CHAPTER I

INTRODUCTION

1.1 Introduction

Regardless of the emphasis on industrialization, agriculture remains a dominant sector of the Indian economy both in terms of contribution to Gross Domestic Product (GDP) as well as a source of employment to millions across the country.

Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture as their principal means of livelihood. The total Share of Agriculture and allied Sectors in terms of percentage of GDP is 13.9 percent during 2013-14 at 2004-05 prices. (CSO, 2015)

India, with its wide inconstancy of atmosphere and soil, is exceptionally great for developing an extensive scope of horticultural crops, for example, fruits; vegetables, tropical tuber harvests and mushroom; ornamental crops; medicinal and aromatic plants, spices and plantation crops like coconut, green nut, cashew, cocoa, tea, coffee and rubber. A noteworthy accentuation was laid by the Government of India in accomplishing self-sufficiency in food production particularly cereals promptly subsequent to accomplishing freedom in 1947. The endeavors effectively got Green Revolution in the late Sixties and mid Seventies. It likewise demonstrated that horticulture crops for which the Indian topography and agro-atmosphere is appropriate could be a perfect decision in accomplishing maintainability by farmers. Notwithstanding, just in mid Eighties did the Government of India recognize horticulture crops as a method for expansion for making farming more beneficial through productive land utilize, optimum utilization of natural resources (soil, water and, environment) and making talented work for rural masses particularly women society. The past endeavors have been compensating as far as expanded generation and profitability and accessibility of horticultural produce. India has in this way developed as the largest producer of coconut, cashew, ginger, black pepper, turmeric, arecanut, and tea, and, the second largest producer of fruits and vegetables.
The growth in the production of fruits and vegetables assumes critical importance nowadays due to the increase in the demand generated by the rapid increase in population and has been accelerated by the rise in the levels of income of the people and the consequent changes in the pattern of consumption. Fruits assume an extraordinary part in creating nations like India both in financial and social circle for enhancing income and nutritious status especially for rural masses.

India is the second largest producer of vegetables and fruits after China and is prevalently known as Fruits and Vegetable Basket of the world (Gandhi and Nambordri, 2002). India has begun putting more noteworthy push on the advancement of horticulture sector after sixties so as to adventure the nation's endless potential to generate the much needed value addition. In 2010-11 horticultural crops set up together secured roughly 11.35 percent of the total cropped area with an annual production of about 114 million tons accounting for more than 18 percent of agricultural output of India (Gogoi and Borah, 2013).

Agriculture in J&K has been diversifying in favour of horticultural crops especially fruits (Baba et al, 2009). Horticulture is one of the most vibrant sectors of Jammu and Kashmir economy. This sector gives immediate and roundabout work to the state populace. J&K is home to some world famous varieties of fruits, dry fruits, honey and saffron. To promote horticulture in the state, the government has declared horticulture as a thrust area (PHD Chamber of Commerce and Industries, 2011). The latest trend indicates that there has been conversion of paddy fields into apple orchards as it is more profitable to farmers. The agriculture land is shrinking at an alarming rate in Kashmir valley, particularly in South Kashmir, once known as the rice bowl of Kashmir (Horticulture Digest, Jammu and Kashmir, 2014).

1.2 World Scenario of Apple Production

Apple is one of the most produced fruits across the globe. China, USA and Turkey are the top three countries in the production of apple. According to the United States Department of Agriculture (USDA), China is the topmost producer of apple with producing 37 million tons in the year 2014-15. Apple is mostly grown in colder areas, which suits the
climate in these countries. The second biggest benefactor is United States. It produced 41 million tons of apples in the year 2014-15. Almost all state in the US produces apples. In any case, around 70 percent of the apples are brought in the state of Washington. Apple is the second most commonly consumed fruit, in US. Apples in USA contribute a huge source of income due to exports. Turkey, stands on number third in apple production in the world. It produced 2.8 million tons of apples in the year 2014-15. India stands on sixth position in terms of apple production in the world. India produced 2.4 million tons of apples in the year 2014-15.

