

**“ECONOMICS OF MARKETING AND PROCESSING OF  
APPLE IN BARRAMULLA DISTRICT OF JAMMU AND  
KASHMIR STATE”**

**THESIS**

**Submitted to the**

***Indira Gandhi Agricultural University, Raipur***

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**for the Degree of**

**MASTER OF SCIENCE**

**IN**

**AGRICULTURE**

**(Agricultural Economics)**

**By**

***Farhat Ahmad Shaheen***

**DEPARTMENT OF AGRICULTURAL AND NATURAL RESOURCE ECONOMICS**

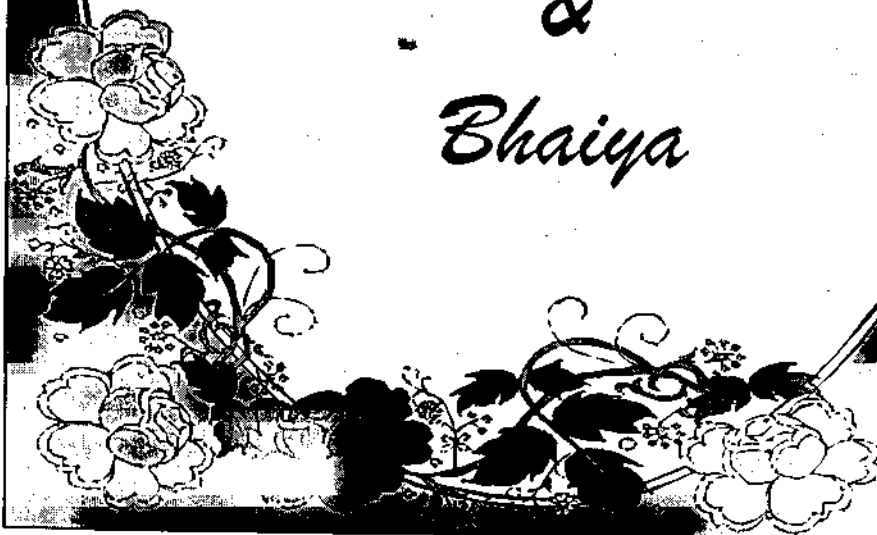
**INDIRA GANDHI AGRICULTURAL UNIVERSITY**

**COLLEGE OF AGRICULTURE**

**RAIPUR (M. P.)**

**2000**

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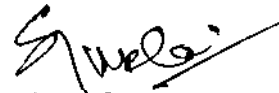


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No part of the thesis has been submitted for any other degree or diploma or has been published/published part has been fully acknowledged. All the assistance and help received during the course of the investigations have been duly acknowledged by him.

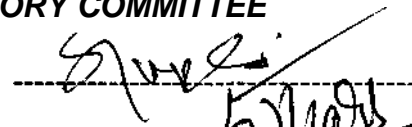


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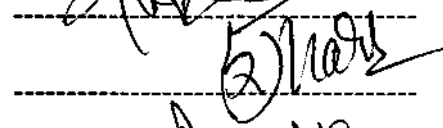
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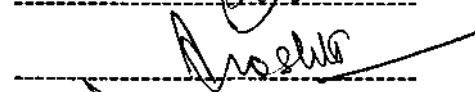
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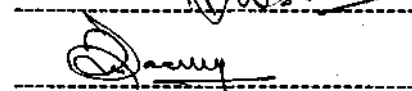
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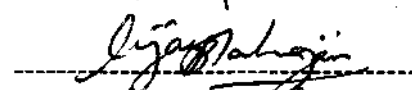
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**Member** : (Dr. R. R. Saxena)



**Member** : (Dr. V. Mahajan)



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**CERTIFICATE - II**

This is to certify that the thesis entitled ECONOMICS OF MARKETING AND PROCESSING OF APPLE IN BARRAMULLA DISTRICT OF JAMMU AND KASHMIR STATE" submitted by F. A. SHAHEEN to the Indira Gandhi Agricultural University, Raipur (M.P.) in partial fulfilment of the requirements for the degree of "MASTER OF SCIENCE IN AGRICULTURE" (Agriculture Economics) in the Department of Agricultural and Natural Resources Economics has been approved by the student's Advisory Committee and External Examiner after on oral examination on the same.

DATE : 04.10.2000

*F. A. Shaheen*  
04.10.2000

EXTERNAL EXAMINER

Dr. S. P. GUPTA  
MAJOR ADVISOR AND CHAIRMAN

*S. P. Gupta*  
-----

Dr. D.K. MAROTHIA  
PROF. & HEAD OF THE DEPARTMENT

*D. K. Marothia*  
-----

DIRECTOR OF INSTRUCTIONS

*K. P. Singh*  
-----

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College of Agriculture, IGAU  
Raipur (M.P.)

F. A. Shaheen,  
(F. A. Shaheen)

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**CHAPTER - I**

**INTRODUCTION**

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## CHAPTER - I

### INTRODUCTION

#### 1.1 Description of Crop :

Apple (*Malus sylvestris*) is a typical temperate fruit, having 7 to 8 feet height and spreading form of branches, with tap root system. It starts flowering in the month of April and has white flowers. In apple trees, the time of flower bud initiation is closely related to the growth cessation of shoots on which they are set (Huang and Cheng, 1984). Most of the commercial apple cultivars are self-incompatible (Brown, 1975), except very few. The cultivated apple is reported to have originated in the temperate region of Western Asia between Black Sea and Caspian Sea and spread throughout the world.

The major apple producing countries in Europe are Germany, France, United Kingdom, Italy, Switzerland and Denmark. The other important apple producing countries are China, USA, France, Turkey, Iran, Italy, Russian Federation, Poland, Germany and India. The China is largest producer of apple crop with annual production of 16,009 thousand M. Tonnes in 1996, backed by USA with production of 4,733 thousand M. Tonnes. Out of the total (53,672 thousand m.t.) World apple production, 29.83 per cent is contributed

by China, followed by USA (8.82 per cent). The production of apple of ten top horticulturally advanced countries is given in the table 1.1.

**Table1.1: Production of apple of ten top horticulturally advanced countries (1994-96)**

S. No.	Country	Production ('000 M.T.)		
		1994	1995	1996
1.	China	14,017 (23.15)	14,017 (28.14)	16,009 (29.83)
2.	USA	5,217 (10.85)	4,801 (9.64)	4,733 (8.82)
3.	France	2,683 (5.58)	2,516 (5.05)	2,455 (4.57)
4.	Turkey	2,095 (4.35)	2,100 (4.22)	2,100 (3.91)
5.	Iran	2,008 (4.17)	1,824 (3.66)	2,000 (3.73)
6.	Italy	2,233 (4.64)	1,940 (3.89)	1,940 (3.61)
7.	Russian Fed.	1,142 (2.37)	1,200 (2.41)	1,800 (3.35)
8.	Poland	1,441 (3.00)	1,288 (2.58)	1,700 (3.17)
9.	Germany	1,841 (3.84)	1,180 (2.37)	1,594 (2.97)
10.	India	1,200 (2.49)	1,200 (2.41)	1,200 (2.24)
11.	Other countries	17,103 (35.56)	17,747 (35.63)	18,141 (33.80)
	WORLD	48,100 (100.00)	49,813 (100.00)	53,672 (100.00)

**Note :** The figures in parentheses represent percentage to total World production

**Source :** Data Base Horticulture(1998), Ministry of Agriculture, Krishi Bhavan, New Delhi 110 001

In India, apple is grown mainly in Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh (hills). The productivity of apple at national level is 5.59 m.t. per ha. which is quite less than 60.70 m.t. per ha. of some advanced countries. In India, largest produce of apple is in J&K, contributing 58.85 per cent of total apple production of the country, with average productivity of 9.16 m.t. per ha.

## **1.2 Economic importance of crop :**

Apple industry plays an important role in the economic scenario of Jammu and Kashmir. It constitutes about 90 per cent of the total horticultural produce of the state. Involving around half a million house holds, apple plays a key role in the rural economy of the state, with an average yearly turn over of Rs. 750 crore (JKHPM). The revenue to state government by virtue of toll tax for export of apples out side the state were Rs. 3.90 crores, 3.25 crores and 4.28 crores in the year 1997-98, 1998-99 and 1999-2000, respectively (JKHPM). Besides this, it present a base for the processing industry, which is still untapped. There are about 0.25 million m.t. of apples unfit for fresh market from which only a small quantity is utilised for the processing. The estimated quantity of un-utilised apple culls can yield an Apple Juice concentrate, worth about 80 crore, (Shah, 1999).

Any problem to this crop has a direct bearing on the state economy in general and orchardists economy in particular. Due to drought in year 1999, a quantity of 1.5 million m.t. of fruit crop (apple) was damaged. Consequently, Indian government imported apples from Newzealand and Australia in order to fulfil the domestic requirement of the country. According to an estimate, about 50,000 ha. area was affected which caused the financial loss of about Rs. 75 crores.

### **1.3 Justification of the study :**

Agriculture is the mainstay of Indian economy and horticulture is a crucial component there of. Horticulture development has been accorded high priority during the 8th and 9th Five Year Plans. The impact of enhanced investment in horticulture has been highly encouraging in terms of vastly improved production of 96.1 million tonnes in 1990-91 to 141.00 million tones in 1996-97 in the country. The state produces about 1 million m.t. quantity of various fruits of which apple constitute 0.86 million m.t. (90 per cent).

The improvement in the production is quite important but marketing has also an equal importance to develop a commercial crop, which is purely produced to sell in the market.

Though, there have been multi-dimensional efforts to increase the production of apple in the state but marketing and processing sectors have not received proper attention. The market of apple is not regulated in the state. There are various malpractices prevailing in the trade and growers are at the mercy of middle men. Producers do not get the proper share of their produce. On the other hand, consumers are paying high prices for the produce.

Nearly 30 per cent of total produce of apple crop is going waste due to pre-harvest drop, making total annual quantum of such fruit about 0.25 million m.t. Due to non-availability of adequate processing facilities in the state, such fruits do not find an appropriate outlet in the market. Against this huge un-marketable surplus, the state has at present, facilities to process just about 60,000 m.t. of apple, which is about 24 per cent of total availability of apple culls. Remaining apple culls offers a good potential for processing industry.

#### **1.4 Objectives :**

Looking to the above facts, it is essential to conduct a study, which could say some thing about variation and growth rate in area, production and productivity of apple in the state. It is expected from this study to find-out the marketing pattern,

marketing cost, margins and price spread. This study will also see the processing costs and economics of apple processing alongwith various constraints faced by the apple growers in the production, marketing and financing.

The present study is therefore, under taken in view of the following objectives:

- I) To estimate the performance of area, production and productivity of apple in J & K state,
- II) To examine the marketing system prevailing in the apple trade,
- III) To estimate the marketing cost, margins and price-spread in the apple marketing,
- IV) To evaluate the processing cost, economics and potentials of apple processing,
- V) To examine the different constraints in financing, production and marketing faced by the apple producer and
- VI) To suggest some policy interventions to improve the production, marketing and financing of apple.

### **1.5 Hypothesis:**

- 1) The productivity of apple is significantly contributing to the production of crop in the state.
- 2) The existing marketing system has various short comings.
- 3) The processing cost of apple is high which could be reduced appropriately.

**CHAPTER - II**

**REVIEW OF LITERATURE**

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## **CHAPTER - II**

### **REVIEW OF LITERATURE**

This chapter represent the brief review of research-work done on the different aspects of apple including production, marketing, trade/export, constraints, processing and storage. The whole chapter is divided into two broad categories i.e., work done in India and work-done in abroad.

#### **2.1 Work done in India :**

The research work done in the above mentioned aspects is given in different sections.

##### **2.1.1 Studies on production :**

Singh and Sikka (1992) made a study on the economics of Production and marketing system of apples in tribal areas of Himachal Pradesh. This study attempts to: (1) analyse the trend in area and output of apples; (2) compare the costs of apple growing with those of field crops; (3) consider the existing marketing system, costs, margins and price spreads; and (4) to generally look at the problems of apple growing in the tribal areas of Himachal Pradesh, India.. Purposive-cum-stratified random sampling technique was used for selection of sample villages from Kinnaur in the tribal region.

Results show that apple growing is more remunerative than field crops and that investment in apple production is profitable and provides greater employment potential to tribal peoples. Problems remain in the areas of marketing, transportation, storage and pricing.

Wani et al (1993) made a study on the economic analysis of different age orchards in apple in J & K. The apple industry is a major sector of the economy of Jammu and Kashmir. This study examines the costs, returns and economics of different age categories of apple orchards in Jammu and Kashmir. Investment in apple orchards is profitable. Cultivation is labour intensive and helps to generate much employment. Net returns from apples can be increased if marketing problems are taken care of and extension services strengthened to educate farmers about the proper input use.

Prasher et al (1996) made an economic analysis of apple cultivation in tribal belt on North-Western Himalayan Region. The objectives of study were (i) the economics of apple orchard raising; and (ii) existing marketing systems and scope for improvement in the tribal region. A sample of 120 growers was selected and information was collected for the year 1990-91. Marketing channels and price-spread, and apple growers'

marketing problems were studied. Apple cultivation in the tribal belt is a remunerative and employment-generating activity. The problems faced include shortage of skilled labour and high wages, shortage of packing material and lack of storage and transportation facilities.

Tripathi (1997) made an economic analysis of production and marketing of apples in Garhwal hills of Uttar Pradesh. He found that Apple production was not a viable enterprise in the Garhwal hills of Uttar Pradesh, India, at the existing level of production technology adopted by the apple producers. The operational and commercial costs were Rs. 761 and Rs. 4722 per hectare per year for apple production. The net return over operational cost was estimated at Rs. 1757 per hectare per year, whereas on the basis of commercial cost, it gave a loss of Rs 2203 per hectare to the apple producers every year. High cost of packing materials, lack of proper grading and packing, and a large number of middlemen in marketing reduced the benefits of apple growers. To make viable and profitable apple production, reallocation of the input resources should be made. Increased use of plant protection measures, fertilizers and human labour in intercultural operations can increase the return of orchards many-fold. Improved production technology should be introduced together with a package of

modern inputs, financial assistance, technical awareness along with development of storage and marketing infrastructure in this trade.

### **2.1.2 Studies on marketing :**

Thakur, D.S. (1973) made an attempt to study the pricing efficiency of the Indian Apple Market in H.P. He found that, in general the whole sale prices of commercial varieties of apple show a rising trend over the years in almost all the large city markets. There is a wide variation among the prices of different varieties and also in the trend in price of the same variety in different markets. Apple prices are characterised by wide fluctuations over time and space according to the position of arrivals & stocks in the market & the variation in weather & demand for outstation dispatches. The cost of apple marketing is high enough & the apple growers get generally less than 50 per cent of consumer's price. It is more profitable to sell apple in distant markets of the country than in markets situated near the production areas. This study shows that the marketing system for apple in India is fairly integrated so far as inter-market price movements are concerned. But it is observed that the traders' profit margin accounts for quite a large proportion of the price paid by the consumer, which shows a symptom of inefficiency.

Atteri and Ray (1992) analysed the Impact of Himachal Pradesh Horticultural Produce Marketing Corporation on the

wholesale price behaviour of apple - a spectral approach. Paper considers the role of the Himachal Pradesh Horticultural Produce Marketing Corporation (HPHPMC) in improving the stability of wholesale prices for apple in the markets of Calcutta, Delhi and Madras. A spectral analysis approach to time series data on prices is undertaken for each of 3 markets, with data divided into two periods (before and after the inception of HPHPMC). Results indicate that six month seasonal cycles were present in all 3 markets in both periods. The paper concludes that there is a need to stabilize apple prices. This is to be achieved by increasing the flow of information to different markets and encouraging more construction of cold storage facilities.

Kainth (1994) made an attempt to study of apple consumption in Urban areas of Indian Punjab, consumer preference and the factors affecting apple consumption. Data were collected from 400 households (1520 consumer respondents, of which 834 were male and 686 female). Households were classified according to five income groups. Large apple size was the most popular with the poor, lower middle and middle class groups, whereas very large apple size was not popular with the upper middle and rich classes. In general, red was the most popular colour. Apple consumption

elasticity was inelastic with respect to family size, family education and disposable income.

Saraswat (1994) present a study on the marketing of Himachal apple in Delhi. The paper investigates: (1) trends in area and production of various fruits in Himachal Pradesh state, India; (2) the marketing system for apples; and (3) marketing problems faced by apple growers in Kicri village. The stages involved in apple marketing include picking, grading, packing and transportation. Apple production is increased greatly during the last two decades. However, there are many problems which need to be resolved in the marketing system. Marketing margins are quite high at both the mashakhor and retail level.

Wani et al (1995) analysed the resource-use and economic efficiency of various marketing cost components in apple based on sample of 30 apple producers in block Bandipora of Barramulla District of Jammu and Kashmir. The allocation of marketing costs is also examined in this study. The results indicate that grading, packing and transportation costs accounted for the largest amount of expenditure by the apple producers. The lowering of the packaging costs is suggested by finding a substitute for wooden packaging. The excessive transportation costs prevent

marginal and small apple producers from sending their crop directly to the market.

Negi et al (1997) conducted a study on the marketing of Himachal apple, over space and time. The study is based on secondary data which reveals that marketing efficiency has declined over time in terms of producers net share leading to an adverse impact on the producers welfare in particular and the state economy in general. Broadening the market will improve producers welfare but selling in distant markets would require transit efficiency and market intelligence besides a prior detailed market study to determine cultural and consumer profile advantages for effective market regimentation.

Singh and Chauhan in 1998, conducted a study on the role of co-operatives in organising production and marketing of Apple produce in H.P. The society selected is Shathla Premal Co-operative Fruit Growers Marketing. Society Ltd. It is the most successful society in organising production and marketing of fruits (apple) in northern India. The main function of the society is to arrange the supply of inputs and also supplies consumer goods to its members on their requirement. The other functions are to provide and arrange the transport of produce of its members, arrange for credit advances and also the dissemination of market intelligence to

its members over years. Society is expanding business activities by providing all types of production and marketing assistance to its members. During 1997-98, society handled 55,000 boxes of apple, worth Rs. 110 lakh and extended Rs. 22 lakh as marketing loan to farmers. The society has planned to set up a modern mechanised grading and packing house complex with facilities like cold storage, pre-cooling chambers, refrigerated transport etc. On the basis of performance of selected society, it can be concluded that co-operative institutions at village level can provide valuable services to horticulturists of state, who can concentrate their efforts on production front without having any barriers for marketing.

### **2.1.3 Studies on trade :**

Saraswat and Vadiya (1995) studied the apple trade in India with special reference to western Himalaya region. The paper presented highlights (1) costs and returns of apple cultivation and trade in the western Himalaya region of India; and (2) the destination of arrivals and sales of apples in Delhi markets. Data for 1990 were collected from a sample of 214 households from six clusters of villages in Shimla, Kullu and Mandi districts of Himachal Pradesh. It was found that farmers raise intercrops until the orchard is three years old. Net returns for the first seven years are negative due to absence of any returns from non-bearing orchards. The

producers share in consumer rupee is only about 40 per cent. Apples are marketed throughout the year.

#### **2.1.4 Studies on constraints :**

Saraswat (1995) analysed the marketing system and the problems faced by apple producers in the Kiari village of Himachal Pradesh. Picking, grading, packing, and transportation stages were taken into consideration through which apple passes from producers to consumers. The involvement of agents in apple market of Delhi is also discussed. The problems faced by farmers include lack of grading and packing with a shortage of skilled labour, fragility of the crop and the long distance from orchard to link road and then the main market, lack of permanent storage facilities, transport logistics, inadequate market information and unfair dealings by agents.

