Chapter VIII

RESULTS, DISCUSSIONS AND MAJOR FINDINGS

8.1 Introduction

Apple is a perennial horticultural crop. Since apple is perishable in nature, they are mostly harvested when they are fully mature and unripe. The taste of apple depends on various factors such as the stage of maturity of the fruit at the time of harvest, method of harvesting, care in handling during transportation and other associated activities. On the basis of different qualities, the apples are graded before marketing and processing. Wooden boxes are commonly used for packing of apple. Packing is also done in paper boxes while individual fruits may be wrapped with fruit covers for various destinations. Orchardists, usually, dispatch their produce by trucks and Lorries in boxes to the local markets and fruit mandies in Delhi and various parts of the country. Main destination of Kashmiri apple is Azad-Pur, New Delhi fruit mandi.

The present study has attempted to examine the economics of apple production and exports of India in general and Jammu and Kashmir in particular. This chapter provides the gist of the study in the background of research context, methodology and research objectives. Findings of the study have helped to formulate the policy implications for the benefit of the apple producers, exporters and the government.

8.2 Main Findings from Secondary Data

- It is found that the growth of area, production and yield of horticulture crops in the country was found to be statistically significant. (See table 4.4), which shows the trend growth rate in area, production and yield of horticulture crops in India from 1991-92 to 2013-14. The growth rate in area under horticultural crops has initially increased from 1.37 percent to 2.36 percent but from year 2011-12 to 2013-14 the growth rate has decreased to 1.42 percent. Similarly the growth rates of production of horticulture crops has also declined from 5.37 (1991-92 to 1995-96) to 2.54 percent from 2011-12 to 2013-14. The growth trends in the yield of horticulture crops in India was 4.17 percent during 1991-92 to 1995-96 but gradually it has also decreased to 1.19 percent during 2011-12 to 21013-14.
The area under horticulture crops in J&K has been increased from 217545 (1999-00) hectares to 369088 hectares in 2014-15. The production of horticulture crops has shown fluctuating trend in the year 1999-2000 was 1105773 MT which increased to 931800 MT, further the production of horticulture in the state has shown the increasing trend till 2010-11 later in late 2012 the production has declined to 1742142 MT, the reason for fall of production was the unrest in the valley. In the year 2014-15 the production has again declined to 1542668 MT, the reason for the decline in production of horticulture crops in 2014 was the floods which hit valley devastatingly. The production of horticulture crops include both fresh and dry fruits, under dry fruits walnut places at number first and in fresh fruits Apple stands in the first number in terms of production.

The share of apple production to total horticulture has been decreased from 1999-2000 to 2014-15 from 84.02 percent to 75.86 percent in the state of Jammu & Kashmir. The reason for the decline in the share of apple towards total horticulture is; crop diversification, farmers has adopted other horticultural crops to their orchards, which they find more profitable. Farmers have adopted other horticultural crops like; Walnut, almond, pear and cherry to be in the safer side while for price fluctuations. Initially farmers were mainly confined to apple and pear cultivation. Now modern technologies have made it possible for other crops to grow as well.

The apple production in the state of Jammu and Kashmir is mainly found in the Kashmir division. Baramulla stands on number first position in apple cultivation with the production share of 36.20 percent to total horticulture production; apple cultivation in Shopian district holds second position with the percentage share of 15.67 percent, followed by Anantnag with 12.77 percent of apple cultivation. Least production of apple is found in Jammu division because of the hot climatic conditions in the division.

The yield of apple among districts was found high in Baramulla district all over years. In the year 2014-15 the yield of apple in Baramulla district was 16.98 MT/Ha. In Baramulla district Sopore town and adjoining villages are the main contributors of apple production. In Anantnag district the yield was calculated as
8.68 MT/H in year 2014-15 which holds second rank in the state. The Shopian district is having 8.49 MT/H yield of apple which is very less as compared to Baramulla district. The yield of Ganderbal, Pulwama, Kupwara and Srinagar is 7.22, 7.05, 5.54, 4.65 MT/H respectively.

- The average yield of apple found in the whole state is 7.16MT/Ha in which Kashmir division alone have yield of 7.87MT/Ha. In overall Jammu division the yield of apple was found 1.66 MT/Ha

- As far as exports of is concerned there has been seen more fluctuations in export values of apple from India. In the year 1994 the value of apple exports was $2159421 which increased to $2910548 in the year 1995. The unexpected dip of apple exports have been found in the year 2001 with meager exports value of $348,528 which further recovers and reached to $7,762,581 in the year 2007. The golden years for apple exports were from 2010 to 2013. The export value in the year 2011 was $14766465. The year 2014 has again a severe dip with the export value of $5,722,769 which was very less as compared to the export values of 2013. The recent exports value of apple in India was $6777181 which is relatively higher than export values of 2014.