Table 1.1 Major Apple Producing Countries in the World

<table>
<thead>
<tr>
<th>S. No</th>
<th>Country</th>
<th>Area (in Ha)</th>
<th>Production (in MT)</th>
<th>Productivity MT/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>2060000</td>
<td>37000000</td>
<td>18.0</td>
</tr>
<tr>
<td>2</td>
<td>United States of America</td>
<td>132656</td>
<td>4110046</td>
<td>31.0</td>
</tr>
<tr>
<td>3</td>
<td>Turkey</td>
<td>150847</td>
<td>2889000</td>
<td>19.2</td>
</tr>
<tr>
<td>4</td>
<td>Poland</td>
<td>194680</td>
<td>2877336</td>
<td>14.8</td>
</tr>
<tr>
<td>5</td>
<td>India</td>
<td>313044</td>
<td>2497678</td>
<td>8.0</td>
</tr>
<tr>
<td>6</td>
<td>Italy</td>
<td>54684</td>
<td>1991312</td>
<td>36.4</td>
</tr>
<tr>
<td>7</td>
<td>Iran (Islamic Republic Of)</td>
<td>134000</td>
<td>1700000</td>
<td>12.7</td>
</tr>
<tr>
<td>8</td>
<td>Chile</td>
<td>36500</td>
<td>1625000</td>
<td>44.5</td>
</tr>
<tr>
<td>9</td>
<td>Russian Federation</td>
<td>183300</td>
<td>1403000</td>
<td>7.7</td>
</tr>
<tr>
<td>10</td>
<td>France</td>
<td>41051</td>
<td>1382901</td>
<td>33.7</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1533204</td>
<td>19196743</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td><strong>World + (Total)</strong></td>
<td><strong>4833966</strong></td>
<td><strong>76673016</strong></td>
<td><strong>15.9</strong></td>
</tr>
</tbody>
</table>

Source: Food and Agriculture Organization of the United Nation, February 2015
1.3 Apple Cultivation in India and Jammu and Kashmir

India produces every single deciduous fruits including pome fruits (apple and pear) and stone fruits (peach, plum, apricot and cherry) in extensive amount. These are for the most part developed in the North-Western Indian States of Jammu and Kashmir (J&K), Himachal Pradesh (H.P) and in Uttar Pradesh (U.P) slopes. The North-Eastern Hills area, including the States of Arunachal Pradesh, Nagaland, Meghalaya, Manipur and Sikkim additionally develops a portion of the deciduous natural products on a constrained scale. Because of presentation and adjustment of low chilling cultivars of harvests like peach, plum and pear, they are additionally now being developed industrially in specific ranges of the north Indian fields. Out of all the deciduous fruits, apple is the most essential regarding production and extent. Apple was brought into the nation by the British in the Kullu Valley of the Himalayan State of H.P. as far back as 1865, while the colored "Delicious" cultivars of apple were acquainted with Shimla slopes of a similar State in 1917. The apple cultivar 'Ambri', is thought to be indigenous to Kashmir and had been become much sooner than Western presentations (Ghosh, 1999).
Apple (*Malus domestica*) is the principle fruit crop of Jammu and Kashmir and records of 51 per cent of total area of 3.62 lac hectare under all temperate fruits grown in the state. The annual apple production in the state is 23.72 lac Metric tons (Horticulture Planning and Marketing, Govt of J&K, 2015). India is the 6th biggest producer and consumer of apples in the world. (Deohar et al, 2006). Average yield of commercially important apple cultivars per unit area the highest in the country ranging between 10-12 tons/ha, but it compares poorly to the yields of 20-30 tons/ha in horticulturally advanced countries of the world. Climate and other agro-ecological factors of Kashmir are in a perfect world suited to the development of numerous assortments. Alternate bearing, defective pruning and training, use of seedling rootstock of unknown performance, absence of appropriate supplement and water administration, inadequacy of reasonable pollinizers/pollinators and in compelling control of bugs and ailments are the primary drivers of low productivity.