Mai-Chand (1997) analysed the constraints of tribal farmers of Himachal Pradesh during the adoption of improved apple cultivation. Sixty farmers from 3 villages of the tribal district of Kinnaur, Himachal Pradesh, were surveyed in 1994. They perceived 34 items to be constraints in the adoption of improved apple cultivation practices. The items of the constraint index were developed in consultation with researchers, extension personnel and progressive farmers and were grouped into four categories

(inputs, production, marketing and technical guidance). Unavailability and high cost of inputs were cited as constraints to adoption of improved apple cultivation practices in 51.67 per cent of cases. Other important input-related constraints were timeliness arrival of inputs, poor quality of inputs, inadequate credit facility and complicated credit procedure. Uncertainty of weather, which caused early flowering and poor fruit setting was the highest (70 per cent) ranking production constraint, followed by lack of irrigation facilities (56.67 per cent), high labour costs (55 per cent), small land holding (51.67 per cent) and fruit drop (48.33 per cent). The most important marketing constraints were road blockades at the time of transportation (50 per cent) and unavailability of markets (48.33 per cent), while lack of guidance regarding selection of appropriate cultivars (48.33 per cent), fertilizer application (43.33 per cent) and utilisation of culled fruits (43.33 per cent) were the highest ranking technical constraints.

## **2.2 Work done in Abroad :**

The work done in abroad on different aspects is presented under the following sub sections.

### **2.2.1 Studies on production :**

Funt et al (1992) made a study on the economics of different apple orchard systems in Columbus, USA. Four orchard

systems that would be suitable for growers in the eastern states were selected for analysis: free standing central leader, staked spindle at 2 different tree densities, and a 4-wire trellis. Annual costs were developed from long term research data. Material, labour and machinery costs were based on 1990 figures. Average prices for fresh and processed fruit from 1985 to 1989 were used. All comparisons were based on the first 15 years of orchard production. Establishment, spraying and pruning costs, yields and rates of return were compared for the different systems and for different farm sizes. Those systems producing the earliest returns (staked spindle and trellis) were preferred to one which may have a higher return later. Medium density (340 trees/acre) was well suited to farms with larger acreages (more than 80 acres) while more intensive plantings were suitable where land was limited.

Akimoto and Maezawa (1996) studied some plans for the economic betterment of fruit growers in a disadvantaged district were studied in the rural mountain village of Kuguno in Gifu, Japan. Shipping of fruit is seldom conducted by a co-operative, but mainly by individual growers. It is considered important for the agricultural co-operative association to develop an active plan for introducing innovative techniques to improve fruit quality and marketing. There is also an urgent need to introduce a technique for growing

peaches in greenhouses in order to improve their sugar content in time for the shipping season. It may also prove effective for apple trees to be lower in order to reduce farm labour costs.

Ceroni et al (1996) made a study on the establishment and production costs in Emilia-Romagna. A quarter of farms in Emilia Romagna specialize in fruit production; these 37,700 farms occupy 1,04,000 hectare, of which 40,000 hectare produces peaches and nectarines. Establishment, production and labour costs are tabulated for ten fruits, indicating cost per ha and cost per kg. Gross margins, net farm income and returns to labour are also tabulated for the ten fruits. While production of fresh peaches, apricots and other fruits provided good returns in 1995, both apple production and peaches are experiencing difficulties for processing. The success of kiwifruit, based on quality and services, demonstrates how the market must develop.

Asif and Hashmi (1998) made a study on the economics of apple production, major constraints in production and marketing in Swat, Pakistan. Apples were the main crop, with other crops including: wheat, onions, tomatoes, maize, and rice. A partial budgeting technique was used for cost-benefit analysis with data drawn from 40 farmers. Marketing was the most costly activity

contributing 49 per cent to the total variable cost, followed by production (45 per cent) and intercropping costs (6 per cent). 98 per cent of farmers reported insect and disease problems in their orchards. The major causes of yield losses as reported by farmers are disease attack (35 per cent), insect attack (13.6 per cent) and natural disasters (12.3 per cent). Farmers reported shortage of credit (40 per cent), storage problems (37.5 per cent) and credit constraints with the local dealers (35 per cent) as the major marketing problems. The improvement in the availability and accessibility of credit for apple growers will diffuse the majority of their production and marketing constraints.

Robinson et al (1998) made a study on the training strategies for high density orchards of the future. The key objective in planning a new apple orchard should be to maximize yield in the early years and still effectively produce larger yields of high quality fruits in the second 10 years. The best way to obtain high early yields is to plant at high densities. With dwarfing rootstocks, the optimum tree density is considerably higher than is common in today's fruit industry. Based on an economic analysis, it is recommended that New York growers should plant a minimum of 400 trees/acre and a maximum of 1000 trees/acre. The specific training system used to develop the orchard is less important than the planting density as

long as minimal pruning is employed. High yield per acre at maturity requires high total light interception when the orchard is mature. This can be accomplished by ensuring that row spacing is not too wide and that tree height is at least 75 per cent of row spacing. High fruit quality when the orchard is mature requires good light distribution throughout the tree canopy. This can best be accomplished by maintaining a narrow conic shaped top to the tree through regular limb renewal pruning.

### **2.2.2 Studies on marketing :**

Tronstad et al (1992) analysed that the marketing concepts associated with quality, location, and time are integrated into a complete model, revealing the linkages between market window approaches and hedonic analysis. An integrated hedonic price model for the US apple industry was estimated using monthly-average price data for 1982-89. Results suggest that size, storage method, grade, and seasonally are the most important influences on the price of apples and thus offer the most promising areas for enhanced returns to growers. Area of apple origin and variety were the least important influences on apple prices, with the exception of the Granny Smith variety.

Leyrer (1993) attempted a study on future fruit marketing of apples. The paper deals with the marketing of apples

produced in Germany. Apple production over the Europe as a whole was increased slightly in the 1990s particularly in Germany, Netherlands and Belgium with a slight reduction in France and with a greater decrease in other countries. Author found that 65 per cent of German apples are retailed through supermarkets, 15 per cent from weekly markets, 15 per cent direct from the orchard or roadside and 5 per cent through specialist shops. About 50 to 60 per cent of production goes through an increasingly concentrated wholesale sector. As consumer demand is fairly stagnant at about 18 kg, German producers are likely to be faced with increasing competition in coming years.

Appeltans (1994) tried to examine the importance of quality, need for concentration of supply, and the role of auctions in apple growing areas of Belgium. Wholesalers need to receive supplies of varieties of apples which are currently popular, preferably red/green types, of good standard quality and size, and properly packed and stored. Jonagold is currently the most preferred variety. Growers are naturally individuals, but must work together to ensure continuity of supply. Distribution is becoming more and more concentrated in the hands of a few wholesalers, which lead to more homogeneity of fruit in terms of quality and classification. These wholesalers are then able to promote the fruit export, its use and

common contracts of sale. They share high-tech transport, packing and warehousing facilities. Increasingly, auction houses are becoming specialists in certain produce.

Cheng-Hsiangtai et al (1996) studied the impact of consumer characteristics on preferences for selected apple varieties. This study examines consumer varietal preferences for three apple varieties. Sensory and visual tests were conducted on 192 college age individuals with New England grown McIntosh and Empire apples and Washington State grown Red Delicious. Qualitative choice models were used in the study to assess the impact of consumer characteristics on their choice of most preferred apple variety from the sensory and visual tests. In the blind-sensory tests, consumers demonstrate their ability to identify the sensory attributes of their most preferred apple variety. On the other hand, visual test results indicate that consumer preference for apple varieties differs by age and sex of the consumer.

Vadnal et al (1996) made an attempt to study the Slovenian apple marketing problem. Slovenian apple production is characterised by permanent volume increase and stabilisation and by restructuring of varieties. Small size operators dominate. The Slovenian apple has become less competitive due to insufficient and out dated storing and packing facilities. The most important

export destinations for Slovenian apples are Yugoslavia, Croatia, Bosnia and Herzegovina. Export of Slovenian apples into the Europe depends on oscillations of production there.

Annual per capita consumption of fresh fruits and apples in Slovenia is about 35 kg and 22 to 24 kg, respectively. More than half of the apples consumed originate from self-supporting plots and hobby activities. The price elasticity of apple demand is low. Income elasticity of apple demand is higher from 0.97 for agricultural households to 0.69 for non-agricultural households. Growers are facing increasing competition at home and abroad.

Carvalho et al (1997) studied the economical importance of commercialisation and post-harvest operations for the productive chain of Brazilian apple. For the home market, the commercialisation segment accounts for 50.33 per cent of wholesale costs, while the remaining 49.47 per cent were attributed to production. For the overseas market, cost proportions changed to 80.02 per cent and 17.98 per cent, respectively.

Grimster (1997) presented a report on the tropical fruits market. The report gives an overall market guide of wholesale market prices for avocado, carambola, coconut, durian, fig, guava, jackfruit, mangosteen, papaya, rambutan and star apple sold in Australian wholesale markets over the period of January

1994 to December 1996. The markets analysed for the report include Adelaide, Brisbane, Melbourne, Perth and Sydney, although prices and throughputs were not always available for all fruits in all markets. Data were obtained from Market Information Services, Brisbane, Hortilink Fruit and Vegetable Marketing Systems, South Australian Farmers Federation and the Perth Market Authority.

Love (1997) identified the variables which can be used for forecasting fresh apple prices for selected months in the marketing season in USA. The price of fresh apples in the USA in 3 months (November, February, and May) indicates the season's overall performance. Fresh apple prices can be predicted for 3 months using 3 different variables: (1) estimated US production; (2) an estimated early-season price; and (3) late-season stocks in cold storage. Estimated total apple production is used to forecast the November grower price, while the November price is used to forecast the February price. The choice to use May 1 cold storage stocks over the November price to forecast the May price is based on the potential to update the stocks' estimate as the season progresses. The forecast equations indicate that every 1 per cent change in supply changes price in the opposite direction by 1.01 per cent for November and 0.97 per cent for May.

Martinez-Damian (1997) presented a paper on the spectral analysis applied to apple prices. Spectral analysis is used to study periodic phenomena which occur in agricultural production. This paper reveals analytically the presence of a 12-month seasonal effect in the behaviour of the US apple (*Malus spp.*) market. The presence of periodic components is important since they allow the advance planning of a marketing strategy.

Mouron & Carint (1997) presented an the article on an ongoing survey into changing prices for apples, oranges and bananas in two supermarkets in central Wadenswil. Study observed the price variation throughout the year, but apples are always dearer than the other two fruits. The price levels over the period of 1989 to 1997 fluctuate most for apples as compared to bananas. Producer costs have, however, been reduced to the profit of the larger producers especially.

Schotazko (1998) presented a market report of apple crop in Washington for the crop year 1998. Use of a statistical model to make projections indicates that a crop with 100 million cartons of fresh apples would cause prices to drop about 16 per cent below than 1997 prices. For 110 million cartons, the fall would be 28 per cent, whilst 120 million cartons would result in a drop in

prices of almost 40 per cent. Under all three scenarios the average price would not cover all growing and warehousing costs.

### **2.2.3 Studies on export / trade :**

Rourke (1994) examines the world apple market and reported the existing situation in the world apple industry. It examines how the forces of globalisation have affected the industry and the managerial and technological adaptations. Study dealt the economic forces which affect firm and industry profitability. An examination is made to maintain the cost efficiency while maintaining the quality of a perishable product. World supplies; production systems and costs; consumption patterns; warehousing and packing (including technical and economic aspects); transportation and wholesaling; retailing; processing systems; government influence; international trade; and future issues for the apple industry are covered in this book.

Rosa et al (1996-97) gave report on World fresh apple situation and US export prospects. They reported that apple production by the world's leading producing countries in marketing year 1996-97 is forecast at a record of 42.3 Mt, which will be 9 per cent above last year's output. China accounts for three quarters of the increase in world apple production in 1996-97. Apple crops are also larger in Italy, Germany, Poland and Chile. On the other hand,

apple production in the USA, New Zealand, and South Africa, as well as in Belgium and the Netherlands, is down in 1996-97. Apple exports in 1996-97 are forecast at 4.5 Mt, practically unchanged from 1995-96 shipments. Smaller crops in some European countries and New Zealand have reduced export prospects in 1996-97. US apple exports in 1996-97, however, are expected to increase by 20 per cent. Larger exportable supplies from western states and strong demand from leading consumers have improved overall US export prospects in 1996-97. The USA has reached several technical agreements with foreign countries, which are expected to result in improved access to important markets in 1996-97..

#### **2.2.4 Studies on constraints :**

Gijsberts (1998) analysed the structural problems in apple sales. He reported that European apple production is experiencing its second serious downturn of the 1990s, with reduced demand and production, as well as less EU intervention and increased world wide competition, especially from China. Price levels are therefore expected to remain under downward pressure. The final section looks at possible solutions, drawing on the historical context and concluding that apple growers should copy tomato growers by creating new varieties and improving quality.

### **2.2.5 Studies on processing and storage:**

Kiss & Kahaber (1992) investigated the profitability of apple storage. They found that returns to apples stored do not differ to those obtained from apples sold immediately on the Hungarian market. As a result, investment in storage facilities has not been maintained. The prices of apples held in store should therefore be increased.

Rosa (1996-97) examined the outlook for concentrated apple juice production and trade in selected countries. He estimated that production of concentrated apple juice (CAJ) in selected countries in 1996-97 is forecasted 6,60,000 tons, 8 per cent above the previous season's output. Poland is expected to account for most of the increase in production. Production in the USA, the world's largest CAJ producer and consumer, is forecasted to decrease 5 per cent in 1996-97. Reduced apple crops in the eastern states combined with a good quality crop in western states have reduced US supplies for processing apples in 1996-97. Selected country CAJ exports are forecast to increase 9 per cent to 5,50,000 tons in 1996-97. Ample exportable supplies in Poland and Argentina, combined with lower international CAJ prices are expected to boost demand in major importing countries, such as the USA. United States CAJ imports in 1996-97 are forecast to increase by 24 per cent (2,00,000 tons), while exports will increase up to 10,500 tons during same year.

**CHAPTER - III**

**METHODOLOGY**

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## CHAPTER - III

### METHODOLOGY

This chapter presents the detailed methodological frame work. The whole chapter is divided into three sub-sections. The complete sampling procedure is described in the first section, while the nature and type of information needed for the study is given in second section. The last section comprises of analytical procedure for each objective separately.

#### **3.1 Sampling Design :**

##### **3.1.1 Selection of state :**

The main apple producing states of India are Jammu and Kashmir (J & K), Himachal Pradesh (H.P.) and Uttar Pradesh (hills) with a negligible portion contributed by Arunachal Pradesh and other states (Table 3.1).

Though, the states of J & K and H.P. have almost equal area under apple cultivation, however, J & K is contributing about three folds of production than H.P. This state covers 35.92 per cent area of total apple cultivation and produces about 60 per cent of country's total production of apple. The productivity level of state is 9.16 m.tonn as compared to 5.59 m. tonn. of All India level. Hence, J & K is selected purposively for the study.

**Table 3.1 : State-wise Area, Production & Productivity of Apple in India (1995-96)**

S. No	Name of State	Area (ha)	Production (m.tonns)	Productivity (m.tonns/ha)
1.	J & K	78,007(35.92)	7,14,834(58.85)	9.16
2.	HP.	78,296(36.05)	2,76,681 (22.78)	3.53
3.	UP. (hills)	55,200 (25.43)	2,10,000(17.29)	2.33
4.	Arunachal Pradesh	5,570 (2.57)	12,993 (1.07)	2.33
5.	Nagaland	64 (0.03)	119 (0.01)	1.86
6.	Other states	9 (0.00)	25 (0.00)	
ALL INDIA		<b>2,17,146(100.00)</b>	12,14,652(100.00)	5.59

**Source :** Data Base Horticulture, Ministry of Agriculture, Department of Agriculture & Co-operation, Krishi Bhavan, New Delhi - 110 001

**Note :** The figures in parentheses represent percentage to total area and production

### 3.1.2 Selection of provinces :

The state of J & K is divided into three provinces i.e., Jammu, Ladakh and Kashmir. The area, production and productivity in these three provinces is shown in table 3.2.

**Table 3.2 : Province-wise Area, Production and Productivity of Apple in J & K (1998-99)**

S. No,	Name of State	Area (ha)	Production (m.tonns)	Productivity (m.tonns/ha)
1.	Kashmir	74,700 (89.64)	7,77,000 (98.16)	10.40
2.	Jammu	8,135 (9.76)	11,454 (1.44)	1.40
3.	Ladakh	501 (0.60)	3,130 (0.40)	6.25
J & K State		83,336 [100.00]	7,91,584 [100.00]	9.50

**Source :** Directorate of Horticulture, (J & K)

**Note :** The figures in parentheses represent percentage to total area and production

Since Kashmir province contributes major portion of area (89.64 per cent) and production (98.16 per cent) of the state, therefore, Kashmir province is purposively selected for study.

### 3.1.3 Selection of district :

Kashmir province is further divided into six districts namely Srinagar, Budgam, Anantnag, Pulwama, Barramulla and Kupwara. The area, production and productivity of apple in different districts is given in table 3.3.

**Table 3.3.: District-wise Area, Production and Productivity of Apple in Kashmir (1998-99).**

S. No.	Name of district	Area (ha)	Production (m.tonns).	Productivity (m.tonns/ha)
1.	Srinagar	4,141 (5.54)	39,000 (5.02)	9.42
2.	Budgam	7,709 (10.32)	47,000 (6.05)	6.09
3.	Anantnag	12,240 (16.38)	1,30,000 (16.73)	10.62
4.	Pulwama	12,600 (16.87)	41,000 (5.28)	3.25
5.	Barramulla	24,700 (33.06)	4,40,000 (56.63)	17.81
6.	Kupwara	13,310 (17.83)	80,000 (10.29)	6.01
Kashmir province		74,700(100.00)	7,77,000 (100.00)	10.40

**Source** : Directorate of Horticulture, (J & K)

**Note** : The figures in parentheses represent percentage to total area and production

District Barramulla contributes 33.06 per cent and 56.63 per cent of total area and production of apple in the Kashmir province, respectively. More-over, the apple juice processing plant is also operating in this district, therefore, this district is selected for the study purpose.

#### **3.1.4 Selection of tehsils :**

Barramulla district comprises of 8 tehsils namely Sonawari, Pattan, Sopore, Tangmarg, Uri, Bandipore, Barramulla and Gurez. Out of these, two tehsils, having highest and average productivity are selected in order to compare the different constraints in production and marketing. The tehsil-wise production is not available as Chief Horticulture Office, (CHO) Barramulla had recorded it zone-wise only. According to the CHO, Barramulla, the Sopore tehsil has highest productivity in the district, while, Bandipore tehsil has average productivity. Thus, these two tehsils are chosen for the study purpose.

#### **3.1.5 Selection of villages and farmers :**

According to information collected from the Chief Horticulture Office (CHO), Barramulla, the apple is being grown in about 90 per cent of the villages in both of these selected tehsils. As both selected tehsils are adjoined with each other, the total combined area of these two tehsils is divided into four parts (up to 5 km, 5-15 km, 15-25 km and beyond 25 km) based on distance from Sopore fruit mandi assuming as a centre. From each of these four parts, two villages are selected randomly. Consequently, Sheer Jageer and Nowpora, Tujer shareef and Warapora. Aaloosa and Quil Muqam and Mangnipora and Patushai villages are selected from the four parts of these two tehsils respectively. The number of

total apple producers in each of the selected villages is taken from the office of CHO, Barramulla . About 75 per cent of these farmers sell their orchards to the pre-harvest contractors at the time of flowering. These farmers are, thus, eliminated from the present set up of marketing as early as apple blossom appears(Qadri). Among rest of the 25 per cent of producers in each of these villages, a proportionate sampling (10 per cent) is done for the want of sufficient number of apple growers for the purpose of study. Consequently, 57 apple growers are selected to collect the required information. The detailed sampling is given in table 3.4.

