-Bearing' (0-7 years) and 'Bearing' (8 to about 40 years). As reported, proportion of non bearing trees is more in Kullu (26 per cent) than Shimla (17 per cent). The bearing category can be further sub-divided broadly into three categories. 8-15 (increasing production), 16-40 (stable production), above 40 years (declining production).

### Shimla

As illustrated in figure 3, it can be concluded that at present 92 per cent of all plants in district Shimla are in the 'bearing' category with the largest proportion of 44 per cent plants in the optimum bearing age group (16-40 years). From here in a few years time, the total output of the state is bound to decline as this category will enter the 'declining productivity' stage (above 40 years) and will be replaced by a lower proportion (31 per cent) plants in the 8-15 age group. Since it is possible to manipulate only the 0-7 years category, it can be safely recommended that to maintain output at the current level or to increase it,

the proportion new plantation has to be increased. The density of plantation in this category should be increased and other controllable skills optimized. Unless this is done, the aggregate production is bound to come down.

### Kullu

In district Kullu too at present the largest proportion of bearing (55 per cent) fall in the optimum bearing category of 16-40. This is followed by the non bearing category or the fresh plantation which forms 26 per cent of the pie. Next is the 8-15 category with 19 per cent plants and it is seen that as of now the sample consists of orchards are fairly new as none have reported trees above 40 years of age. The older plants have been replaced by new plantation.

Here again, in the near future, a decline in production is foreseen but as compared to Shimla the fresh plantation is more which needs to be improved further. Needless to say, the focus will have to be on good quality, high density fresh

plantation and skillfully managed land holdings to ensure current or better productivity.

## Summary

The apple farmers of Shimla and Kullu, though at a superficial level seem to be dealing with the same problems, yet there are fundamental differences in their avocation. The differences are not limited to 'orchard constitution' although the present study is. The differences in the 'orchard constitution' and approach to 'farming practices' (dealt with in another study), get reflected in the vastly different 'cost and output' values of the two districts. The dynamics of these 'same' factors result in the creation of a unique set of challenges which demand a customized approach for optimum results. The immediate need is to have a customized program, one that offers 'tailor made solutions' to the problems of the farmers unique to the districts of Shimla and Kullu rather than a 'one size fits all' approach.

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