In terms of nutrition, fruits are a good source of a few vitamins, minerals salts and dietary fibers, which are exceptionally fundamental for keeping up great wellbeing. Fruits are health promoting as well as pleasure giving items of food. Apple fruit is notable for its impressive list of phtyto-nutrients, and anti-oxidants. The components of apple are basic for ideal development, advancement, and general wellbeing. Apples are low in calories, apples are rich in cancer prevention agent, and apple fruit contains great amounts of vitamin-C and beta-carotene. Further, apple fruit is a decent wellspring of B-complex vitamins, for example, riboflavin, thiamine, and pyridoxine. Apples likewise convey a little measure of minerals like potassium, phosphorus, and calcium. Potassium is an essential part of cell and body liquids helps controlling heart rate and pulse; hence, counters the terrible impacts of sodium.

1.3.1 Climate

Most of the apple varieties require about 1500 hours below 7°C to break the rest period. The average temperature should be 21°C to 24°C during growing season of the crop. Locations having frequent frost and hail storms should be avoided for cultivation of apple. In general a cool climate with low winter temperature and little rainfall in summer are most suitable for apple cultivation.
1.3.2 Soil

Loamy soils rich in organic matter are most conductive to apple growing. Waterlogged conditions should be avoided. Soils with slightly acidic to neutral reaction (5.5 to 6.5 pH) are most suited for cultivation of apple. It is always advisable to consider soil profile and texture before establishing an apple orchard. A thumb rule can be to see if any apple orchard is thriving well in the vicinity of the area, proposed to be brought under apple cultivation, before deciding upon laying an apple orchard.

1.4 Different Varieties of Apple Cultivars

The most important factor in the cultivation of apple is proper selection of varieties which have commercial value and are also suitable for effective cross-pollination.

1.4.1 Lal Ambri

Fruit medium to large, conical to slightly large, red stripped with long and broad broken streaks against yellow base, flesh white with firm texture and having aroma like Ambri. Lal Ambri matures in first week of October. The trees are vigorous, hardy and very productive. The average yield of 20 years and above old trees ranges from 20-25 Metric Tons/ha. Lal Ambri is high quality apple having potential for export market with characteristic Ambri shape and aroma.

1.4.2 Sunhari

Fruit medium to large, roundish to conical in shape, skin sulphur yellow with slight raddish tinge, flesh greenish white, sweet, fairly juicy, aromatic crisp and slightly subacidic. Sunhari ripens in early October. Sunhari tree is moderately vigorous. The average yield of 20 years and above old trees range from 15-17 MT/ha. Sunhari is high quality apple with excellent shelf life and flavour with low russetting habit and a good pollinizer.
1.4.3 Akbar

Fruit medium to large, oblong to slightly conical in shape, red stripped dominating more than 75 per cent of fruit surface, flesh firm, crisp and whitish green in colour, sweet with slight acidic tinge, richly juicy, Akbar matures in late September. Akbar trees are vigorous, hardy and highly productive. The average yield of 20 years and above old trees range from 30-35 MT/ha. It is a high yielding variety with excellent quality fruit.

1.4.4 Firdous

Firdous tree moderately vigorous, wide, spreading, spurring medium, flowering intermediate, both on spurs as well as on tips, regular with heavy intensity, pink to carmine in colour, leave oval to oblong. Firdous fruit is round to oblong in shape, medium to large in size, with yellow background having deep red over colour covering 85 per cent of fruit surface.

It is a mid season variety, the fruit takes 119-122 days after full bloom to mature and is ready for harvest in third week of August. The fruit is of good taste, flavour, slightly sub acidic, flesh crisp and juicy, and good shelf life under ambient conditions. Trees of 20 years age yields 12 to 15 MT/ha on an average.