**Table 3.4 : Sampling of apple growing farmers**

Villages	Tehsil	Distance from local mandi (km)	Total number of apple growers	Apple growers involved in marketing	Selected farmers
1. Sheer Jageer	Sopore	1	248	62	6
2. Nowpora	Sopore	4	468	117	12
3. Warapora	Sopore	12	367	92	9
4. Tujar shareef	Sopore	15	156	39	4
5. Aaloosa	Bandipore	21	362	90	9
6. Quil Muqam	Bandipore	25	377	94	9
7. Mangnipora	Bandipore	27	116	29	3
8. Patushai	Bandipore	30	208	52	5
Total			2302	575	57

**Source :** Chief Horticulture Office, Sopore, Barramulla

### **3.1.6 Selection of market functionaries :**

The official record about the number of different market functionaries is not available as market is not regulated, but an unofficial statistics is obtained after interacting with producers and intermediaries. According to this statistics, the number of wholesalers / commission agents and Retailers is 172 and 248 respectively. About 10 per cent of total population i.e. 17 wholesalers and 25 Retailers are selected to collect the required information. Two processing plants viz., Apple juice processing plant, Sopore of JKHF, AC and other private plant at Srinagar are operating in the Kashmir province. Only the processing plant of JKHPMC is taken into consideration as other plant (private) refused to give the required information.

## **3.2 Data collection :**

### **3.2.1 Secondary data :**

The district-wise data of apple in Kashmir province and of state is collected from Directorate of Horticulture, J&K. In order to calculate the relative shares, coefficient of variations and compound growth rate, 8 years data are collected from 1991-92 to 1998-99.

**Table 3.5 : Area, Production and Productivity of apple in J & K state from (1991-92 to 1998-99)**

Area ('000 ha), Production ('000 m.tonnes)

Year	Area (ha)	Production (m. tonnes)	Productivity (m.t. /ha)
1991-92	69.49	624.47	8.99
1992-93	70.36	669.26	9.51
1993-94	73.10	792.75	10.84
1994-95	74.99	674.05	8.99
1995-96	78.01	714.83	9.16
1996-97	80.36	816.05	10.15
1997-98	82.58	864.12	10.46
1998-99	83.34	791.58	9.50

**Source :** Directorate of Horticulture, J & K.

### 3.2.2 Primary data :

The primary data are collected from the farmers through personal interview with the help of well prepared schedule and questionnaire. The harvesting of crop starts from the month of September and continue up to end of October. However, there are some early varieties which comes to harvesting stage in the month of July. These varieties constitute about 30 to 35 per cent of total apple production of the state. Since the marketing of apple continues

**Table 3.6 : Area , Production and productivity of Apple in different districts of Kashmir Province during (1991-92 to 1998-99)**

Area ('000 ha), Production ('000 m. tonnes), Productivity ( m. tonnes/ha)

Year	SRINAGAR		BUDGAM		PULWAMA		ANANTNAG		BARRAMULLA		KUPWARA						
	Ar.	Py.	Ar.	Pr.	Ar.	Pr.	Ar.	Pr.	Ar.	Pr.	Ar.	Pr.					
1991-92	3.63	18.22	5.02	48.89	10.36	9.15	62.00	6.78	9.73	52.55	5.40	24.57	367.94	14.98	12.46	70.50	5.66
1992-93	3.67	24.95	6.79	50.60	13.76	9.28	52.56	5.66	9.83	62.62	6.37	24.67	403.02	16.34	12.52	71.50	5.71
1993-94	3.72	30.90	8.31	64.80	11.42	11.44	56.86	4.97	11.05	94.80	8.58	23.41	452.72	19.34	12.58	86.09	6.85
1994-95	3.76	26.84	7.14	40.58	6.94	11.68	42.46	3.64	11.21	66.50	5.93	23.62	418.59	17.72	12.70	75.48	5.95
1995-96	3.79	28.32	7.47	39.13	5.42	11.93	44.22	3.71	11.43	90.00	7.87	23.92	422.78	17.67	12.70	81.51	6.42
1996-97	3.89	32.00	8.23	55.50	7.37	12.38	60.60	4.89	11.53	107.50	9.32	24.36	445.50	18.29	12.95	102.00	7.87
1997-98	4.05	33.00	8.15	50.20	6.51	12.48	48.20	3.86	12.05	110.12	9.14	24.63	488.20	19.82	13.25	121.30	9.15
1998-99	4.14	39.00	9.42	47.00	6.10	12.60	41.00	3.25	12.24	130.00	10.62	24.70	440.00	17.81	13.31	80.00	6.01

Ar. = Area, Pr. = Production and Py.= Productivity

Source : Directorate of Horticulture, Jammu and Kashmir

upto March, the required information are therefore, collected from the farmers from March to April, 2000.

Data include information regarding the land utilization, cropping pattern, yield per unit of area, sources of irrigation, month-wise sale, per box price of apple of different varieties, agency to whom sold, place of sale, expenditure incurred on labour, transportation, octroi and commission etc. Various questions on the constraints faced by farmers in production, marketing and financing of apple have also been included in the questionnaire. The farmers perceptions about the future prospects of the crop as well as suggestions for the development of crop are also considered for the study.

Data are also collected from different market intermediaries in order to work out the marketing cost and margins at different stages of marketing. The information included quantity bought and sold, place of sale, price paid, price received, to whom produce is sold, from whom the produce is bought. Different marketing expenditure incurred on transportation, commission, mandi fee, loading/ unloading, licensing fee and maintenance expenditure are collected. Rent of shop, capital invested and interest rate and other miscellaneous costs along with losses different level of marketing are also asked from these intermediaries.

The information regarding the processing cost is collected from the manager of apple juice plant running under the govt. undertaking. This include the information regarding the month-wise purchase of raw material and price paid. The different information on fixed costs like land and site development, building, plant and machinery, installation costs, tax, licensing fee, insurance, interest on working capital are recorded from plant. Similarly the transportation, wages and salaries, printing and stationary, store spare parts, fuel, pomace lifting, chemical and lubricants, packaging expenditure, repair and maintenance and other miscellaneous costs are collected from the processor / manager of the plant in order to calculate the economy of the plant. The recovery percentage, total quantity of final product produced, price received of final produce and by-product are also asked to workout the cost benefit ratio of the plant.

### **3.3 Analytical procedure :**

The objective wise analytical procedure is described in this sub section .

#### **3.3.1 Measurement of growth rate and relative shares :**

The relative shares in area and production of apple in different districts of Kashmir are assessed by calculating the triennium averages to avoid the effect of any abnormal crop year.

To compute the compound growth rate in area, production and productivity of apple, the exponential function of the following form is used

$$Y = A B^t$$

Taking log on both sides

$$\log y = \log A + t \log B$$

Assuming  $\log y = y$

$$\log A = a$$

$$\log B = b$$

We get

$$Y = a + bt \quad (t=1, 2, \dots, n)$$

After regression between  $y$  and  $t$

we have value of 'a' and 'b'

$$a = \text{constant}$$

$$b = \text{coefficient}$$

$$\text{as } b = 1 + r$$

$$\text{Hence } r = b - 1$$

where,

$$r = \text{compound growth rate}$$

$$= (\text{anti log of } b-1) \times 100$$

$$t = \text{time variable } (t=1, 2, \dots, n)$$

$$b = \text{regression coefficient}$$

$y$  = index no. of area, production and productivity of apple.

### 3.3.2 Marketing pattern :

To examine the existing marketing pattern of apple, following estimates are obtained :

- (i) Category-wise and market-wise sale of apple.
- (ii) Variety-wise sale of apple by different categories.
- (iii) Various costs incurred in the marketing of produce for different markets.
- (iv) Category-wise and market-wise economics of apple marketing
- (v) Variety-wise and market-wise economics of apple marketing

### 3.3.3 Marketing cost and price spread :

The total expenditure incurred by each agency is estimated. All these items are added to obtain the per kg marketing cost of apple as follows :

$$C = C_f + C_{m1} + C_{m2} + C_{m3} + \dots + C_{mi}$$

Where,

$C$  = Total cost of marketing (Rs/kg)

$C_f$  = Cost incurred by farmers (Rs/kg)

$C_{mi}$  = Expenditure incurred by  $i$ th type of intermediaries in the process of buying and selling (Rs. /kg)

Per kg gross margin at each successive stage of marketing is worked out by taking the difference of sale price and purchase price. The following formula is used to workout the per kg gross margin for each marketing agency.

$$M_g = S_i - P_i$$

Where,

$M_g$  = Gross margin

$S_i$  = Sale value of produce for  $i$ th intermediaries

$P_i$  = Purchase value of  $i$ th intermediaries

$i$  = Type of intermediaries

The net margins of  $i$ th type market agencies are calculated as under

$$N_{mi} = P_{Ri} - (P_{pi} + C_{mi})$$

Where,

$P_{Ri}$  = Per kg price received of produce by  $i$ th type intermediaries.

$P_{pi}$  = Per kg purchase price by the  $i$ th type intermediaries

$C_{mi}$  = Per kg marketing cost incurred by  $i$ th type of intermediaries

= Net margin of  $i$ th type of market intermediaries

### 3.3.4 Producers share in consumer rupee :

To calculate the producers share in consumer rupee, following formula is applied

$$P_s = (P_f \div P_c) \times 100$$

Where,

$P_s$  = Producers share in consumer rupee

$P_f$  = Net price received by farmer

$P_c$  = Price paid by consumer

### 3.3.5 Measurement of Marketing efficiency :

Marketing efficiency is estimated by using Shepherds formula :

$$ME = \left[ \frac{V}{I} - 1 \right] \times 100$$

Where,

ME = Index of marketing efficiency

V = Value of produce sold or price paid by consumer  
(retail price)

I = Total marketing cost or input of marketing

In order to find out the processing cost, gross returns and net returns, simple mathematical procedure of addition, subtraction, multiplication and division is used. The depreciation on building and plant machinery is calculated by the straight line method.

$$\text{Depreciation} = \frac{\text{Actual price} - \text{Junk value}}{\text{Expected life}}$$

**CHAPTER - IV**  
**AGRO-ECONOMIC FEATURES OF**  
**THE STUDY AREA**

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**CHAPTER - IV****AGRO-ECONOMIC FEATURES OF  
THE STUDY AREA**

In this chapter, an attempt is made to present the statistics on different aspects of study area in order to have the knowledge of region. The present study is carried in district Barramulla of Jammu and Kashmir state. Some brief information about the district as well as statistics related to Kashmir province / State is described in this chapter. The present chapter deals with geographical location, climate, land use pattern, cropping pattern, land holding, source of irrigation, distribution of total cropped area, number of holdings by size classes, fruit growers co-operative marketing societies, demographic features and NSDP (Net state Domestic Product) by sectoral break up of the state.

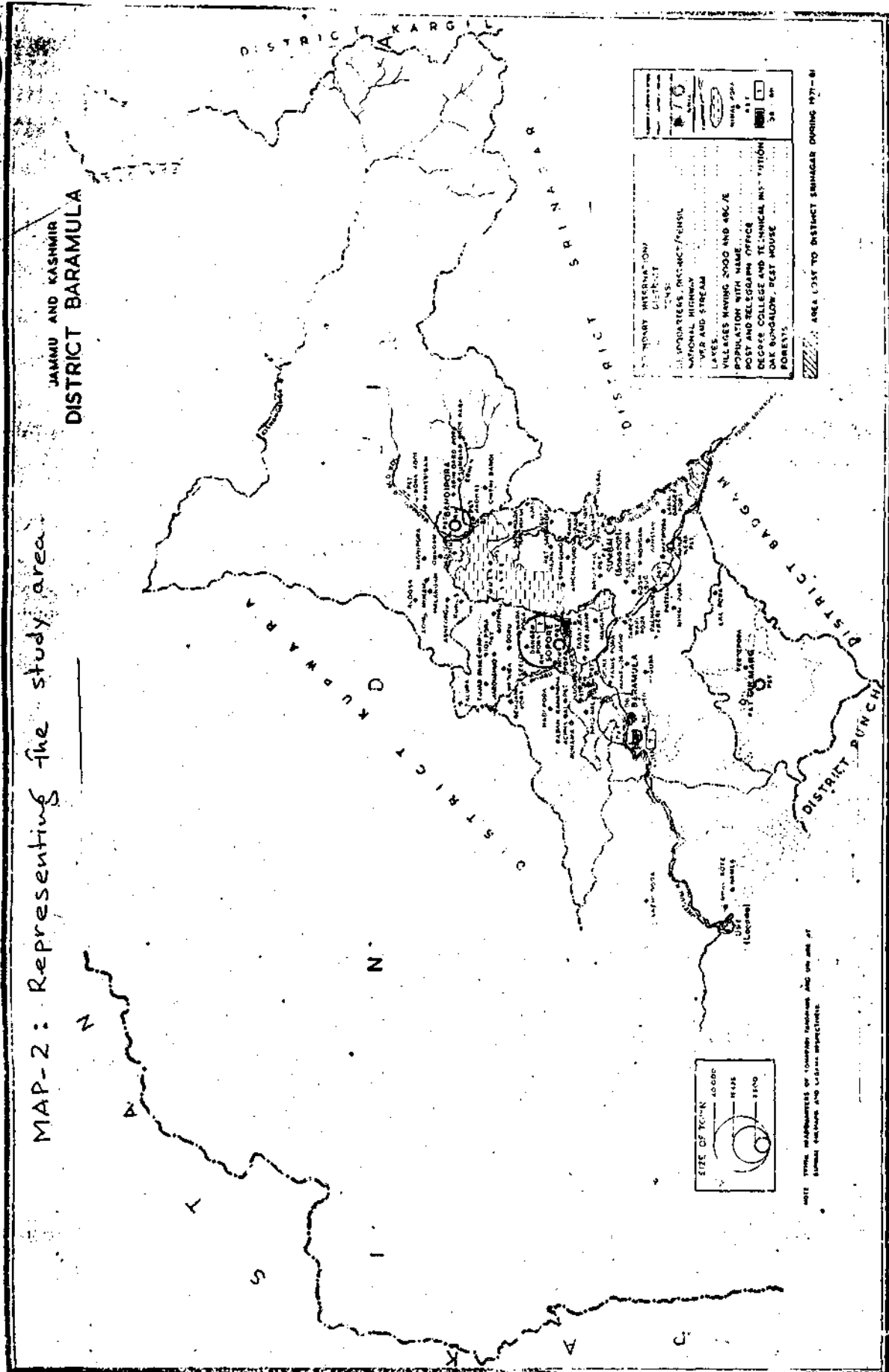
**4.1 Brief profile of study area :**

District Barramulla has a total area of 4580.925 sq.km, largest among all districts in J&K state. Geographically it lies between 32°-55' to 33°-50' north latitude and 73°-45' to 75° -20' east longitude, commanding an average height of 1581 mts. The Barramulla district is surrounded by Pakistan occupied Kashmir (POK) in North West, Srinagar in South-east, Budgam & Ganderbal in east



MAP-2: Representing the study area

JAMMU AND KASHMIR  
DISTRICT BARAMULA



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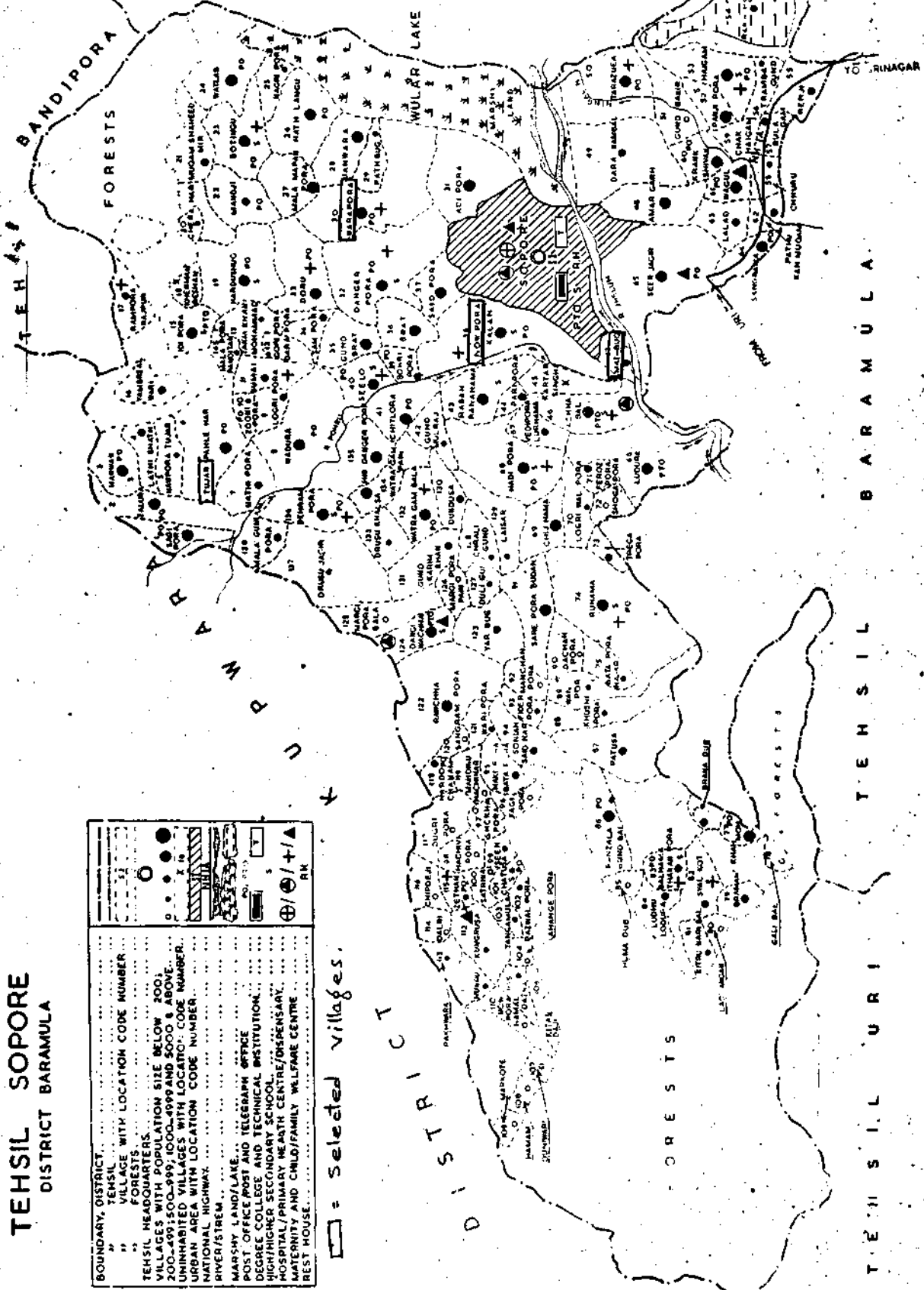
Based upon Survey of India map with the permission of the Surveyor General of India.

MAP-3: Representing study area.

TEHSIL SOPORE  
DISTRICT BARAMULA

BOUNDARY, DISTRICT	○
TEHSIL	□
VILLAGE WITH LOCATION CODE NUMBER	●
FORESTS	▨
TEHSIL HEADQUARTERS	⊕
VILLAGES WITH POPULATION SIZE BELOW 2000	○
2000-4999; 5000-9999; 10000-49999 AND 50000 & ABOVE	○
UNINHABITED VILLAGES WITH LOCATION CODE NUMBER	○
URBAN AREA WITH LOCATION CODE NUMBER	○
NATIONAL HIGHWAY	—
RIVER/STREAM	—
MARSHY LAND/LAKE	▨
POST OFFICE/POST AND TELEGRAPH OFFICE	⊕
DEGREE COLLEGE AND TECHNICAL INSTITUTION	⊕
HIGHER/SECONDARY SCHOOL	⊕
HOSPITAL/PRIMARY HEALTH CENTRE/DISPENSARY	⊕
MATERNITY AND CHILD/FAMILY WELFARE CENTRE	⊕
REST HOUSE	⊕

□ = selected villages.



BANDIPORA FORESTS

WULAR LAKE

DISTRICT

FORESTS

TEHSIL UURI  
TEHSIL BARAMULLA  
TEHSIL JURI

TO SRINAGAR



and Kupwara in north. The Whole state is divided into three provinces, namely Jammu, Kashmir & Ladakh. The study is taken in district Barramulla of Kashmir province which consists of six districts. The Barramulla district has 8 tehsils namely Pattan, Sonawari, Bandipore, Sopore, Barramulla, Uri, Tangmarg & Gurez, among which Sopore and Bandipore tehsils are taken for study. These two tehsils comprising 80 and 63 villages respectively according to revenue records.