- The exports destination of apple is mainly in Bangladesh with the percentage share of 73.94 followed by Nepal 21.60 percent remaining 4.46 percent is being exporting to other nations like Sri Lanka and UAE. The study has shown that apple exports from India are confined to Asian countries only. The reason for less exports of apple cultivation is high competition with china and domestic demand of apple in Indian markets.

- Forecasts for apple production (with 95% confidence intervals) were generated by using ARIMA (1, 1, 1) model for the period 1994-95 to 2025-26. Forecasts (with their upper & Lower Limits at 95% confidence intervals) ARIMA (1,1,1) forecast model showed that the apple shipment is in positive trend up to 2015-26. The export value of apple would increase and Predicted export of apple (Forecast Values) will range between 2910548 US$ and 8,092,131 US$ during the period, 1994-95 to 2025-026. This means that an increased export of apple will be available in future and will fetch more foreign earnings.
The competitiveness of Indian apple exports has been studied with the help of RCA which reveals that India is uncompetitive in the world market in terms of apple exports, despite the fact that India stands on number fifth in terms of apple production in the world. Since the revealed comparative performance indexes only measures the observed trade data, factors like communication, transport, storage, distribution, quality, meeting specific quarantine requirements of the importing countries are not taken into account. As a result the actual performance of Indian apple exports in the global market might not be as expected. However that there has been a considerable increase in the volume of apple exports but the foreign exchange earnings are not much impressive.

8.3 Main Findings from Primary Data

- It is found from the study that majority of the respondents belongs to general category indicating no, major caste classifications. There is complete absence of caste discrimination in the horticultural sector of the state of Jammu & Kashmir as there is no such discrimination in the land holdings share on the basis of any caste. Highest percentage of general category has been found in Budgam district (83.33 percent) followed by Shopian district (82.93 percent)

- The economic status of apple growers shows that most of the respondents were living above poverty line 71.60 percent of respondents remaining (28.4 percent) are below the poverty line. The highest number of people below poverty line has been found in Shopian district (37.80 percent). The results show that the horticultural growers of the state of Jammu & Kashmir have good economic conditions. The reason for good economic status of horticultural producers of the valley is that the primary occupation of the majority of the respondents is business other than horticulture. Horticulture being the secondary occupation of the majority of population

- The state of Jammu and Kashmir has a good percentage of literate people the overall state literacy rate among males is 78.3 percent. As the study was carried during the horticulture growers of the state of Jammu & Kashmir all the
respondents in the state were only Males, leaving no scope for women in this sector.

- The highest percentage of uneducated people has been found in Budgam district (23.81 percent) followed by Baramulla (23.03 percent) and the least percentage of uneducated respondents has been seen in Shopian district. Similarly, highest number of post graduates has been found in Pulwama district (35.71 percent) followed by Budgam (30.95 percent). The overall educational scenario of the study area is that almost 50 percent of the respondents were having the qualification of Post graduation and Graduation. Remaining half of the population were Twelfth (+2) (8 percent), followed by Matric (15.7 Percent), Middle (11.5 Percent) followed by not literates (21 Percent)

- The primary occupation of 40.18 percent of the respondents were Employed which include both government and private jobs. 31.72 percent of respondents were related to agriculture as farmers. 13.60 percent of respondents owned their own businesses where as only 8.76 percent of respondents were primarily involved with horticulture sector; remaining 5.74 percent has been labeled as others which includes; masons, carpenters, drivers, private bus conductors etc.

- The fruit growers in the state procure the saplings mainly from nurseries (56.50 percent). The horticulture department supplies over one-fourth of saplings to the growers. Only 28.70 per cent of the growers use their own saplings. This speaks of the callous attitude of the horticulture department towards the state horticulture sector.

- Three fourth of growers does not receive any sort of subsidy for their saplings from the department of horticulture.

- All the apple growers use organic manure, fertilizer and pesticides to their orchards for better production. In fact the study has found that the excess usage of fertilizers has been used in apple orchards.

- District Budgam needs the intervention of experts for the awareness of spraying frequencies, as only 88.10 percent of the respondents are spraying according to the guidelines by the agriculture experts and scientists.
Most of the growers affirmed that there is sufficient availability of packing material. Only few respondents are facing shortage of packaging material in peak seasons. The wooden and paper boxes are available. Mostly growers use both types of packing boxes (75.8 percent), some of the grower (16.3 percent) prefer only wooden boxes for packing. The reason for using wooden boxes is that they send their extra produce to other parts of the country the growers fear that the boxes might get damaged due to rain or improper handling as the wooden boxes are more durable. Only a small proportion (7.9 percent) use boxes made of paper. All the respondents have admitted that the boxes made of paper are cheaper than wooden boxes.