1.4.5 Shireen

Moderately vigorous tree, open top, spurring much, flowering regular, intensity moderate, leaves broadly ovate fruit is oval to conical in shape, small to medium in size, greenish yellow ground colour with orange red blush dominating 2/3 of fruit surface. It takes 139 to 144 days from full bloom to mature. Shireen matures during last week of September to first week of October. It is resistant to scab and shows field resistance to alternaria (fungi) spot and powdery mildew and slightly susceptible to sooty blotch. Trees of 20 years and above yield 15-17 MT/ha on an average.

1.4.6 Shalimar Apple-1

Shalimar apple tree-1 is vigorous, spreading, spurring medium, flowers mostly on spurs, 3-5 flowers per cluster, flowering regular and intensity medium. Fruit; roundish to
oval in shape, colour; (ground) yellow, (over) red (pinkish), over amount of colour; more than 50 percent, Size; small to medium. Flesh of Shalimar Apple-1 is cream, moderately crisp, juicy and sweet. Maturity takes place 130-142 days after full bloom (fourth week of August to first week of September). Shalimar apple tree-1 yields 20-25 MT/ha at 20 years of age on seedling root stock. Shalimar apple tree-1 is also resistant to scab, slightly susceptible to sanjose scale, wooly aphid and tortrix moth.

1.4.7 Shalimar Apple-2


1.5 Promising Exotic Varieties of Apple in Jammu and Kashmir

There are various promising and exotic varieties of apple which are found in the state of Jammu and Kashmir, the most important varieties are: Summerred apple, Molli’s Delicious, Gala Must, Imperial Gala, Red Chief, Red Fuji, Jonica, Florina, Golden Delicious, Straking Delicious, Tydeman’s Early Worcester, Starkrimson, Red Spur, Vance Delicious, Oregon Spur, Spartan, Red Gold

1.6 Significance of the Study

In view of immense importance of apple production and exports in Jammu and Kashmir any study on this aspect would be worth-while to undertake. Against this background the present study analyses the trends of area, production, productivity and exports of apples in the Jammu and Kashmir State. Attempt has been made to understand
the cost structures predominantly; and offer suggestions for further improvement. The apple industry has been deliberately chosen for this study because, among the horticulture sector of the Jammu and Kashmir State apple cultivation is done at an extensive scale in the State as it occupies 45.51 percent of total horticulture area in the State. Apple cultivation provides employment to 7 lakh families in the state. (Economic survey, 2013-14). Apple contributes 75.86 percent of production to the states total horticulture production. A major portion of population is dependent on the horticulture sector and is engaged in apple trade. With the result it has a direct "bearing on the horticulture economy of the Jammu and Kashmir”

1.7 Research Gap and Statement of Research Problem

Since independence, India has made substantial progress in the field of agricultural sector in terms of increase in output, yields and in areas under many agricultural crops. The technological development in the field of agriculture has made India self-sufficient in respect of food grains and also a leading producer of several agricultural commodities in the world. At present, India is the largest producer of fruits, cashew nuts, coconuts, tea and milk in the world the second largest producer in wheat, vegetables, sugar and fish and the third largest producer of in respect of rice and tobacco. The green revolution in the major crops, the yellow revolution in respect of the oilseeds, the white revolution in milk production, the blue revolution in fish production and the golden revolution in respect of the horticultural products have significantly contributed to the present achievement in the several sub sectors. However, in recent years, the output and growth has declined in respect of many crops. The costs and returns of agricultural commodities have been determined by demand and supply, patterns of production, costs incurred in production and such other factors. The agricultural commodities are perishable in their nature and their needs and production are vital to the memory.