Apart from this, the district is famous through out the world for its salubrious climate and scenic beauty. It also includes one of the largest natural lake of Asia famous by "Wular lake", occupying an area of 12.5 sq. miles in normal conditions.

#### **4.2 Climate :**

The area has a temperate climate with severe cold in winter and moderate temperature during summer. The average annual rainfall is 1274.9 mm in the district varying from 610.90 in Sopore to 2823.60 mm. in Tangmarg. The rainfall pattern from 1993 to 1997 of main five stations of study area is presented in table 4.1.

The months of June and July are the hottest and temperature goes upto 29.53° C on an average, whereas the months of December and January experiences minus temperature

when mercury goes down to  $-2.54^{\circ}$  C on an average. The minimum and maximum temperature in different months of the years from 1992-96 to shown in table 4.2.

**Table 4.2: Annual Rainfall in Barramulla district of J & K.**

S. No.	Station	Rain-fall (m.m.)					Avg. Rainfall
		1993	1994	1995	1996	1997	
1.	Barramulla	931.20	709.80	635.40	876.30	741.60	778.86
2.	Sopore	610.90	NR	NR	NR	NR	610.90
3.	Gulmarg	882.90	1874.40	974.40	1544.60	1381.50	1331.56
4.	Tangmarg	1488.30	2503.60	2823.60	1695.30	2125.30	.22
5.	Bandipore	1220.80	848.00	862.00	964.00	831.00	
Average rainfall							777.90

Source: Chief Engineer Irrigation & Flood Control Deptt.

Note : NR - Not reported.

**Table 4.2 : Month-wise minimum and maximum temperature variation in Kashmir province of J & K state**

S.No.	Month	Temperature variation (°C)												Average temp. variation				
		1992			1993			1994			1995			1996			Max.	Min.
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			
1.	Jan.	6.7	-0.8	5.4	-2.6	7.6	-0.5	3.2	-4.7	5.9	-2.7	5.57	-2.54					
2.	Feb.	9.1	-0.3	11.9	0.9	8.1	0.3	6.8	-0.7	10.7	0.7	9.16	1.90					
3.	March	12.2	3.0	12.2	2.1	16.0	5.4	13.6	3.4	14.1	4.9	13.44	3.62					
4.	April	19.2	7.1	21.9	7.2	18.5	5.8	17.6	7.4	19.9	7.5	19.08	6.97					
5.	May	22.7	9.4	25.0	11.6	24.1	11.0	25.1	10.5	21.3	10.0	24.03	10.71					
6.	June	28.0	13.5	28.7	14.1	29.2	15.0	30.5	14.1	26.9	15.4	29.00	14.67					
7.	July	29.5	17.6	27.7	17.3	29.9	20.0	29.8	18.7	29.4	17.8	29.53	18.16					
8.	Aug.	28.8	17.4	30.2	16.1	29.7	19.0	28.7	18.5	27.5	17.5	29.08	17.70					
9.	Sep.	25.4	12.7	28.1	12.8	26.8	11.7	26.9	11.4	28.4	13.8	27.24	12.90					
10.	Oct.	21.5	6.3	23.3	3.5	20.9	5.0	21.1	6.5	19.8	5.9	21.55	5.18					
11.	Nov.	16.2	0.8	15.4	1.3	17.1	0.3	15.8	-0.6	13.1	1.1	15.75	2.10					
12.	Dec.	10.1	-1.1	11.2	-3.5	7.5	-1.2	6.2	-0.3	7.7	-3.1	8.53	-1.64					

Source: Regional Meteorological Office, Srinagar (Kashmir).

### 4.3 Land utilization pattern :

Total geographical area of Barramulla district is 1,44,000 hectares according to village papers, out of which total cropped area is 89,000 hectares constituting 61.80 per cent of total geographical area. Land under forests is quite low (1,000 hectare),

**Table 4.3 : Land Utilization Pattern in J & K & Barramulla district (1997-98)**

S.No.	Particulars	Area (000' ha)			
		(J & K)		(Barramulla)	
		Area	Per centage	Area	Percentage
1.	Total geographical area according to village papers	2,416	100.00	144	100.00
2.	Area under forests	658	27.24	1	0.78
3.	Land put to non-agricultural uses	291	12.04	15	10.40
4.	Baren and uncultivable land	291	12.04	9	6.25
5.	Permanent pastures and other grazing lands	126	5.21	13	9.02
6.	Land under miscellaneous tree crops not included in area sown	72	2.98	2	1.37
7.	Culturable waste land	140	5.79	12	8.33
8.	Old fallows	8	0.34	2	1.37
9.	Current fallows	97	4.02	6	4.16
10.	Net area sown	733	30.34	84	58.32
11.	Area sown more than once in a year	347	14.36	5	3.47
12.	Total cropped area	1083	44.82	89	61.80

**Source :** Financial Commissioners Office.

which constitutes 0.78 per cent of total geographical area. The cultivable waste land is 8.33 per cent, which can be brought under cultivation after some improvement to increase the cropped area in the district. The area sown more than once in a year contribute 3.47 per cent of total geographical area. The land under pastures is 13,000 hectares (9.02 per cent of total geographical area) shows that the rearing of live stock is one of the important occupations in the district. The utilization of land under different uses is given in table 4.3.

#### **4.4 Cropping pattern :**

Rice occupies the largest percentage (38.19), backing up by maize (28.04 per cent) of the total cropped area. The area under fruits and vegetables constitute 21.72 per cent of total cropped area. Rice is the main food crop of state as well as Barramulla district. Moreover, other crops like millets, pulses, condiments and other spices, oilseeds, fodder crops and other non-food crops are also grown. The area sown more than once in a year constitutes 6.15 per cent of total cropped area (89,820 ha) as shown in table 4.4.

**Table 4.4 : Distribution of total area sown under different crops in J&K and Barramulla district(1997-98)**

S.No.	Crops	J & K		Barramulla	
		Area (ha)	Per centage	Area (ha)	Percentage
1.	Rice	2,75,750	25.45	34,300	38.19
2.	Jowar	20	Neg.	-	-
3.	Bajra	10,240	0.95	10	0.01
4.	Maize	3,10,880	28.70	25,190	28.04
5.	Wheat	2,44,670	22.58	520	0.58
6.	Barley	7,480	0.69	10	0.01
7.	Millets	13,030	1.20	580	0.65
8.	Pulses	32,550	3.00	4,270	4.75
9.	Sugarcane	200	0.02	-	-
10.	Condiments & Spices	2,190	0.20	120	0.13
11.	Fruits & Vegetables	64,400	5.95	19,510	21.72
12.	Other food crops	280	0.02	-	-
13.	Oilseeds	39,390	6.40	2,120	2.36
14.	Fibres	550	0.06	-	-
15.	Dyes & tanning material	5,360	0.50	-	-
16.	Drugs, narcotics & plantation crops	50	Neg.	-	-
17.	Fodder crops	45,780	4.22	3,160	3.52
18.	Other non-food crops	550	0.06	30	0.04
19.	Total area sown	10,83,370	(100.00)	89,820	(100.00)
20.	Area sown more than once in a year	3,47,380	32.06	5,520	6.15
21.	Net area sown	7,35,990	67.94	84,300	93.85

**Source :** Financial Commissioners Office (Srinagar)

#### 4.5 Size and number of land holdings :

The average size of land holding is highest in Leh district (1.38 hectare), where as lowest is in Srinagar district (0.37 ha). The reason is that Leh has lowest population in the state, while Srinagar district has high population as compared to its area. The over all average size of land holding in the state is 0.76 hectare as given in table 4.5.

**Table 4.5 : Number and Area of Operational Holdings in J & K (1995-96)**

S.No.	District	No. of Holdings	Area	Avg. Size of Holding (ha)
1.	Anantnag	1,66,390	81,340	0.49
2.	Pulwama	1,03,610	66,280	0.64
3.	Srinagar	87,990	32,390	0.37
4.	Budgam	1,07,360	57,920	0.5
5.	Barramulla	1,65,330	95,770	0.58
6.	Kupwara	87,510	48,300	0.55
7.	Leh	12,040	16,590	<b>1.38</b>
8.	Kargil	16,630	12,940	0.78
9.	Jammu	1,65,200	1,59,270	0.96
10.	Udhampur	1,13,560	1,25,560	1.11
11.	Doda	1,08,940	91,480	0.84
12.	Kathua	82,940	96,570	1.16
13.	Rajouri	66,390	79,100	1.19
14.	Poonch	51,880	49,020	0.94
	Total	13,35,770	10,12,530	0.76

**Source :** Agriculture Census 1995-96.

About 85 per cent of total number of holdings come under marginal farms i.e. less than 1. ha. Semi small and small farms constitute 10.64 and 4.26 per cent respectively. The rest of farmers come under semi-medium, medium and large. The classification of farmers based on their holding is given in table 4.6.

**Table 4.6 : Number of holdings by size classes in Barramulla district (1995-96)**

S.No.	Holding Size (Hect.)	No. of Holdings	Per centage
1.	Below 0.05	99,362	60.10
2.	0.05 – 1.0	40,338	24.40
3.	1.0-2.0	17,590	10.64
4.	2.0-3.0	5,038	3.05
5.	3.0-4.0	2,002	1.21
6.	4.0-5.0	835	0.51
7.	5.0-7.5	141	0.09
8.	7.5 – 10.0	16	Neg.
9.	10.0-20.0	1	Neg.
10.	20.0 and above	2	Neg.
11.	All size classes	1,65,325	100.00

Neg. : Negligible.

Source : Agriculture Census 1995-96.

#### **4.6) Source of irrigation :**

Canal is the major source of irrigation in the district as 92.74 per cent of total irrigated area is irrigated by it. Tanks and Wells constitute very less portion of irrigated area, with 0.09 and 1.75 per cent of total irrigated area respectively. The rest of the irrigated

area (5.42 per cent) comes under irrigation from other sources like springs, nahlas, ponds etc. (Table 4.7).

**Table 4.7 : Net Area Irrigated from different sources in J & K state and Barramulla districts**

S.No.	Particulars	J & K		Barramulla	
		Area Irrigated (ha)	Per-centage	Area Irrigated (ha)	Per-centage
1.	Canals	2,84,310	92.08	37,190	92.74
2.	Tanks	2,520	0.82	40	0.09
3.	Wells	1,300	0.42	700	1.75
4.	Other Sources	20,640	6.68	2,170	5.42
	Total	3,08,770	100.00	40,100	100.00

**Source :** Financial Commissioners Office.

#### **4.7 Fruit growers co-operative marketing societies :**

Fruit growers co-operative marketing societies were started in 1974 with a total number of 19. The number increased and reached to 248 upto 1997-98 in the state. The number of these societies in six districts of Kashmir province is presented in table 4.8. It is seen that highest number of these societies is in Barramulla district i.e. 59, with a membership of 4, 138, as this district produces more than half of the total production of apple in state. The main functions of these societies were to sell the produce of the growers and to cater their needs. These societies did not get popularity, due

to lack of resources, inefficient management and dishonest transaction, with the result most of these societies are defunct.

**Table 4.8 : District-wise Number and Membership of Fruit growers Marketing societies (1997-98) in Kashmir Province**

S.No.	District	No. of Societies	Membership
1.	Anantnag	36	2,857
2.	Pulwama	27	1,761
3.	Srinagar	9	612
4.	Budgam	23	2,095
5.	Barramulla	59	4,138
6.	Kupwara	25	2,192
	Total	179	13,655

**Source** : Horticulture Department, J & K.

#### **4.8 Socio-economic indicators of state :**

The different socio-economic indicators of the state are given in tables 4.9 and 4.10. The total estimated population of state is 77,18,700. About 76.17 per cent population lives in rural areas where as urban population constitutes about 23.83 per cent of total population of state. The male to female ratio is 92 females for every 100 males in the state. The population contribution of state to total population of India is 0.88 per cent, which is very much less. The decadal percentage growth rate of population is 28.92 and the change in growth rate is -0.77 per cent.

An improvement by 35 to 42.64 per cent was observed in Net State Domestic Product (NSDP) mainly due to primary sector (Agriculture and live stock). The secondary sector (manufacturing, construction, electricity, gas and water supply) shows a decline in NSDP from 17.00 to 8.38 per cent which include. The tertiary sector (public administration, trade, hotels and restaurants) shows an improvement of 1 per cent to NSDP. The per capita income of state at constant and current prices is Rs. 2009 and Rs. 6658 respectively.

**Table 4.9: Important demographic features of J & K (1991)**

S. No.	Description	Magnitude	
		<u>1981(Actual)</u>	<u>1991(Estimated)</u>
1.	Total Population	59,87,389	77,18,700
	i. Male	31,64,660 (52.85)	40,14,100 (52.00)
	ii. Female	28,22,729 (47.15)	37,04,600 (48.00)
	iii. Rural	47,26,986 (78.95)	58,79,300 (76.17)
	iv. Urban	12,60,403 (21.05)	18,39,400 (23.83)
2.	State population as percentage of total population of India	0.91	0.88
3.	Total area in Sq.Km. (including area illegally held by Pakistan & China)	2,22,236	2,22,236
4.	Density of Population per Sq.Km. of comparable area	59	76
5.	Decadal percentage growth rate of population	29.69	28.92
6.	Change in growth rate		-0.77
7.	Rate of change in <u>growth rate</u>		-2.59

**Source : Census Deptt.**

Note : Figures in parentheses represent the per centage to total population.

Note : The 1991 census has not been conducted in J & K population figures are as projected by the standing committee of Experts set up by G.O.I. on population projections, October, 1989

Table 4.10 :Net State Domestic Product by Sectoral break up at current & constant (1980-81) Prices

( Rs. in Crores)

S. No.	Sector	At current prices (1996-97)		At constant Prices (1980-81)	
(A.)	Primary Sector	2478.22	(42.64)	613.22	(35.00)
1.	Agriculture including live stock	2227.38	(38.32)	573.74	(32.71)
2.	Forestry & logging	200.06	(3.44)	24.38	(1.40)
3.	Fishing	38.26	(0.66)	7.64	(0.45)
4.	Mining & quarrying	12.52	(0.22)	7.46	(0.44)
(B)	Secondary Sector	486.89	(8.38)	298.17	(17.00)
5.	Manufacturing (registered sector)	157.03	(2.70)	65.23	(3.72)
6.	Manufacturing (unregistered sector)	155.74	(2.68)	66.05	(3.76)
7.	Construction	435.47	(7.50)	130.60	(7.45)
8.	Electricity, gas & water supply	-261.35	(4.50)	36.29	(2.07)
(C)	Tertiary Sector	2847.09	(48.98)	842.48	(48.03)
9.	Transport, communication & storage	82.29	(1.42)	16.92	(0.96)
10.	Trade, Hotels & restaurants	846.39	(14.56)	218.09	(12.43)
11.	Banking & insurance	227.53	(3.91)	77.32	(4.41)
12.	Real estates, ownership of dwelling & business services	127.22	(2.19)	137.78	(7.85)
13.	Public administration	946.38	(16.28)	246.48	(14.06)
14.	Other services	617.28	(10.62)	145.89	(8.32)
	i) Education services	362.59	(6.24)	82.59	(4.71)
	ii) Medical & Health Services	161.01	(2.77)	36.47	(2.08)
	iii) Sanitary Services	13.08	(0.23)	2.98	(0.17)
	iv) Service n.e.c.	80.60	(1.38)	23.85	(1.36)
15.	Total Net State Domestic Product (NSDP)	5812.20	(100.00)	1753.87	(100.00)
16.	Population (Lakhs)	87.30		87.30	
17.	Per Capita income (Rs.)	6558.00		2009.00	

**Note :** Figure in parentheses represent the percentage to the total NSDP.

**Source :** Directorate of Economics and Statistics, J & K

**CHAPTER - V**

**RESULTS AND DISCUSSION**

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## CHAPTER - V

# RESULTS AND DISCUSSION

The present chapter is going to put forth the results obtained from the analysis on various objectives which are already mentioned in chapter-I. The discussion on the result obtained is done simultaneously. The whole chapter is divided into seven sub-sections.

### **5.1 RELATIVE SHARES, CO-VARIANCES AND GROWTH RATE:**

The relative shares in area and production, co-efficients of variation and compound growth rates of area, production and productivity in different districts of Kashmir province as well as Jammu & Kashmir state are dealt in this sub-section.

#### **5.1.1 Relative Shares :**

The relative shares in area and production of apple are presented in table 5.1. An examination of table reveals that Baramulla district is the major apple growing district, as it contributes about 34 per cent and 60 per cent to total area and production of apple in the State respectively. The area share in Baramulla district shows a decreasing trend from 34.11 per cent during 1991-92 to 1993-94 which is reduced to 29.93 per cent during last three years of study period. Similar type of

decreasing trend may be seen in share of production, where it decreased from 58.65 per cent during first period to 55.58 per cent during last period.

The Kupwara district which follows next after Barramulla district in share of area, contributes about 17 per cent to total area. The percentage share in area shows a decreasing trend, whereas production share increased from 10.93 per cent to 12.27 per cent during these three periods in this district.

The Pulwama and Anantnag districts are contributing almost equal share in area (about 15 per cent) and remains more or less constant with a slight variation over all the three periods. However, from the production point of view Anantnag district contributes higher than Pulwama and shows an increasing trend from 10.06 per cent to 11.97 per cent and then to 14.06 per cent in 1st, 2nd and 3rd periods respectively. On contrary, the shares in production in Pulwama district decreased from 8.22 per cent to 6.68 and then to 6.06 per cent during referred periods respectively.