The study revealed that the growers grade apple, making the size of it as the basis of grading. Most of the growers grade their fruits manually, as there are very few growers who grade their fruits through machines.

The study further reveals that most of the growers (64.95 per cent) have availability of grading machines but nearly 86.71 percent of respondents do not grade through machines they grade their produce manually, the reason for their manual grading is they find it cheap as compared to grading via machines.

Most of the growers (83 per cent) are facing the shortage of trucks during the peak seasons. Further, there are very few organized transporting agencies available in the state of Jammu and Kashmir. 56.80 percent of respondents have affirmed the availability of transporting agencies.

Warehouses for apple are easily available for farmers, but when it comes to cold storage houses it is hardly available. Nearly 40 percent of growers have availability of cold storage houses.

Most of the growers in J&K have easily accessibility to local mandis for direct selling of fruit. Further, no minimum fixed price is prevailing in the market. The price in the market is fixed by the demand and supply interaction. Majority of the growers (86.4 per cent) do not export their produce to the nations.

Speaking about the awareness that growers must have regarding their business, a major share of the respondent (89.73 percent) reported in affirmative. The main sources of the information are newspaper, radio, television etc. the government
has also started program on television like Butraat and also Kissan call centers have been established to facilitate the growers in getting the required information regarding their horticulture activity.

- Only one-third of the respondents attend horticulture training and demonstration causes organized by the concerned departments and institutions. However, exhibitions by horticulture department are showing a prominent presence of fruit growers as indicated by the data. 59.82 percent of the respondents have attended exhibition.
- The apple produce is not insured for a major share of growers while only (12.69 percent) of the produce is insured.
- The total establishment costs per hectare have worked out to Rs. 134058.16, which included the variable costs of Rs. 63228.10 and the fixed costs of Rs. 70830.05.
- Annual operational and maintenance cost of apple shows cultivators incur Rs 82100 per hectare in apple orchard, the major cost to be incurred is cost of nursery which accounts for about 44.66 percent of total initial cost, nearly 9.7 percent of total cost is incurred on layout digging and filling of pits and about 14.6, 21.8, 6.1 percent on manure, fertilizers and plant protection of the initial investment respectively.
- It has been found that the cost of fertilizers to small farmers is Rs. 26170.22 per hectare whereas for large farmers the cost on fertilizers was less than the small sized farmers (Rs. 22145.82 per hectare). The cost incurred for pesticides among small farmers was Rs. 29465.58 per hectare as against Rs. 25322.30 per hectare in large farms which is also less than small farmers. Cost on labour was high in large farmers Rs. 21109.49 per hectare as against Rs. 19638.90 per hectare in large farmers. Cost on post cultivation practices is higher in small farmers. The cost of post cultivation practices include; packaging raw material, cost on grading, transportation, storage and marketing. The overall cost of post cultivation is higher in small farmers in the state of Jammu and Kashmir as a whole. In Budgam district wise the cost of pre cultivation and cost of post cultivation is higher for large farmers.
The income generated from the sale of apple has been found high in large farmers Rs. 566556.58 per hectare. The low price for small farmers is due to the selling of the produce in the local markets, and got the proceeds of selling their apple immediately (Rs. 564023.96 per hectare). The large farmers would not sell their apple in the local market but will take them only to the urban market centers through proper marketing channels. The price of apple will be determined on the basis of the size of the apple, their taste and their color at that time of offering them in the market. The marketing cost has been Rs. 35708.55 per hectare for the small farmers and Rs. 16279.26 per hectare for the large farmers respectively.

The income generated from the sale of apple has been found high in large farmers in almost all the districts except district Pulwama which has more income generation from small farmers (Rs. 634025.61 per hectare). The low price for small farmers is mostly due to the selling of the produce in the local markets. Marketing costs has been found high in small farmers of Pulwama district Rs. 40487.21 per hectare, this is mainly because of less marketing facilities available in the district. As far as net profits is concerned it has been found that larger farmers of district Baramulla and Shopian has highest profits near to Rs. 520000 per hectare, these two districts are the main apple growing districts in the valley and enjoys the highest profits in the state.

The results of frontier production function and the technical efficiency of sample farmers in the state of Jammu and Kashmir which includes four districts. The coefficient of independent variable of fertilizer in the state of Jammu and Kashmir is -0.596 which shows that the farmers are using more fertilizers than the actual usage of fertilizers. The coefficient of pesticide is 0.099 and the coefficient of labour is 0.449 which shows that pesticide usage of farmers and labour usage is significant. This means if the farmers will increase 1 percent cost on pesticides that will increase the output/production of apple by 0.009 percent. Similarly to increase 1 percent of output/production of apple in the state of Jammu and Kashmir the growers has to increase 0.0449 percent of labour in the study area.