Jammu and Kashmir is basically agrarian economy in nature. Horticulture by its contribution to GSDP, employment, income, living standard of people has emerged a prominent sub- sector for overall economic growth of the state. Due to stagnant growth in agriculture, weak industrial base and backward private sector, there is need to strengthen the position of horticulture as the sector is best viable option for exploration.
In the State of Jammu and Kashmir, especially in Kashmir Division the horticulture plays a significant role in contributing to the development of the economy of the state. J&K is famous for some horticultural crops like apple, walnut, almond, apricot and saffron. Horticulture is the backbone of the state economy and is providing the employment to the large chunk of the population. But this sector is facing a lot of challenges and competition from the neighbouring state like Himachal Pradesh. There are various problems related to production, exports and marketing. There is a less intervention by the govt. In terms of addressing the issues faced by the growers, sellers and market mechanism. An attempt has been made through this study to decipher and quantify the positive impact of this sector to the people of J&K.

Apple production in state is facing infrastructural, credit, marketing problems. There is wide research gap, less work has been done, and there are only a few research articles available. There has not sufficient research on the horticulture production, export and employment trend in the state of Jammu and Kashmir. Therefore in consideration of the status of horticulture industry in the state, the current study will highlight certain issues regarding the Area, production, productivity and exports trend of apple production in the state.

1.8 Objectives

In view of the importance of horticulture sector to the economy of Jammu and Kashmir, importance of apple to the state exchequer and the research gap, the present study is taken up with the following precise objectives:

1) To analyse trends in area, production, productivity and exports of Apples in Jammu and Kashmir
2) To analyse the costs and returns of Apple cultivation in the study area.
3) To examine the resource – use efficiency in Apple cultivation among the different categories of the farmers.
4) To understand the marketing problems of the Apple growers in the study area.
5) To study the export competitiveness and direction of trade of Apples.
6) To overview the government initiatives with respect to Apple cultivation and exports
1.9 Hypotheses

In support of the objectives outlined above, the present study seeks to test the following hypothesis:

- Apple cultivation in Jammu and Kashmir is profitable and viable
- Technological advancement has a positive impact on the area, production and productivity of Apples.
- There is a positive relationship between cost and output of Apple in the study area.
- The larger the number of middlemen in the market the lower is the margin of the Apple.

1.10 Methodology

Designing a suitable methodology and the selection of the appropriate analytical tools is very important for a meaningful analysis of any research problem that has been undertaken. This section has been devoted to a description of the methodology which includes:

i. Nature and sources of data
ii. Sampling procedure
iii. Analytical tools and techniques

1.10.1 Nature and Source of Data

The study was undertaken using both primary and secondary data where primary data has been collected from apple cultivators in Jammu and Kashmir for the present study.

a) Primary Data

Based on the information gathered at orchard level, a well designed schedule has been drafted, pre-tested and used for field survey to collect primary data through personal interview method. The purpose of the study has been clearly explained to apple orchardists personally in local language and their co-operation is secured. The field survey has been carried out during the period May to August 2016 for the purpose of the collection of the primary data. This period is related to the pre-harvesting period of apple in the study area. The data collection pertains to the agricultural years of 2015-16.
b) Secondary Data:

On the other hand secondary data has been collected from official websites and official records & documents; such as National Horticulture Board, Department of Horticulture Planning and Marketing J&K, Sheri-Kashmir University of Agriculture Science and Technology (SKUAST). The period of secondary data is from 2001-02 to 2013-14, while the growth rates has been calculated from 1991-92 to 2013-14. The export data has been collected from the UNCOMTRADE the period of the data is from 1994-95 to 2015-16.

1.10.2 Sampling Procedure

The present study was conducted in four apple producing districts of the valley, among these districts the two districts are high apple producers viz; Baramulla and Shopian and the other two districts with low apple production districts viz; Budgam and Pulwama. To increase the precision of sampling, the stratified sampling has been used because it includes all important sub populations. The strata’s has been made on district wise then teshil wise then CD Block wise and the farm size of the growers. The sample has accordingly been apportioned size of the study is 331 which have been obtained by the production ratio of 4:2:1:1 in Baramulla, Shopian, Budgam and Pulwama respectively.