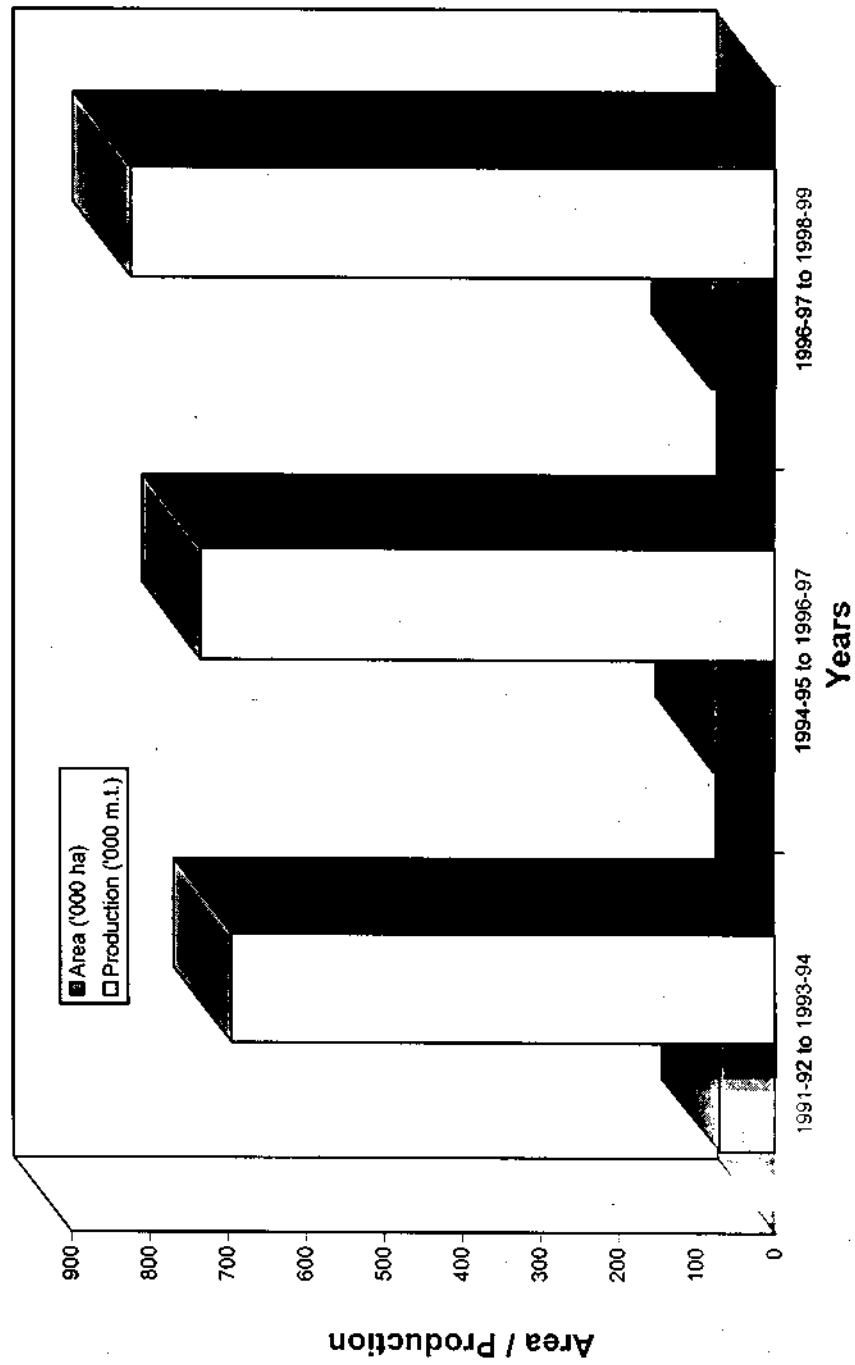
The share in area, to total area of state, is lowest (5.18 per cent) in Srinagar districts during first period, which slightly decreased over remaining periods. Similarly the production share is also lowest (about 4 per cent) in the district but it shows an increasing trend during the period of eight years. Ladakh and Jammu provinces combinedly contributes

**Table 5.1 : Relative shares in Area and production of Apple in different districts of Kashmir Province and J & K State (1991-92 to 1998-99)**

DISTRICTS	(Triennium Average)				(Area in hectares, Prod. in M. Tones)			
	1991-92 to 1993-94 (Period-I)		1994-95 to 1996-97 (Period-II)		1996-97 to 1998-99 (Period-III)			
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
1. Srinagar	3674.16 (5.18)	24689.33 (3.55)	3813.66 (4.90)	29053.00 (3.95)	4027.00 (4.90)	34666.66 (4.21)		
2. Budgam	5074.00 (7.15)	54761.66 (7.87)	6865.00 (8.83)	45068.33 (6.14)	7648.33 (9.32)	50900.00 (6.18)		
3. Pulwama	9957.80 (14.03)	57140.33 (8.22)	11996.00 (15.42)	49093.00 (6.68)	12486.66 (15.21)	49933.33 (6.06)		
4. Anantnag	10203.90 (14.37)	69991.33 (10.06)	11390.66 (14.64)	88000.00 (11.97)	11940.00 (14.54)	115874.67 (14.06)		
5. Barramulla	24214.57 (34.11)	407895.67 (58.65)	23968.33 (30.82)	428957.67 (58.36)	24564.66 (29.93)	457900.00 (55.58)		
6. Kupwara	12516.20 (17.63)	76030.00 (10.93)	12781.66 (16.43)	86329.66 (11.75)	13171.00 (16.05)	101100.00 (12.27)		
7. Ladakh+Jammu Provinces	5343.67 (7.53)	4984.68 (0.72)	6970.33 (8.96)	8475.00 (1.15)	8253.66 (10.05)	13544.66 (1.64)		
<b>J &amp; Kstate</b>	<b>70984.30 (100.00)</b>	<b>695493.00 (100.00)</b>	<b>77785.64 (100.00)</b>	<b>734976.66 (100.00)</b>	<b>82091.31 (100.00)</b>	<b>823919.32 (100.00)</b>		

Note : Figures in the parentheses represent the percentage to the total area and production

**Fig.5.1 : Triennium Average of Area and Production of Apple in J & K state (1991-92 to 1998-99)**



about 9 per cent share in area and 1 per cent share in production of the total area and production in the State.

Though, the relative shares of different districts changed over this period, however, there is continuous increase in area under apple in the state and reached upto a level of 82091.31 hectares, showing about 15 per cent increase in area. This area had most probably come from waste lands as well as shift from other cereal crops. On the other hand, variation in production of apple in the state may be due to many reasons. The production of apple shows a net increase of about 18 per cent during this period of 8 years in the state.

#### **5.1.2 Variability :**

District-wise Co-variance of area, production and productivity of apple in Kashmir province as well as state is presented in table 5.2. It is evident from the table that Barramulla district shows least variability i.e., 1.98 per cent 7.81 per cent and 8.16 per cent in area, production and productivity respectively. On the other hand Budgam shows highest variability in area (18.72 per cent) and productivity (32.96 per cent) while it is highest for production (28.10 per cent) in case of Anantnag. It is also seen from the table that the coefficient of variation in area, production and productivity varies across the districts.

**Table 5.2 : Co-variance of area, production and productivity of apple in different district of Kashmir province of J & K state (1991-92 to 1998-99)**

District	Area	Production	Productivity
1. Srinagar	4.44 (170.14)	19.79 (5768.95)	16.22 (1.23)
2. Budgam	18.72 (1199.29)	15.38 (7628.50)	32.96 (2.80)
3. Pulwama	11.42 (1297.94)	15.14 (7719.24)	24.55 (1.13)
4. Anantnag	11.1 (865.45)	28.10 (25084.92)	21.86 (1.72)
5. Barramulla	1.98 (479.57)	7.81 (33549.92)	8.16 (1.44)
6. Kupwara	2.40 (307.40)	18.92 (16276.60)	17.15 (1.15)
State	15.26 (10691.96)	29.16 (173675.29)	19.61 (1.68)

**Note :** Figures in the parenthesis indicate the standard deviation

It implies that the higher variation in production is the consequent of variation in productivity of crop. The various factors like irregular rainfall, occasional drought spells, untimely snow fall, invariable hail storms and out break of pests and diseases in epiphytatic proportions may be an appropriate reason for the high variability in productivity of the crop. The interaction and cumulative / synergetic effect of all these factors is highly responsible of this higher variability in the productivity and hence in the production of the crop.

### **5.1.3 Compound Growth Rate :**

Compound growth rates of area, production and productivity in different districts of Kashmir province and J & K state is presented in table 5.3. The table reveals that the production of apple in the state has increased significantly. The compound growth rate of production (4.45 per cent) in the state may be the consequent of significant growth rate of area (2.35 per cent) and productivity (2.05 per cent) as well.

Going through the district, the maximum growth rate of area (10.25 per cent) is seen in Budgam followed by Pulwama (4.85 per cent) and Anantnag (3.35 per cent) districts. On the contrary, the compound growth rates of production and productivity is found to be either negative or non-significantly positive in Budgam and Pulwama districts. It implies that production of apple in these two districts could not increase

**Table 5.3 : Compound growth rate of Area, Production and Productivity of Apple in J & K State(1991-92 to 1998-99)**

District	Area	Production	Productivity
1. Srinagar	1.86* (0.0009)	8.54** (0.0077)	6.56** (0.0078)
2. Budgam	10.25* (0.0091)	-0.97 (0.0116)	-10.17** (0.0149)
3. Pulwama	4.85* (0.0042)	3.62 (0.0098)	-8.09** (0.0106)
4. Anantnag	3.35* (0.0020)	12.43* (0.0097)	8.78* (0.0092)
5. Barramulla	0.19 (0.0015)	2.62** (0.0041)	2.42*** (0.0049)
6. Kupwara	1.00* (0.0005)	5.02*** (0.0104)	3.97 (0.0102)
State	2.35* (0.0006)	4.45* (0.0028)	2.05* (0.0026)

**Note :** Figures in the parenthesis indicate the standard error of coefficient

\* - Significant at 1 per cent probability level

\*\* - Significant at 5 per cent probability level

\*\*\* - Significant at 10 per cent probability level

significantly due to negative and significant growth in productivity inspite of significant increase in area. Though the Barramulla district did not experienced significant growth in area under crop, however, productivity and hence the production increased significantly with 2.42 per cent and 2.62 per cent respectively in this district. The Anantnag district shows highest growth rate in production (12.43 per cent) followed by Srinagar (8.54 per cent) which is mainly due to higher growth rate in productivity i.e. 8.78 per cent and 6.56 per cent in these two districts respectively .

It can be concluded from the table that efforts should be made to bring the uncultivable land under cultivation in Anantnag and Srinagar districts, where the compound growth rate in productivity of this crop is significantly higher. This will not only increase the area under cultivation but will also improve the production of crop in these two districts.

## 5.2 LAND USE AND CROPPING PATTERN :

Land use and cropping pattern followed by apple growers are discussed in this sub section.

### 5.2.1 Land use Pattern :

Land use pattern at sampled farms is presented in table 5.4. The average size of land holding i.e. owned land is observed to be 1.77 ha., 3.24 ha and 8.95 ha at small, medium and large farms respectively along with 4.65 ha as an overall average. It is necessary to mention here that the pre-harvest contract of apple orchards at the flowering stage prevails in the study area. These pre-harvest contractors have leased-in orchards in addition to their own apple orchards.

As evident from table, the leased in land at medium (29.69 per cent) and large farms (22.23 per cent) is quite more as compared to small farms (12.42 per cent). This shows that these farmers have sufficient resources to manage this land. The percentage of irrigated area to total cultivated area is found to be 66.25 per cent , 59.44 per cent and 55.10 per cent at small, medium and large farms respectively. Area under apple shows a positive relationship with the total cultivated area. It varies from 54.91 per cent, 81.23 per cent and 86.28 per cent at small, medium and large farms respectively. These figures show that the selected farmers are mainly apple growers. -

**Table 5.4 : Land use pattern at sampled farms**

Categories	Area in hectares							Per ha. prod. of apple
	Owned land	Leased in	Leased out	Total cult. area	Irrig. area	Area under apple	Farm prod. of apple	
1. Small farmers	1.77 (91.97)	0.24 (12.42)	0.08 (4.39)	1.93 (100.00)	1.28 (66.25)	1.06 (54.91)	31.80	30.00
2. Medium farmers	3.24 (76.18)	1.26 (29.69)	0.25 (5.87)	4.25 (100.00)	2.52 (59.44)	3.45 (81.23)	131.22	38.03
3. Large farmers	8.95 (79.61)	2.50 (22.23)	0.20 (1.84)	11.24 (100.00)	6.19 (55.10)	9.70 (86.28)	433.56	44.69
<b>Aggregate</b>	<b>4.65 (80.14)</b>	<b>1.33 (22.97)</b>	<b>0.18 (3.11)</b>	<b>5.80 (100.00)</b>	<b>3.33 (57.39)</b>	<b>4.73 (81.56)</b>	<b>198.86</b>	<b>42.04</b>

Note : Figures in parentheses represent the percentage to total cultivated area.

More than 80 per cent area allocated under apple orchard by medium and large farmers is clear indication that these farmers have sufficient resources to manage this area. The financial assistance rendered by commission agents in this trade to these farmers may also be a reason to manage more than 80 percent area under apple cultivation. The per farm production is observed to be as 31.80 tonns, 131.22 tonns and 433.56 tonns in case of small, medium and large farms respectively. The per hectare production varies from 30 tonns at small, 38.03 tonns at medium to 44.69 tonns at large farms. The sufficient use of required inputs by medium and large farmers may be a reason of relatively higher per hectare production at these farms as compared to small farms. Moreover, the age of orchard, technological gap and other natural factors may also contribute the variation in per hectare production of this crop among the categories

### **5.2.2 Cropping Pattern :**

The cropping pattern followed at sampled farms is presented in table 5.5. As it is evident from the table, in all the categories, most of the area is allocated under the apple cultivation, constituting 49.76 per cent at small, 77.81 per cent at medium and 82.28 per cent at large farms to total cropped area. The area under kharif crops constitutes 35.78,

**Table 5.5 : Cropping pattern followed by sampled farmers in the study area.**

CROPS	Small farmers		Medium farmers		Large farmers	
	Area(ha)	Prod.(q)	Area(ha)	Prod.(q)	Area(ha)	Prod.(q)
<b>A. Kharif</b>						
Paddy	0.64	35.02	0.54	35.82	0.96	36.28
Maize + Moong	0.06	0.55	0.03	0.37	0.24	3.60
M.P. cherry	Neg	-	-	-	0.05	4.91
Beans	Neg	-	0.03	0.26	0.08	0.96
Vegetables	0.06	5.06	0.09	9.24	0.16	30.40
<b>Total area</b>	<b>0.76(35.78)</b>		<b>0.69(15.49)</b>		<b>1.49(12.76)</b>	
<b>B. Rabi</b>						
Mustard	0.19	1.27	0.16	1.07	0.36	2.21
Oats	0.06	2.83	0.09	5.08	0.15	4.04
<b>Total area</b>	<b>0.25(11.81)</b>		<b>0.25(5.65)</b>		<b>0.51(4.37)</b>	
<b>C. Perennial crops</b>						
Apple	1.06(49.76)	1590 boxes	3.45(77.81)	6561 boxes	9.70(82.28)	21678 boxes
Pear	0.04	6 boxes	0.05	18 boxes	-	-
Cherry	0.02	0.25	-	-	-	-
Walnut	2 No.	1.95	3 No.	2.5	4 No.	3.17
<b>Total area</b>	<b>1.12(52.39)</b>		<b>3.50(78.85)</b>		<b>9.70(82.28)</b>	
Total cultivated area	1.93		4.25		11.24	
Total cropped area	2.13(100.00)		4.44(100.00)		11.70(100.00)	
Cropping intensity (%)	110.36		104.47		104.09	

**Note :** Figures in the parentheses represent the percentage to total cropped area.

15.49 and 12.76 per cent in case of small, medium and large farms respectively which is mainly contributed by paddy crop while area under rabi crops constitute 11.81, 5.65 and 4.37 per cent of total cropped area in case of small, medium and large farms respectively. Mustard is the main crop among rabi season crops in all three categories. The percentage of area under kharif and rabi crops is decreasing as the size of holding increases. The reason behind this is that the large farmers are purely apple growers and have allocated very less area to other crops while small farmers take more or less every crop for their livelihood. The cropping intensity is computed as 110.36, 104.47 and 104.09 per cent at small, medium and large farms respectively.

### **5.3 MARKETING PATTERN :**

The marketing pattern and the markets selected by apple growers to sell their produce are described under this sub-section. This section includes category-wise, market-wise and variety-wise sale of apple, marketing cost of apple in different markets and economics of marketing of different varieties of apple in various markets. These aspects are presented through table 5.6 to table 5.14.

### 5.3.1 Category-wise and market-wise sale of apple :

Category-wise and market-wise sale of apple is presented in table 5.6. It may be seen from the table that 64.03 per cent of the total produce is contributed by large farmers while these figures are 24.23 per cent and 11.74 per cent in case of medium and small farmers respectively. The markets selected by the sample farmers are Sopore, Jammu, Dehli, Calcutta and Ahmedabad. The major share of produce sold by sample farmers is in Azadpur fruit market Dehli, constituting 57.41 per cent of total sale which is backed up by Sopore (local fruit market of study area), accounting for 26.11 per cent of total sale. Jammu and Calcutta markets constitute almost equal share with 6.48 per cent and 6.91 per cent to total sale of apple by sample farmers, respectively. Ahmedabad constitutes least percentage share (3.09 per cent) of total sale.

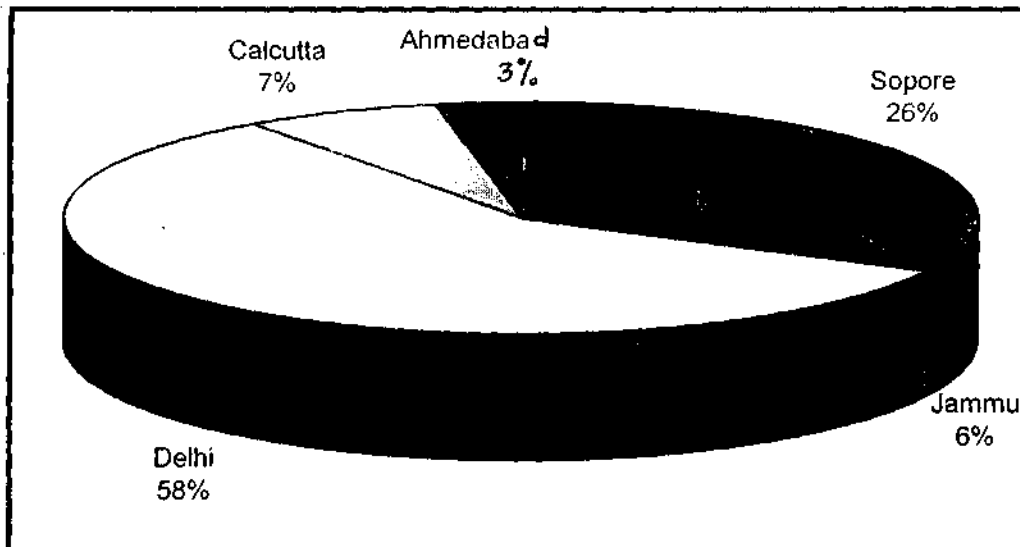
As we go through across the markets, it is seen that the major share of sale by small farmers is in Sopore (60.87 per cent), backed up by Dehli (25.78 per cent) which combinedly constitute about 86 per cent of total produce of this category. In case of medium and large farmers, the major percentage share of sale is in Dehli with 59.11 per cent and 62.56 per cent respectively. Similarly the percentage share of sale by medium

**Table 5.6 : Category-wise sale of apple in different markets.**

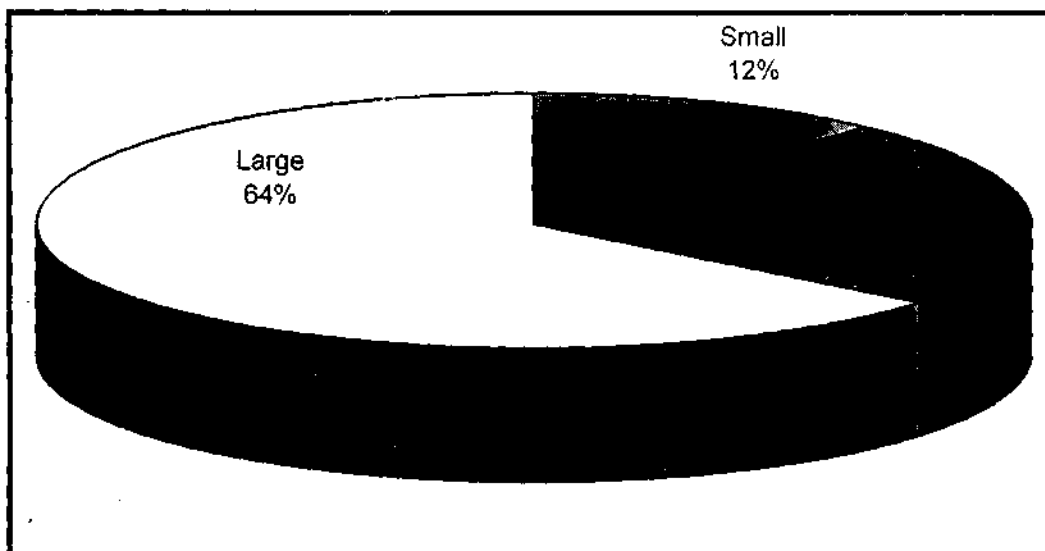
S.N.	Market	(Quantity in boxes, 1 box = 20 kg)			
		Small farmers	Medium farmers	Large farmers	Total
1.	Sopore	29,040(27.37) (60.87)	21,090(19.88) (21.43)	55,960(52.75) (21.51)	1,06,090(100.00) (26.11)
2.	Jammu	2,850(10.82) (5.97)	12,150(46.13) (12.35)	11,340(43.05) (4.36)	26,340(100.00) (6.48)
3.	Delhi	12,295(5.27) (25.78)	58,180(24.95) (59.11)	1,62,740(69.78) (62.56)	2,33,215(100.00) (57.41)
4.	Calcutta	1,900(6.78) (3.98)	7,000(24.96) (7.11)	19,140(68.26) (7.36)	28,040(100.00) (6.91)
5.	Ahmedabad	1,625(12.91) (3.40)	-	10,960(87.09) (4.21)	12,585(100.00) (3.09)
<b>Total sale</b>		<b>47,710(11.74) (100.00)</b>	<b>98,420(24.23) (100.00)</b>	<b>2,60,140(64.03) (100.00)</b>	<b>4,06,270(100.00)</b>

**Note :** Figures in the parentheses represent the percentage to total figures

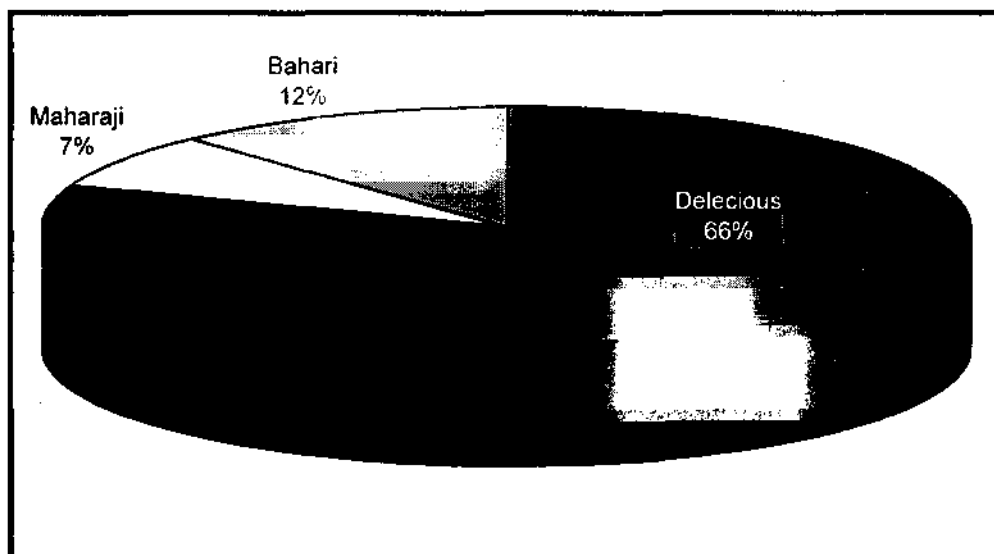
**Fig.5.2 : Percentage sale of apple by sample growers in different markets**



**Fig.5.3 : Percentage contribution of different categories**



**Fig.5.4 : Percentage contribution of different varieties**



and large farmers is almost equal in case of Sopore (about 21 per cent) and Calcutta (about 7 per cent) of their respective total sales. However, the percentage share of medium farmers in case of Jammu market is higher (12.35 per cent) than large farmers (4.36 per cent) of their respective total sales.