The results shows the estimated value for the variance of inefficiency parameter (log Sig 2 v) and the variance of the disturbance term (log Sig 2 u) is statistically
significant at 1 percent level of significance. Therefore, there is inefficiency in inputs used by the farmers. The estimated average efficiency of apple growers is 0.6973 which shows there is an existence of 31 percent inefficiency in the use of inputs like fertilizers, pesticides and labour by the farmers. Hence, there is a scope for increase in output by 31 percent without the increase in cost of inputs.

8.4 Policy Implications

It has been observed that the cultivation of apple in the study region is economically viable. However, the removal of certain constraints faced by the growers both at the stages of production and marketing can also help to boost the yield and get better price for their produce. Well planned and coordinate programmes of action to encourage the orchardist to concentrate on this highly economic occupation are required. The following are relevant implications of the present study.

At every stage of raising the plant, the orchardist must be given proper instructions to increase the productivity. A Horticulture Marketing Training Institute should be established for training and education of personnel engaged in various activities of marketing viz., packing, grading, standardization etc. Cold storage facility must be established in the production centers, so that the growers can stock their produce to sell it at attractive price at the appropriate time. Open action system can be introduced which will open up an organized marketing system for apple.

Grading and quality control Act should be executed which should include establishment of grade specification and enforcement of grading programmes, operation of inspection systems and control laboratories. At the same time, grading should be carried out in accordance with the best mechanical devices.

Since the market rate of Apple fluctuates, there should be a minimum price fixed (per Kg or per Box) by the government so that growers will at least be sure of the minimum returns as is done in other cases. There is need to launch a campaign for boosting exports of Apple. New markets should be identified and a culture of value addition promoted. Government should devise a Plan to deal with the emerging
challenges of the WTO regime. Measures should be setup to improve post- harvest management practices and follow with International Standards.

There are the ordinary transportation facilities on one hand and on the other hand the product is perishable which harms the quality of the product. The distance between the source market and the destination market is long, so it is also a hindrance. Hence, the markets should be integrated to avoid this risk by way of refrigerated transportation facilities. There is no railway connectivity to the valley so the fruits are being transported mainly through trucks to rest of India which is expensive and time consuming.

Provisions should be made for more exports. The Apple in the region should be uplifted on the lines of SEZs. Efforts should be made to ignore the influence of commission and forwarding agents on apple trade and to establish such a distribution system of fruit as would ensure direct sale to the consumer. This type of marketing channel will be remunerative.

Market information centers should be established which will provide the apple growers and trader’s day to day knowledge and information about the happenings and trends prevailing in the various marketing centers in and outside the State. Such a facility will help the growers/traders to decide about future market strategy.

Opportunities of more revenue should be grabbed by establishing processing unit’s at large scale at district level so that the wastage could be reduced to its minimum. Each year juices of different kinds including Apple juice (acquired from Kashmir itself by certain beverage companies) make its way to Kashmir which worth as high as Rs.100 crores

Adequate arrangements should be made for imparting training and education to the growers so as to equip them to face the marketing challenges. Growers should be trained in the art of bargaining, selling, price fixation and so on.

Cooperative marketing is a unique pattern of marketing where the growers sell their produce to the cooperatives organized with the help of the Government. Although, there are some cooperative societies in the State, these are totally inadequate and inefficient to meet the requirements and demand of the apple industry.
The services of horticulture marketing specialists should be offered from other parts of the country to work for some time in a particular area, to analyse problems on this subject and make recommendations to the State in the light of current conditions. Anti-hail nets should be provided to growers on subsidies rates to prevent the crop from hail storms.

- High density apple orchard management should
- Introduction of Vermin composts and bio fertilizers
- Irrigation facilities for Kareva land orchards
- Legume crops (such as peas and beans) should be sowed for soil texture
- Introduction of high yielding Apple variety which is good in color and size
- Standardization of existing root stocks of apple under normal density plantation.

### 8.5 Conclusion

It is a gratifying experience to study at close quarters the harrowing experience of some of the apple growers in Jammu and Kashmir. The highly volatile price pattern, lack of storage facilities, non-availability of agricultural labourers at times, the primitive methods of apple cultivation are some of the crippling roadblocks faced by the apple growers. Apple is highly tasty and luscious fruit for Indians. To meet the ever-growing demand of the apple, land diversification is of utmost importance. The apple cultivation provides employment opportunities to many people and also helps the apple growers for improving their economic status. In this context, the present study is highly exclusive in nature and the findings of the study will help policy makers to correct deficiencies in the existing marketing system/ operation of the apple industry. The suggestions, if implemented properly would prove a gateway to the future prosperity of the industry.