1.10.3 Analytical Tools and Techniques

To fulfill the specific objectives of the study, based on the nature and extent of availability of data, the following analytical tools and techniques were adopted:

1.10.3.1 Tabular Analysis

Tabular analysis was adopted to compile the general characteristic of the sample farmers, determine the resource structure, cost structure, returns, profits and opinion of growers regarding constraints in horticulture sector. Statistical tools like mean, compound growth rates were used to study the trends and then regression was used to predict the
trends regarding production and productivity of horticulture crops in Jammu and Kashmir and as well as in India as a whole.

1.10.3.2 Compound Growth Rate Analysis

To analyse the trends in the growth rate with regard to area, production and productivity of different crops grown under horticulture in India and Jammu and Kashmir, quadratic function were used as under:

\[ Y = a + bt + ct^2 \] ..............(1)

Where, \( Y_t \) = Dependent variable for which growth rate is estimated
\( a \) = Intercept
\( b \) = Regression coefficient
\( t \) = Year which takes value 1, 2….n
\( Ct \) = disturbance term in the year ‘t’

1.10.3.3 Production Function Analysis

Cobb-Douglas production function has been used to estimate the resource use efficiency. The dependent variable in the study is apple production whereas independent variables are fertilizers (N, P, K), pesticides and labour. These are the important factors which influence the output of the apple. Apart from these independent variables there are some variables which influence the output but the study has chosen the most important variables all other variables have been put in the disturbance term.

A log linear model of the farm has been used as:

\[ \ln Y = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + (v_i \pm u_i) \]

Where; \( Y \) = Gross returns of Apple (Rs/ha)
\( X_1 \) = Cost on Fertilizer (N+P+K)
\( X_2 \) = Cost on Pesticide
\( X_3 \) = Cost on Labour (Monetary Values)
\( \beta_0 \) = constant/ Intercept term
\( \beta_1 \) to \( \beta_3 \) represents production elasticities of respective inputs
\( v \) = Residual term
\( u \) = Error term
1.10.3.4 Auto Regressive Integrated Moving Average (ARIMA)

Export performance of apple has been analyzed with the help of moving average structure as explained by ARIMA models. Exports of apple have been modeled as ARIMA process. Identification of the values of parameters $p$, $d$, and $q$ has been done on basis of Auto Correlation Function (ACF) and Partial Auto Correlation Function (PACF) analysis.

First step in fitting the model is making the time series stationary. If time series is not stationary then it has to be transformed to make it stationary. Generally time series is differenced to make it stationary. ARIMA $(1,1,1)$ is calculated as:

\[
ARIMA(1, 1, 1) = (1 - \phi B)(1 - B)X_t = (1 + \theta B)Z_t
\]
\[
(1 - \phi B - B + \phi B^2)X_t = (1 + \theta B)Z_t
\]
\[
(1 - B - \phi B + \phi B^2)X_t = (1 + \theta B)Z_t
\]

\[
X_t - X_{t-1} - \phi X_{t-1} + \phi X_{t-2} = Z_t + \theta Z_{t-1}
\]
\[
\Rightarrow X_t = X_{t-1} + \phi X_{t-1} - \phi X_{t-2} + Z_t + \theta Z_{t-1}
\]

1.10.4.5 Revealed Comparative Advantage Index:

The concept of revealed comparative advantage (Balassa 1965, 1977, 1979, 1986) pertains to the relative trade performance of individual countries in particular commodities. On the assumption that the commodity pattern of trade reflects the inter country differences in relative costs as well as in non-price factors, this is assumed to “reveal” the comparative advantage of the trading countries. The factors that contribute to
movements in RCA are economic: structural change, improved world demand and trade specialization.