It is clear from the table that about 66 per cent and 40 per cent of the total produce by small and medium farmers respectively is sold within state (i.e. in Sopore & Jammu markets). The underlying factor for this is that, these farmers are in need of money and cannot wait for longer time. Moreover, these farmers do not have the liquidity potential to sell their produce at distant markets.

When we move across the categories and within the markets, the percentage share of large farmers in each market is highest, except for Jammu, in which share of medium farmers exceeds to that of large farmers. It is also noted from the table that percentage share of produce sold by small farmers is minimum in all markets except in case of Sopore market.

### **5.3.2 Variety-wise sale of apple by different categories :**

Category-wise and market-wise sale of different varieties is presented in table 5.7 to table 5.11. It is evident from the table 5.7, that the main variety grown by sample farmers among three categories is

**Table 5.7 : Variety - wise and category-wise sale of apple**  
(Quantity in boxes)

Categories	Varieties				Total
	Deleicious	American	Mahraji	Bahari	
Small	30,658 (64.26)	9,907 (20.77)	4,085 (8.56)	3,060 (6.41)	47,710 (100.00)
Medium	67,365 (68.45)	15,550 (15.80)	6,965 (7.08)	8,540 (8.67)	98,420 (100.00)
Large	1,70,050 (65.37)	33,850 (13.01)	19,375 (7.45)	36,865 (14.17)	2,60,140 (100.00)
<b>Total</b>	<b>2,68,073</b> <b>(65.98)</b>	<b>59,307</b> <b>(14.60)</b>	<b>30,425</b> <b>(7.49)</b>	<b>48,465</b> <b>(11.93)</b>	<b>4,06,270</b> <b>(100.00)</b>

**Note :** Figures in parentheses represent the percentage to total produce by respective categories.

Delecious which constitutes about 66 per cent of the total produce sold by these categories. American variety keeps second place having about 15 per cent of total sale while Mahraji and Bahari varieties combinedly constitute about 19 per cent of total produce sold. Maximum production (about 85 per cent) is coming from Delecious and American varieties at small and medium farms while large farmers are taking their 80 per cent production from Delecious and Bahari varieties. From production point of view, Mahraji, Bahari and American varieties keep third place at small, medium and large farms respectively. It is imperative to mention here that Bahari varieties are a group of early varieties (Kesri, Razaqwari and Hazratbali).

The total sale of different varieties in various markets is presented in table 5.8. It is observed from the table that more than 50 per cent quantity of Delecious, American and Bahari varieties is sold by sample growers in Dehli, followed by Sopore market. These three varieties keep their 85.71 per cent, 70.93 per cent and 85.16 per cent control on Dehli and Sopore markets combinedly. The maximum quantity of Mahraji variety (67.57 per cent) is sold by sample growers in Sopore market followed by Dehli market (17.70 per cent). The reason behind this is that, Mahraji variety is a low returning variety as compared to other varieties while the marketing cost is same for all the varieties. The

**Table 5.8 : Variety - wise sale of different varieties in various market** (Quantity in boxes).

S.No. Markets	Varieties		
	Delectious	American	Mahraji Bahari
1. Sopore	65,288 (24.35)	12,502 (21.08)	20,560 (67.57)
2. Jammu	16,905 (6.31)	4,655 (7.85)	3,830 (12.59)
3. Delhi	1,64,500 (61.36)	29,565 (49.85)	5,385 (17.70)
4. Calcutta	12,355 (4.61)	11,445 (19.30)	240 (0.79)
5. Ahmedabad	9,025 (3.37)	1,140 (1.92)	410 (1.35)
<b>Total</b>	<b>2,68,073</b> <b>(100.00)</b>	<b>59,307</b> <b>(100.00)</b>	<b>30,425</b> <b>(100.00)</b>
			<b>48,465</b> <b>(100.00)</b>

Note : Figures in the parentheses represent the percentage to total produce of respective variety.

percentage share of all the varieties is found to be less than 10 per cent in case of Calcutta and Ahmedabad, except 19.30 per cent share of American variety in Calcutta market. Similarly, Jammu is also chosen by farmers to sell their less than 10 per cent of produce of all varieties except Mahraji.

The variety-wise sale of apple by small, medium and large farmers in different markets is shown from table 5.9 to table 5.11. The maximum quantity of Delecious, American and Mahraji varieties is sold by small farmers in Sopore, followed by Dehli. These two markets account 85.29 per cent, 90.11 per cent and 88.13 per cent quantity of Delecious, American and Mahraji varieties respectively. Most of the quantity of Bahari variety (63.56 per cent) is sold by this category of farmers in Dehli market followed by Sopore (23.37 per cent).

Quantity of different varieties sold by medium farmers in various markets is presented in table 5.10. Figures show that this category of farmers chosed Dehli market to sell their maximum quantity of Delecious (59.39 per cent), Mahraji (45.58 per cent) and Bahari (84.84 per cent) varieties, followed by Sopore market with 22.26 per cent, 31.95 per cent and 7.55 per cent quantity of these varieties respectively. These two markets constitute about 82 per cent, 78 per cent and 92 per cent of the total quantity of Delecious, Mahraji and Bahari varieties. In

**Table 5.9 : Variety - wise sale of apple by small farmers in different markets**

(Quantity in boxes)

S.No. Markets	Varieties				Total
	Delectious	American	Mahraji	Bahari	
1. Sopore	18,578 (60.60)	7,052 (71.18)	2,695 (65.97)	715 (23.37)	29,040 (60.87)
2. Jammu	1,590 (5.19)	475 (4.79)	485 (11.87)	300 (9.80)	2,850 (5.97)
3. Delhi	7,570 (24.69)	1,875 (18.93)	905 (22.16)	1,945 (63.56)	12,295 (25.78)
4. Calcutta	1,585 (5.17)	315 (3.18)	-	-	1,900 (3.98)
5. Ahmedabad	1,335 (4.35)	190 (1.92)	-	100 (3.27)	1,625 (3.40)
<b>Total</b>	<b>30,658</b> <b>(100.00)</b>	<b>9,907</b> <b>(100.00)</b>	<b>4,085</b> <b>(100.00)</b>	<b>3,060</b> <b>(100.00)</b>	<b>47,710</b> <b>(100.00)</b>

Note : Figures in the parentheses represent the percentage to total figure.

**Table 5.10 : Variety - wise sale of apple by medium farmers in different markets**

(Quantity in boxes)

S.No. Markets	Varieties				Total
	Delectious	American	Mahraji	Bahari	
1. Sopore	15,000 (22.26)	3,220 (20.71)	2,225 (31.95)	645 (7.55)	21,090 (21.43)
2. Jammu	9,385 (13.94)	1,150 (7.39)	1,365 (19.60)	250 (2.93)	12,150 (12.35)
3. Delhi	40,010 (59.39)	7,750 (49.84)	3,175 (45.58)	7,245 (84.84)	58,180 (59.11)
4. Calcutta	2,970 (4.41)	3,430 (22.06)	200 (2.87)	400 (4.68)	7,000 (7.11)
5. Ahmedabad	-	-	-	-	-
<b>Total</b>	<b>67,365</b> <b>(100.00)</b>	<b>15,550</b> <b>(100.00)</b>	<b>6,965</b> <b>(100.00)</b>	<b>8,540</b> <b>(100.00)</b>	<b>98,420</b> <b>(100.00)</b>

**Note :** Figures in the parentheses represent the percentage to total figure.

case of American variety, Dehli, Calcutta and Sopore markets are selected by medium farmers to sell their about 93 per cent of produce

The quantity of different varieties sold by large farmers at various markets may be seen in table 5.11. Like-wise medium farmers, large farmers also selected Dehli market to sell their maximum quantity of Delecious(68.75 per cent) and Bahari(66.66 per cent) varieties followed by Sopore market. These farmers sold their 87.40 per cent and 83.98 per cent of Delecious and Bahari varieties respectively in these two markets. The maximum quantity of American variety is disposed off by these farmers in Dehli (58.90 per cent) market, followed by Calcutta (22.75 per cent). During the course of investigation, farmers perceived that American variety is liked by the consumers of Calcutta, Probably, this may be a reason for higher percentage sale of this variety in Calcutta market by medium and large farmers.

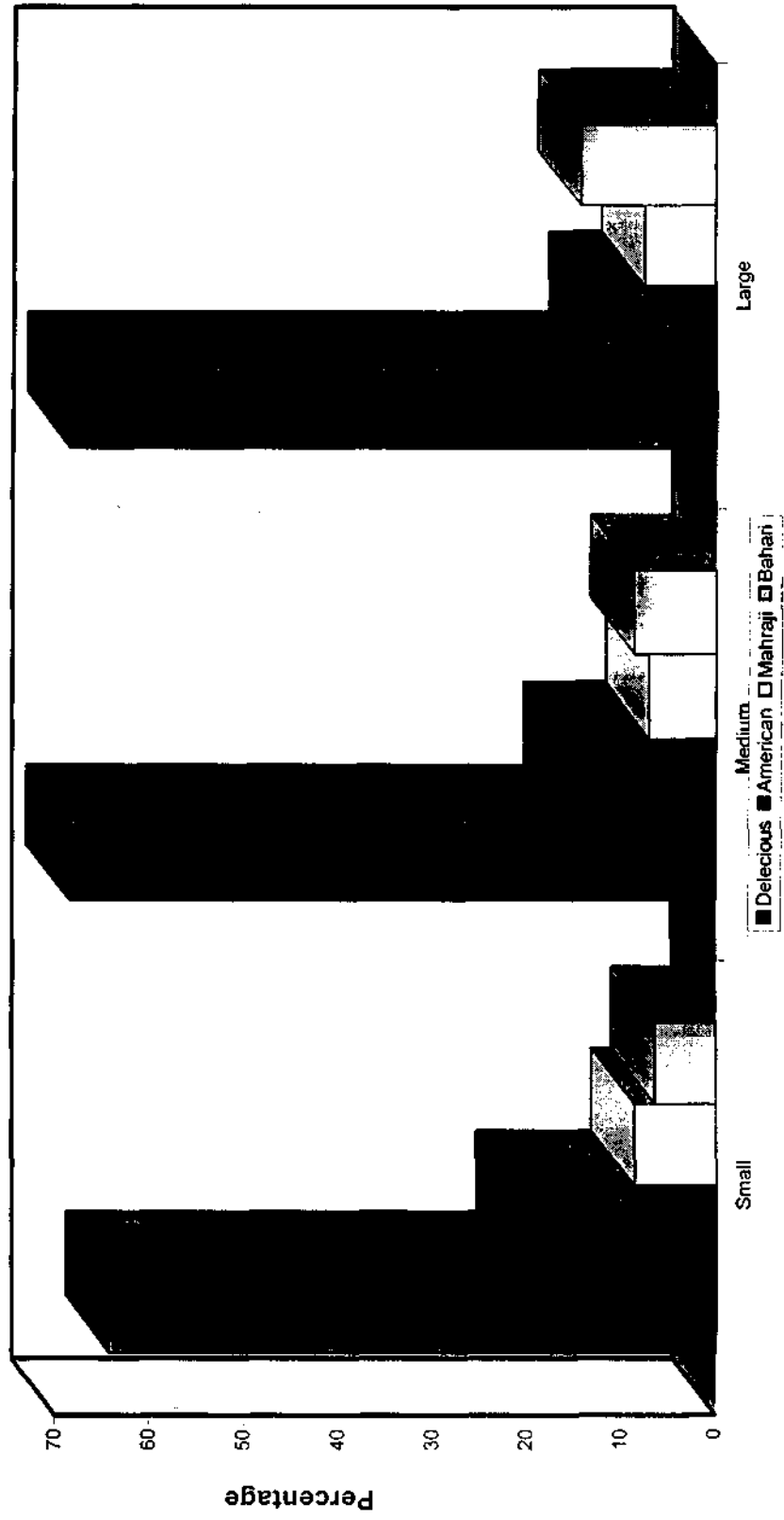
It is interesting to note here that small and large farmers sold more than 65 per cent quantity of Mohraji variety in Sopore market while medium farmers chosed Dehli market to sell maximum quantity (45.58 per cent) of this variety. As already mentioned, this variety is low returning as compared to Delecious and American varieties, farmers like to dispose off this variety in the local market to save the excess marketing cost in case of distant markets.

**Table 5.11 : Variety - wise sale of apple by large farmers in different markets**

S.No. Markets	Varieties				Total
	Delectious	American	Mahraji	Bahari	
1. Sopore	31,710 (18.65)	2,230 (6.59)	15,640 (80.72)	6,380 (17.32)	55,960 (21.51)
2. Jammu	5,930 (3.49)	3,030 (8.95)	1,980 (10.22)	400 (1.08)	11,340 (4.36)
3. Delhi	1,16,920 (68.75)	19,940 (58.90)	1,305 (6.74)	24,575 (66.66)	16,740 (62.56)
4. Calcutta	7,800 (4.58)	7,700 (22.75)	40 (0.20)	3,600 (9.76)	19,140 (7.36)
5. Ahmedabad	7,690 (4.53)	950 (2.81)	410 (2.12)	1,910 (5.18)	10,960 (4.21)
Total	1,70,050 (100.00)	33,850 (100.00)	19,375 (100.00)	36,865 (100.00)	2,60,140 (100.00)

Note : Figures in the parentheses represent the percentage to total figure.

Fig.5.5 : Category-wise percentage share of different varieties



### 5.3.3 Marketing cost of apple :

The component-wise marketing cost of apple incurred by growers / pre-harvest contractors in different markets is presented in table 5.12. Since the marketing cost across the categories and within the market is almost same. It is calculated in different markets based on total number of farmers irrespective of the categories.

As it is evident from the table that highest marketing cost of Rs. 134.16 per box is estimated in case of Calcutta, followed by Ahmedabad (Rs. 114.72 per box), Dehli (Rs. 102.65 per box), Jammu (Rs. 72.80 per box) and Sopore (Rs. 60.51 per box). The main components responsible for the variation of marketing cost across the markets are transportation cost and commission charges. The freight charges taken by the transporters generally varies over the marketing season for the same market. During the hike in prices of apple at terminal markets and due to non-availability of sufficient trucks, the growers are generally exploited by transporters and have to pay more freight.

The per box cost of these two items comes highest in Calcutta (63.81 per cent), followed by Ahmedabad (56.63 per cent), Dehli (52.70 per cent), Jammu (43.54 per cent) and Sopore (32.92 per cent) of total marketing cost. The transportation cost varies across the markets as it is mainly based on the distance of market. The charges on commission are

to be observed different in different markets. The highest commission is charged in case of Dehli (11 per cent of price) while it was lowest in Jammu and Ahmedabad markets (8 per cent of price). The commission charged from the farmers / pre-harvest contractors which are financed by commission agents is generally higher (about 2 to 5 per cent) as compared to other farmers.

The costs on plucking, assembling and grading (Rs. 6.43 per box), Packaging (Rs. 31.55 per box) and head load to road (Rs. 1.00 per box) are also important cost components as they constitute from about 29 per cent in Calcutta to 65 per cent in Sopore market. The costs on these three components is observed as same in all the markets, as these are on farm costs made by the growers before sending it for different markets. However, percentage share of these costs decreases as the markets become distant from the producing area, due to increase in total marketing cost.

The tax charged by the state government in the form of toll tax for export of fruits out side the state is Rs. 6.80 per box which was recently raised by state government during financial year 1999-2000. Earlier it was Rs. 4.80 per box. The other cost components are octroi, mandi association fee, loading and unloading charges and

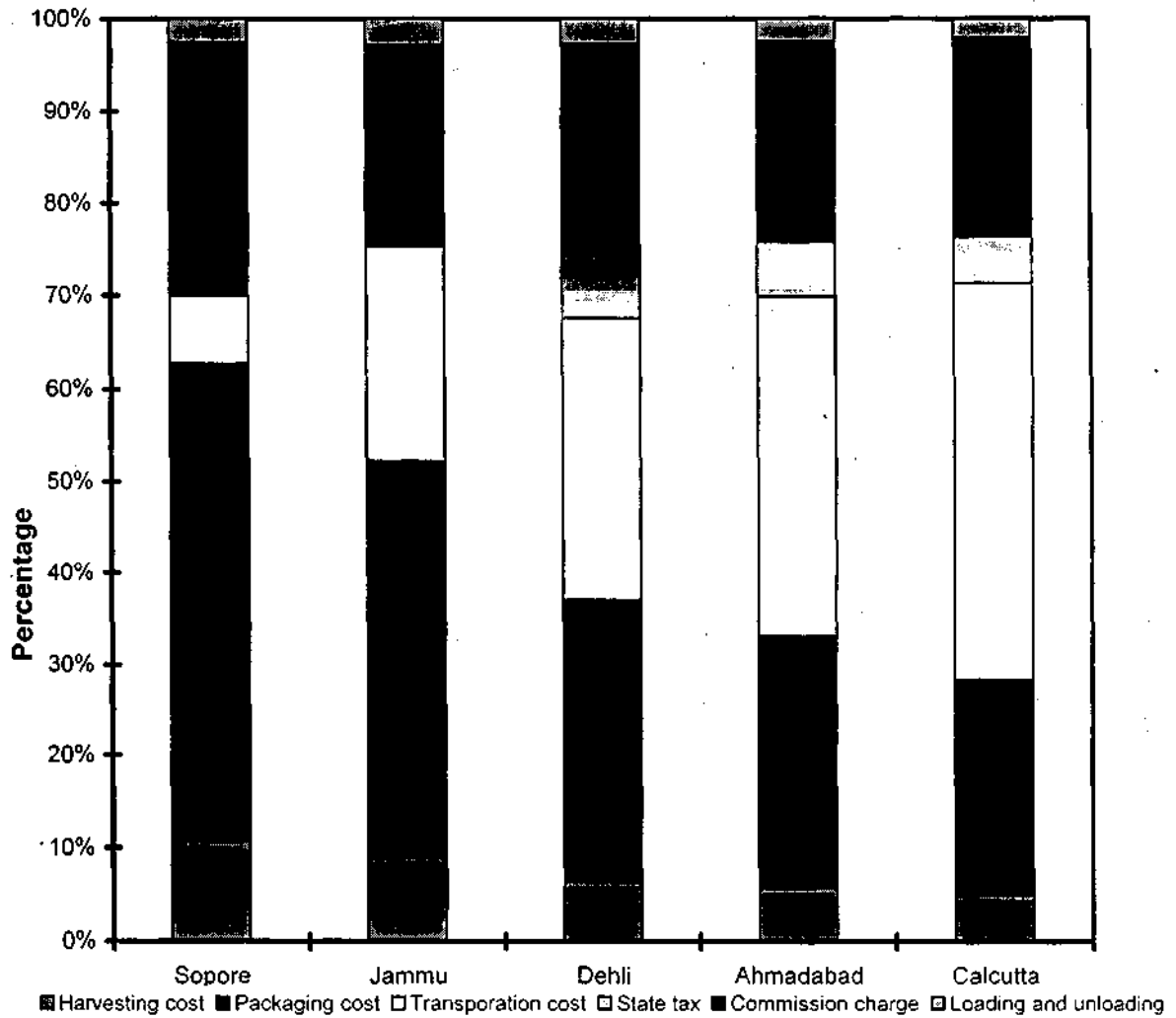
**Table 5.12 : Marketing cost of apple in different markets**

(Rs./box, 1 box = 20 kg)

SN. Particulars	Markets				
	Sopore	Jammu	Delhi	Ahmedabad	Calcutta
1. Harvesting cost (plucking Assembling & grading)	6.43 (10.63)	6.43 (8.83)	6.43 (6.26)	6.43 (5.60)	6.43 (4.79)
2. Packaging cost (cost of wooden box, cost of nails, paddy straw, Papers, cost of packaging, Labelling and stencilling Charges)	31.55 (52.14)	31.55 (43.34)	31.55 (30.74)	31.55 (27.50)	31.55 (23.52)
3. Head load to road	1.00 (1.65)	1.00 (1.37)	1.00 (0.98)	1.00 (0.87)	1.00 (0.75)
4. Transportation cost	3.33 (5.50)	15.84 (21.76)	30.38 (29.59)	41.15 (35.87)	56.67 (42.24)
5. Octroi	0.01 (0.02)	--	--	--	--
6. State tax	--	--	6.80 (6.62)	6.80 (5.94)	6.80 (5.07)
7. Commission charges	16.59 (27.42)	15.86 (21.78)	23.72 (23.11)	23.82 (20.76)	28.94 (21.57)
8. Mandi Association fee	0.10 (0.16)	0.10 (0.14)	--	1.25 (1.09)	--
9. Loading and unloading charges	1.50 (2.48)	2.00 (2.75)	2.75 (2.68)	2.70 (2.35)	2.75 (2.05)
10. Communication charges	0.00 (0.00)	0.02 (0.03)	0.02 (0.02)	0.02 (0.02)	0.02 (0.01)
<b>Total marketing cost</b>	<b>60.51 (100.00)</b>	<b>72.80 (100.00)</b>	<b>102.65 (100.00)</b>	<b>114.72 (100.00)</b>	<b>134.16 (100.00)</b>

Note : Figures in the parentheses represent the percentage to total figure.

**Fig.5.6 : Percentage share of various cost components for different markets**



communication charges which account for about less than 3 per cent of the total marketing cost.

#### **5.3.4 Category-wise economics of marketing of apple :**

The marketing cost, gross price, and net-share per box in different markets irrespective of the varieties are presented in table 5.13. It may be seen from table that the marketing cost incurred by farmers of different categories is almost equal within the market. The small variation in marketing cost across the categories is due to commission charged on varying prices of product.

It is observed from table that gross price received by large farmers in Sopore market is relatively less (Rs.165.48 per box) than gross prices received by small (Rs. 183.26 per box) and medium (Rs. 185.41 per box) farmers. The high percentage sale of low returning variety (Mahraji) by large farmers in Sopore market may be a reason of this difference of about Rs. 20 per box. The per"box average price is estimated as Rs. 174.30 in this market. In Jammu and Dehli markets, the gross prices of large category farmers are highest with Rs. 202.26 and Rs. 218.00 per box respectively which is Rs. 13.94 per box and Rs. 12.49 per box higher as compared to prices of small farmers in these two markets respectively.

Unlike, the highest price received by large farmers in Jammu and Dehli market, they received relatively less prices in Calcutta and Ahmedabad markets. Medium farmers received about Rs. 18.00 per box more as compared to price received by large farmers. Similarly in Ahmedabad, large farmers received about Rs. 12.00 less per box as compared to small farmers. Relatively large farmers follow up their produce till it reaches in Jammu and Dehli market and the presence of these farmers with their produce may play an important role to realise higher prices in these markets. On contrary, the small farmers are restricted to follow up their produce due to lack of resources.

The overall average net share is highest for Ahmedabad market with Rs. 183.07 per box, followed by Calcutta (Rs. 154.98 per box), where as it is least in Azadpur fruit market, Dehli (Rs. 112.98 per box). The average net shares of Sopore (Rs. 113.79 per box) and Jammu (Rs. 125.55 per box) is higher than Dehli (Rs. 112.98 per box). The reason behind this is that more than about 60 per cent of the produce from Jammu and Kashmir and Himachal Pradesh is sold directly in Azadpur fruit market, Dehli. Due to the high arrival of produce in this market, the prices and hence the net share is comparatively low than that of other markets.

**Table 5.13 : Category-wise economics of marketing of apple in different markets**

(Rs./box, 1 box = 20 kg)

SN. Particulars	Markets				
	Sopore	Jammu	Delhi	Calcutta	Ahmedabad
<b>A. Marketing cost</b>					
Small	60.70	73.17	99.91	135.88	115.31
Medium	60.57	71.53	102.02	136.05	-
Large	60.61	73.34	103.02	133.24	112.49
Average	60.51	72.80	102.65	134.16	114.72
<b>B. Gross price</b>					
Small	183.26	188.32	205.51	299.71	308.21
Medium	185.41	197.05	211.16	301.86	-
Large	165.48	202.26	218.00	283.44	296.25
Average	174.30	198.35	215.63	289.14	297.79
<b>C. Net share</b>					
Small	122.56	115.15	105.60	163.83	192.90
Medium	124.84	125.52	109.14	165.81	-
Large	104.87	128.92	114.98	150.20	183.76
Average	113.79	125.55	112.98	154.98	183.07

### **5.3.5. Variety-wise economics of marketing :**

Variety-wise and category-wise marketing cost, gross price and net share in different markets are presented in table 5.14. It is observed from the table that there is variation in marketing cost across the varieties and within the market. The marketing cost of Mahraji and Bahari varieties is less than American and Delicious in all the markets. This variation is contributed by the commission charges levied on the gross prices which are low for these two varieties in comparison to Delicious and American varieties.

The average price of Delicious variety varied from Rs. 200.44 per box in Sopore to Rs. 313.78 per box in Ahmedaba'd, with a difference of Rs. 113.34 per box. The net share of Delicious variety is highest in Ahmedabad (Rs. 198.81 per box) followed by Calcutta (Rs.151.86 per box). However, the average net share of this variety in Dehli market (Rs.125.59 per box) is observed quite less not from Calcutta and Ahmedabad market but also less than that of Sopore (Rs. 139.37) and Jammu (Rs. 143.25) markets. The reason is already mentioned of this phenomenon.

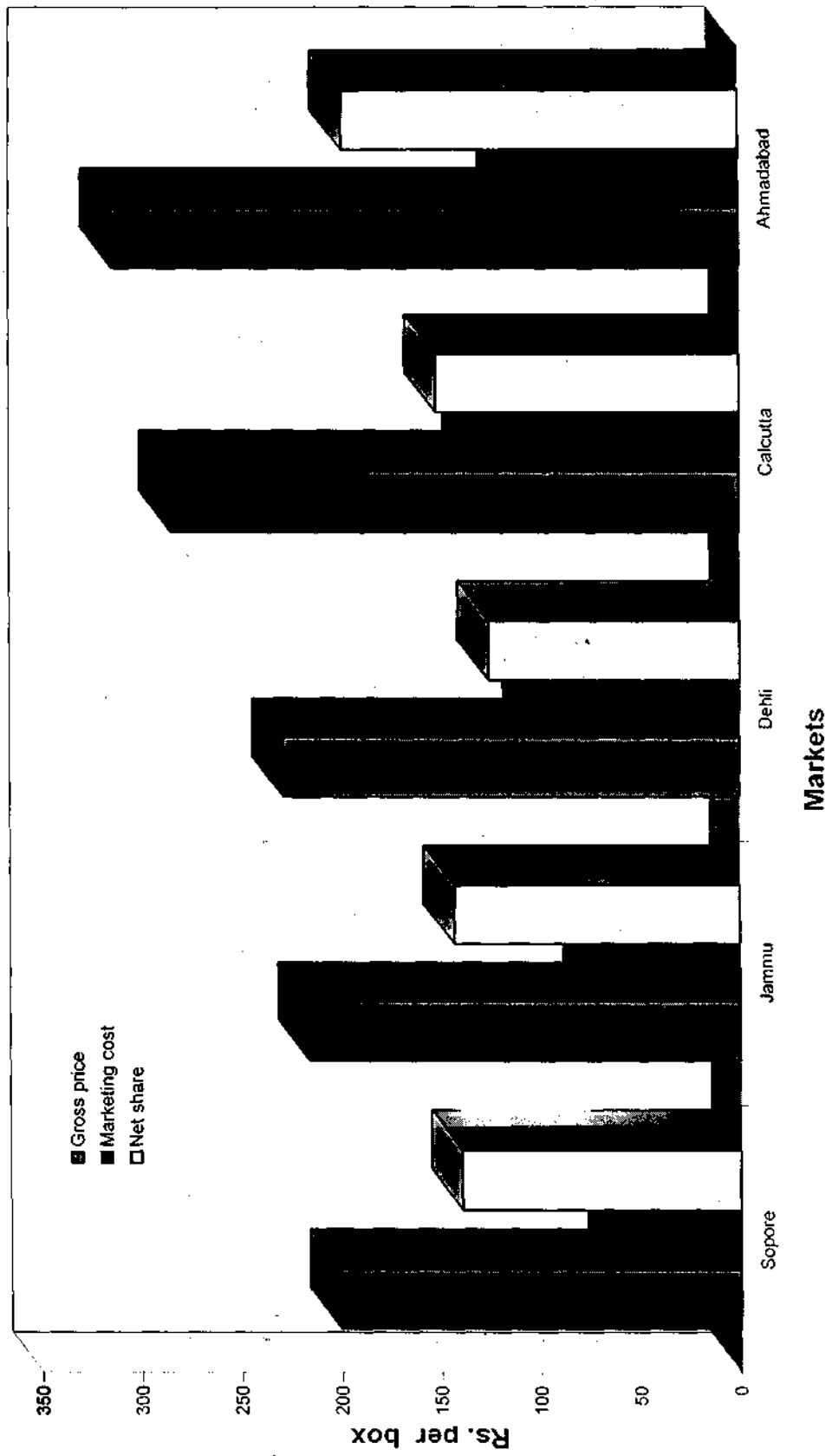
On examining the categories, it is seen that the large category farmers have got maximum price for Delicious variety in Sopore (Rs. 203.37 per box), Jammu (Rs. 225.00 per box), Dehli (Rs. 230.00 per box)

**Table 5.14 Variety-wise and category-wise economics of marketing of apple in different markets.**

(Rs. per box, 1 box = 20 kg)

Varieties => Categories =>	DELECIOS			AMERICAN			MAHARAJI			BAHARI				
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Average	
<b>Markets</b>														
<b>1. SOPORE</b>														
Marketing cost	60.80	60.92	61.30	61.07	60.67	60.43	61.45	60.74	51.51	51.20	52.18	51.98	52.44	52.79
Gross price	195.50	200.40	203.37	200.44	194.00	194.95	205.00	196.20	92.29	92.35	102.05	99.72	102.62	110.00
Net share	134.70	139.48	142.07	139.37	133.33	134.52	143.55	135.45	40.78	41.15	49.87	47.73	50.18	57.21
<b>2. JAMMU</b>														
Marketing cost	74.31	71.61	74.16	72.75	73.91	71.33	73.60	73.07	67.11	63.65	66.25	65.43	66.31	63.97
Gross price	215.00	210.50	225.00	216.00	210.00	207.00	218.00	214.46	125.00	111.09	126.21	120.66	115.00	115.00
Net share	140.69	138.89	150.84	143.25	136.09	135.67	144.40	141.40	57.89	47.44	59.96	55.23	48.69	51.03
<b>3. DELHI</b>														
Marketing cost	101.30	102.71	103.44	103.16	102.68	104.30	105.64	105.10	89.67	90.75	91.61	90.77	90.93	93.52
Gross price	226.30	225.58	230.00	228.75	238.85	240.00	250.00	246.67	120.55	116.81	122.50	118.81	132.00	142.00
Net share	125.00	122.87	126.56	125.59	136.17	135.70	144.36	141.57	30.88	26.06	30.89	28.04	41.07	48.48
<b>4. CALCUTTA</b>														
Marketing cost	134.39	133.28	132.29	132.80	137.91	138.58	137.18	137.61	-	120.86	119.50	120.63	-	124.86
Gross price	293.89	284.25	282.94	284.65	329.00	337.25	331.88	333.41	-	160.00	155.00	159.16	-	200.00
Net share	159.50	150.97	150.65	151.86	191.09	198.67	194.70	195.80	-	39.14	35.00	38.45	-	75.14
<b>5. AHMEDABAD</b>														
Marketing cost	114.56	-	115.04	115.00	117.76	-	118.85	118.66	-	-	103.65	103.65	106.16	-
Gross price	310.00	-	314.44	313.78	350.00	-	362.00	360.00	-	-	172.00	172.00	205.00	-
Net share	195.44	-	199.40	198.81	232.24	-	243.15	241.33	-	-	68.35	68.35	98.84	-

**Fig.5.7 : Gross price, marketing cost and net share of Delectious variety in different markets**

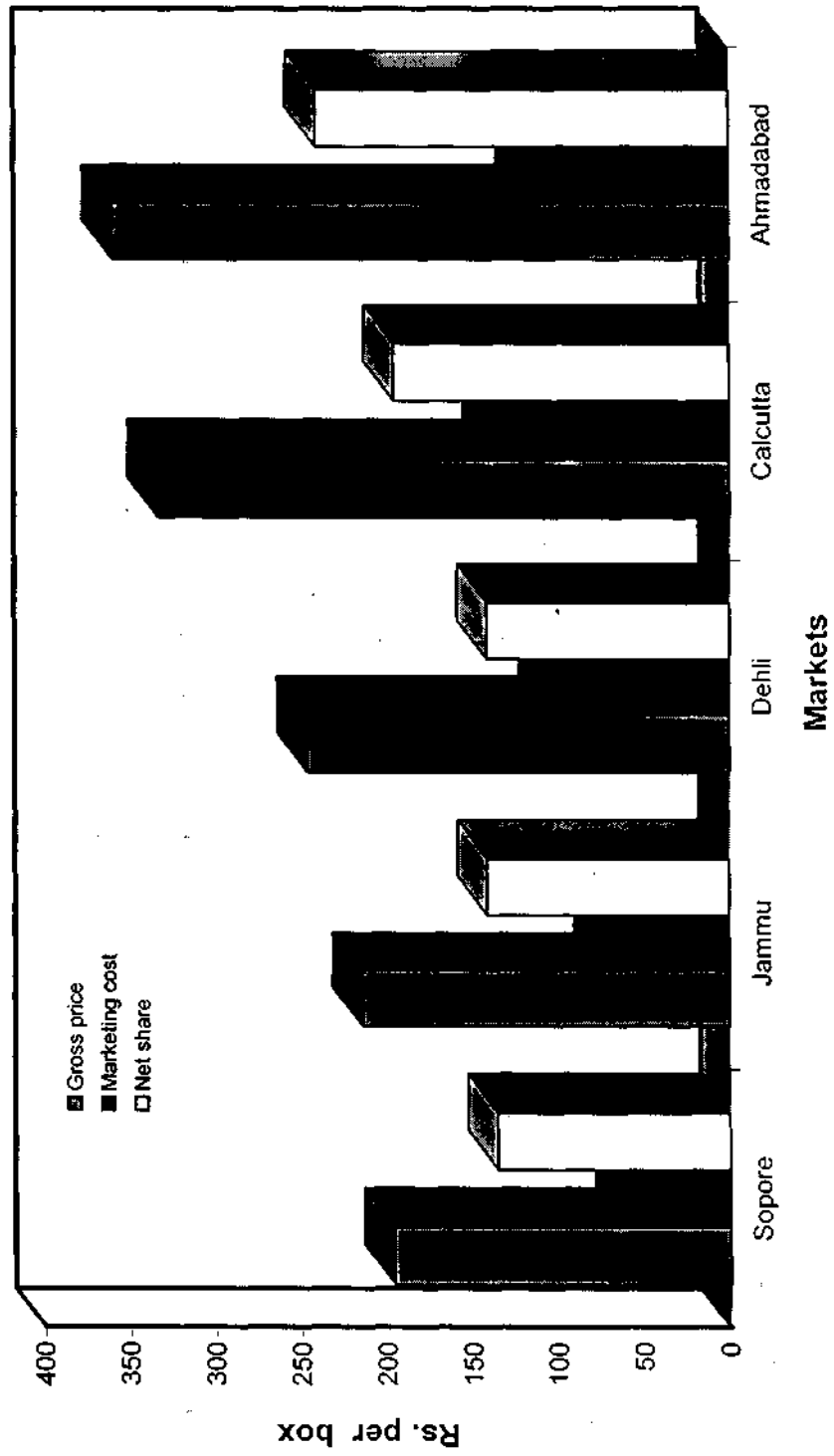


and Ahmedabad (Rs. 314.44 per box) while it is maximum for small category farmers (Rs. 293.89 per box) in case of Calcutta market. The variation in prices of Delicious variety among the categories is from Rs. 4.42 per box in Dehli to Rs. 15.00 per box in Jammu.

Likewise Delicious, the average prices of American variety varied from Rs. 196.20 per box in Sopore to Rs. 360.00 per box in Ahmedabad with a big difference of Rs. 163.80 per box which is higher by Rs. 50.46 per box as compared to Delicious variety. Similarly, the average net share of this variety is highest in Ahmedabad (Rs. 241.33 per box) followed by Calcutta (Rs. 195.80 per box) while it is same in Dehli and Jammu (about Rs. 141.00 per box) markets.

The category-wise prices and net share of this variety shows similar trend as that of Delicious variety. Here also, the prices of large category farmers is maximum in Sopore (Rs. 205.00 per box), Jammu (Rs. 218.00 per box), Dehli (Rs. 250.00 per box) and Ahmedabad (Rs. 362.00 per box), Whereas, it is maximum for medium farmers in Calcutta (Rs. 337.25 per box). The per box price variation of American variety across the categories varied from Rs. 8.25 per box in Calcutta to Rs. 12.00 per box in Ahmedabad.