The RCA index is defined as the ratio of two shares. The numerator is the share of a country’s total exports of the commodity of interest in its total exports. The denominator is share of world exports of the same commodity in total world exports. The advantage of using the comparative advantage index is that it considers the intrinsic advantage of a particular export commodity and is consistent with changes in an economy’s relative factor endowment and productivity. The Balassa’s index is calculated as:

\[
RCA_{IA} = \frac{X_{IA}}{X_{IT}} \div \frac{X_{WA}}{X_{WT}}
\]

Where;

- \( RCA_{IA} \) = Revealed comparative advantage ratio for India in Apple
- \( X_{IA} \) = India’s exports of Apple
- \( X_{IT} \) = Total exports of India
- \( X_{WA} \) = World exports of Apple
- \( X_{WT} \) = World total exports

### 1.10.4.6 Revealed Symmetric Comparative Advantage (RSCA)

A problem with Balassa’s RCA index is its values is asymmetric and use of which in the econometric analysis results in biased estimates. Dalum et al (1998) has suggested that Balassa index should be made symmetric, because the RCA is not comparable on both sides of unity as it varies from one to infinity, if a country has comparative advantage in a product groups and from zero to one for those if the country has comparative disadvantage in it. Because of this asymmetry problem, the mean of the index tend to be higher than median, thus resulting in the skewed distribution of the index towards right. This leads to overstating the relative weight of sectors with value of index greater than one when compared to the sectors with the value of index less than one. To overcome this problem Dalum et al proposed an alternative index called Revealed Symmetric Comparative Advantage (RSCA) index to alleviate the skewedness problem as follows:
\[ RSCA = \frac{RCA-1}{RCA+1} \]

RSCA ranges from minus one to plus one (-1<RSCA<1) and avoids the problem of zero values. Positive indices show a comparative advantage while negative indices reflect a comparative disadvantage.

1.11 Chapter Scheme

The present study entitled “An Economic Analysis of Apple Production and Exports-A Study of Jammu And Kashmir” has been presented in eight chapters.

- **Chapter-I Introduction**: The first chapter introduces the subject and deals with characteristic features of apple, statement of the problem, objectives of the present study, methodology, collection of data, period of study, tools of analysis, limitations of the study and the presentation scheme of the various chapters.

- **Chapter-II Review of Literature**: The second chapter presents a thematic review of the past studies conducted so far and has made some observations on production, cost of cultivation, marketing, exports and on such other details.

- **Chapter-III Description of Study Area**: The third chapter is devoted with a description of the study area.

- **Chapter-IV Growth of Horticulture Crops in India and Jammu and Kashmir**: The fourth chapter has analyzed the Growth of Horticulture Crops in India and Jammu and Kashmir. The overall growth rates of horticulture crops of India have been studied in general and horticulture growth trends in Jammu and Kashmir have been studied in particular. The whole chapter is based on secondary data.

- **Chapter-V Production and Marketing Practices of Apple in the Study Area**: The fifth chapter has made an attempt to analyse the production and marketing practices of apple of the sample farmers. The chapter has focused from cultivation of apple to marketing and exports of apple. The problems faced by growers in
different stages of cultivation, marketing and exports have been studied in this chapter.

- **Chapter-VI** An Analysis of Cost and Returns Structure and Resource-use Efficiency. The fifth chapter has focused its attention on Cost and Returns Structure and Resource-Use Efficiency of Apple production. The chapter is based on primary data.

- **Chapter-VII** Comparative Advantage of Apple Exports in India and Jammu and Kashmir. The sixth chapter has determined Apple exports of India and Jammu and Kashmir.

- **Chapter VIII** Results, Discussion and Major Finding. The seventh chapter has presented a summary of the findings along with suggestions and conclusions based on the findings of the study.

1.12 Limitations of the Study

1) The study is confined to only four districts of the valley

2) Only apple cultivation is studied

3) The data and information on apple production and the marketing changes have been collected through a sample survey by holding personal interviews with the sample farmers. They do not maintain any accurate records of their cultivation expenses, and their expenses on the application of various inputs and their total returns. Therefore, some amount of recall bias is found to be associated with the collected data.

4) To minimize the recall bias, cross checks have been made by the researcher in the field itself.
1.13 Conclusion

This present chapter has focused on the introduction of the subject, and has mentioned about the characteristic features of apple. Further the methodology has been clearly mentioned in the present chapter. The next chapter, which is review of literature, will be studies in second chapter.

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