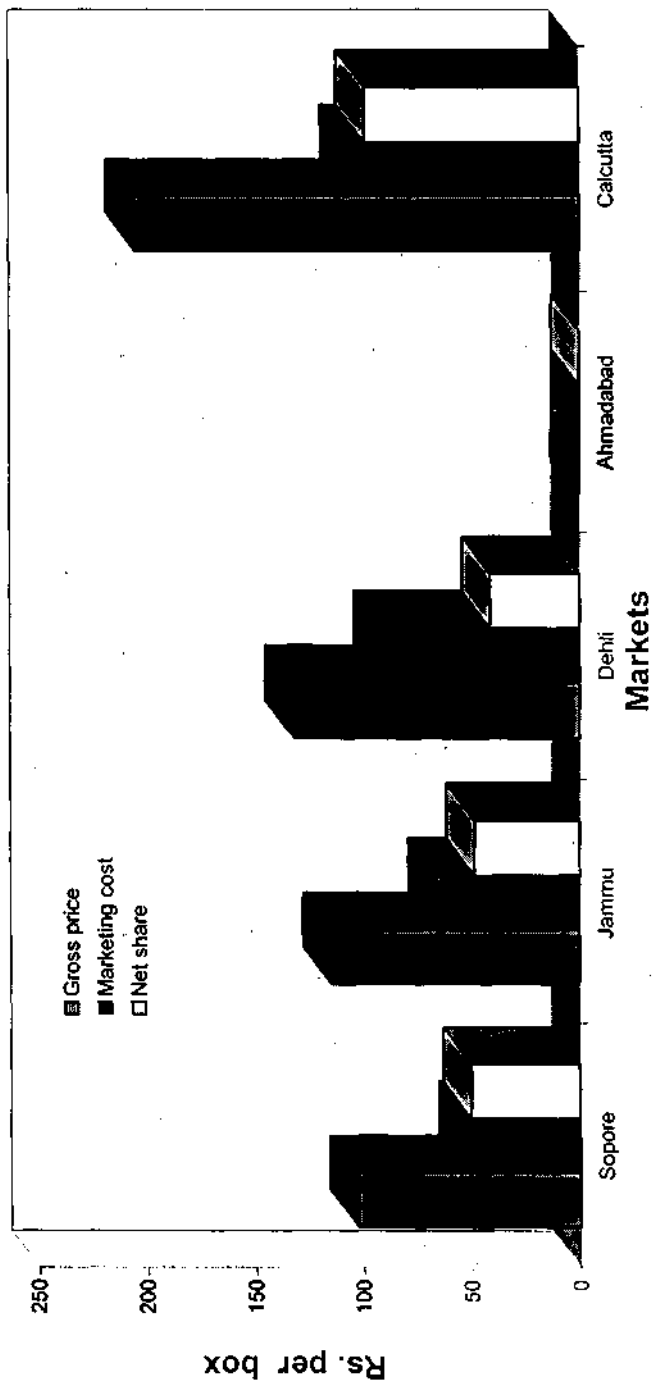
**Fig.5.8 : Gross price, marketing cost and net share of American variety in different markets**



The average price of Delecious variety is higher than American by Rs. 4.24 per box and Rs. 1.54 per box in Sopore and Jammu markets respectively. On moving to distant markets from producing area, it is observed that average price of American variety leads to Delecious by Rs. 17.92 per box, Rs. 48.76 per box and Rs. 46.22 per box in Dehli, Calcutta and Ahmedabad markets respectively. Consequently, the average net share of American variety is higher than Delecious in these three distant markets as the marketing cost is almost same for these two varieties. Some of the farmers perceived that American variety is more preferred by the consumers of eastern region of India. Moreover, the production of this variety is also quite less as compared to Delecious variety. These may be the adequate reasons of higher price of this variety over Delecious in case of distant markets.

For Mahraji variety, the price variation is least (Rs. 72.28 per box ) across the markets with the average price of Rs. 99.72 per box in Sopore to Rs. 172.0 per box in Calcutta. Like wise Delecious and American varieties, Mahraji variety gave maximum net share to large farmers in Sopore (Rs. 49.87 per box), Jammu (Rs. 59.96 per box) and Dehli (Rs. 30.89 per box) markets. Medium farmers realised maximum net share (Rs. 39.14 per box) in Calcutta market while the produce of this variety is not disposed by small and medium farmers in Ahmedabad market. The

**Fig.5.9 : Gross price, marketing cost and net share of Mahraji variety in different markets**

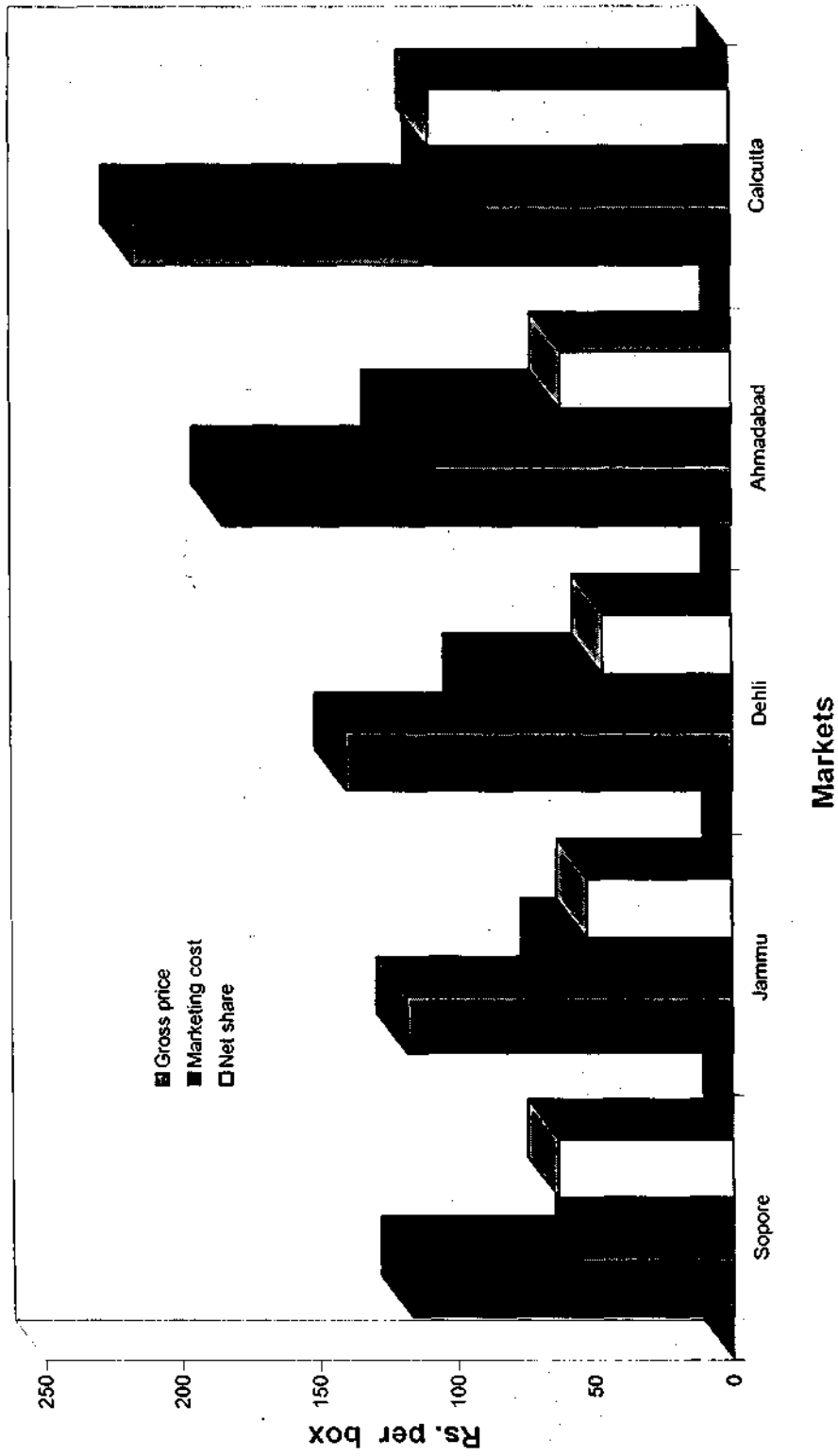


variation in price of Mahraji variety across the categories and within the market is from Rs. 5.00 per box in Calcutta to Rs. 15.12 per box in Jammu market.

The prices of Bahari varieties are higher than Mahraji in all the markets except in case of Jammu market. The average prices of Bahari varieties varied from Rs. 116.62 in Sopore to Rs. 216.40 per box in Ahmedabad market, with a differences of Rs. 99.78 per box. Like wise other varieties, the net share of Bahari varieties too, is highest in Ahmedabad market (Rs. 109.20 per box) and least in Dehli market (Rs. 46.58 per box). Among the categories, the maximum prices for Bahari varieties are received by large category farmers in Sopore (Rs. 118.87 per box), Jammu (Rs. 122.50 per box) and Ahmedabad (Rs. 217.00 per box) while in case of Dehli and Calcutta markets, the prices received as maximum by medium category farmers with Rs. 142.00 per box and Rs. 200.00 per box respectively. The prices for these early varieties varied across the categories from Rs. 7.50 per box in Jammu to Rs. 17.67 per box in Dehli.

The average net shares in Dehli for Delecious , Mahraji and Bahari varieties are less than net share in Sopore and Jammu markets. The prices of these varieties are not much higher in Dehli market as compared to prices prevailed in Jammu and Sopore markets while the marketing

**Fig.5.10 : Gross price, marketing cost and net share of Bahari variety in different markets**



cost is proportionately higher in Dehli market. This is the main reason of low returns from produce in this market. The Mahraji variety gives good returns in Jammu market (Rs. 55.23 per box) after Ahmedabad market where it is highest (Rs. 68.35 per box). It is because of the fact that Mahraji variety is much preferred by the consumers of the Jammu region due to its sour in taste. It is concluded from the table that Ahmedabad market is economical for marketing of apple for all the categories and varieties, followed by Calcutta, as the average net share is maximum in Ahmedabad market followed by Calcutta.

#### **5.4 MARKETING CHANNEL AND PRICE SPREAD:**

The important marketing channels prevailing in case of Kashmir apple are discussed here. Price spread is calculated only for channel which gets completed within the study area.

##### **5.4.1 Marketing Channels :**

The different marketing channels prevailing in marketing of apple are presented in table 5.15. Various market functionaries are involved in this trade. It involves agencies like growers, pre-harvest contractors, forwarding and commission agents, wholesalers and retailers. There are seven marketing channels patronised by the apple growers. Though, channel V and VI had not been identified in the present study, both of these are existing in the study area.

The apple growers / pre-harvest contractors sell their produce at terminal markets like Dehli, Ahmedabad and Calcutta by two methods. In first method, producers send their produce to these markets through forwarding agents at Sopore / Srinagar and commission agent at terminal markets. In another method, producers /pre-harvest contractors sell their produce in these markets directly through commission agents only. The first four channels are mostly followed by growers to sell their produce.

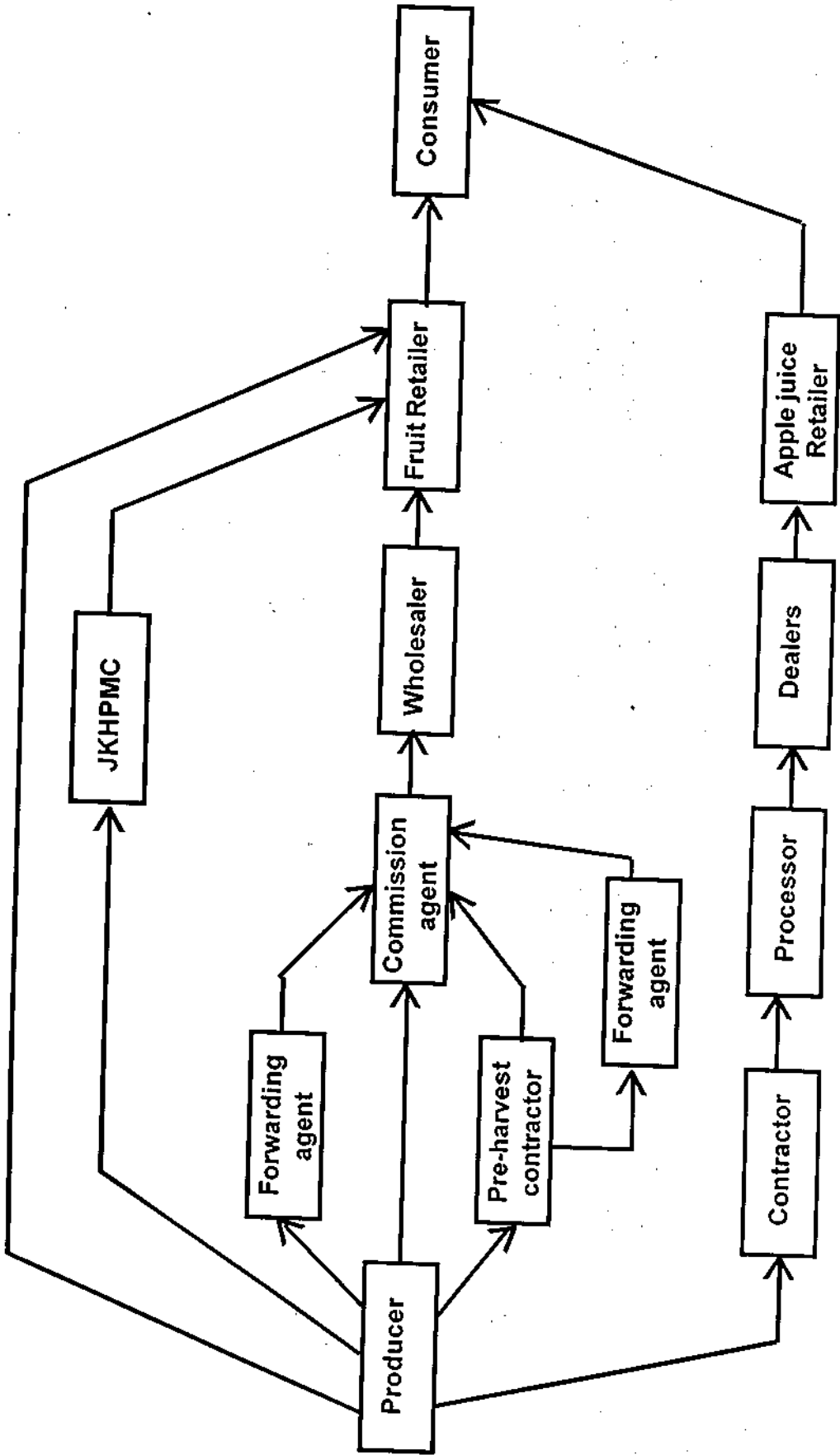
The highest percentage (51.37 per cent) of the total produce is transacted through channel - I followed by channel - II(23.25 per cent). The channel-III and IV account for 19.75 per cent and 5.63 per cent of the total produce transacted by these growers respectively. It is observed from the table that more than 70 per cent of produce is marketed by producers / pre-harvest contractors through commission agents, without involving of forwarding agent. On the other hand, channel II and IV, where producers / pre-harvest contractors depend on forwarding agents to sell their fruit at terminal markets, constitute 28.88 per cent of the total produce sold.

The channel VII exists in case of culled apples (un-marketable surplus) which finds its way to Apple Juice Processing Plant. There is about 25 per cent of loss in form of culled apples to total production due

**Table 5.15 : Different marketing channels existing in apple trade**

Channels	Number of Intermediaries
I	Producer- Commission agent - Whole saler - Retailer - Consumer
II	Producer- Forwarding agent - Commission agent - Whole saler - Retailer - Consumer
III	Producer- Pre-harvest Contractor - Commission agent - Whole saler - Retailer - Consumer
IV	Producer -Pre-harvest contractor - Forwarding agent - Commission agent - Whole saler - Retailer - Consumer
V	Producer - JKHMC - Retailer - Consumer
VI	Producer - Retailer - Consumer
VII	Producer - Contractor - Processor - Dealers - Retailers - Consumers

Fig. 5.11 Marketing Channels of Apple



to inferior grade, pre-harvest drop, under development of colour, reduced size etc. From total culled apples of sample orchardists, only 20 per cent is being utilised by the processing plant. The producer sells the culled apples to contractor which in turn supplies it to processing plant. There is no direct sale of these apples by growers to processing plant.

#### **5.4.2 Price spread :**

The produce is sold by apple growers either in local or in distant markets of the country through various channels as already discussed. The price spread could not be calculated in those channels which terminate in distant markets due to lack of time and other constraints. It is estimated only in channel I and III in which produce (Delecious, American and Bahari varieties) completes its journey from producer to consumer within the study area only. Therefore, the price spread for these three varieties is presented in table 5.16. The price spread for Mahraji variety is not calculated as it is not preferred by the local consumers.

It may be seen from the table that, the producers share in consumer rupee is found to be about 54 per cent for Delecious and American variety while this figure is only 33.63 per cent in case of Bahari varieties. The marketing cost incurred by producers constitutes 24.03 per cent and 24.60 per cent for Delecious and American varieties respectively

which is about 5 per cent less as compared to that of Bahari varieties (29.50 per cent). The highest percentage share of expenditure incurred by producers is on packaging ( about 13 per cent), followed by commission charges which account for about 7 per cent of the consumer price in case of Delecious and American varieties.

The expenses made by the wholesalers / commission agents were estimated about 1 per cent of the consumer price while the net margin received by this agency constitute 4.44 per cent, 3.99 per cent and 7.18 per cent of the consumer price for Delecious, American and Bahari varieties respectively. Marketing cost incurred by retailer constitute about 4.6 per cent in which the wastage of apple at the rate of 2.5 per cent makes 2 per cent of the consumer price. The rest of the marketing cost made by retailer is on carriage and handling, municipality fee and rent of the shop. The retailers net margin account for about 12 per cent of the consumers price in case of Delecious and American varieties while it is 23.05 per cent in case of Bahari varieties.

It is clear from table that the net margin made by retailers and wholesalers in case of Bahari varieties is about double than other two varieties. Being early varieties, these come early (July - August) in the market. Due to limited supply of these varieties without no other option with consumers, the price of these varieties goes high in the market. This is

**Table 5.16 : Price Spread, Marketing margin and producer's share for different variety of apple Srinagar**

Particular	(Rs. / box, 1 box = 20 kg)			
	Delicious	Percentage	American	Bahari Percentage
<b>A. Producer</b>				
i) Gross return	200.45	77.75	196.20	78.40
ii) Expenses incurred by grower				
- Plucking, assembling and grading	6.43	2.49	6.43	2.56
- Packing cost	31.55	12.24	31.55	12.61
- Transportation cost	4.33	1.68	4.33	1.73
- Commission of commission agent and market charges	18.14	7.04	17.75	7.10
- Loading and unloading	1.50	0.58	1.50	0.60
- Octroi and postage	0.01	0.00	0.01	0.00
- Marketing cost	61.96	24.03	61.57	24.60
ii) Net price received by grower	138.49	53.72	134.63	53.80
<b>B. Whole saler</b>				
i) Whole sale price	200.45	77.75	196.20	78.40
ii) Expenses incurred by wholesaler /commission agent	2.50	0.96	2.50	0.99
iii) Market margin by wholesaler	11.45	4.44	10.00	3.99
Gross margin	13.95	5.40	12.50	4.99
<b>C. Retailor</b>				
i) Retailers purchase price	214.40	83.16	208.70	83.39
ii) Expenses incurred by retailor	6.45	2.50	6.45	2.58
iii) Retailer's loss @ 2.5 % Marketing cost	5.36	2.08	5.21	2.08
iv) Retailer's margin	11.81	4.58	11.66	4.66
Gross margin	31.58	12.25	29.89	11.95
	43.31	16.84	41.55	16.61
<b>D. Consumers price</b>	257.79	100.00	250.25	100.00
				184.37
				100.00

the main reason for high share of retailers and wholesalers in consumer price of Bahari varieties.

The total marketing cost incurred by all agencies constitute about 30 per cent for Delecious and American varieties while it is 36.14 per cent in case of Bahari varieties. Similarly the total margin made by the wholesalers and retailers account about 16 per cent for Delecious and American varieties. For Bahari varieties this figure is almost double (31.58per cent) than the other two varieties. These figures of costs and returns suggest the scope for improving the system both in the favour of growers as well as consumers. This is possible by strengthening and streamlining the arrangements for enforcement/and inspections to ensure a regulated system of open auctions, trading practices and margins of intermediaries. More over, co-operative marketing and the volume of sale directly to consumers may improve the producers share in consumer rupee.

### **5.5. MARKETING EFFICIENCY :**

The marketing efficiency for different varieties of apple is calculated in table 5.17. The marketing efficiency can be examined on the basis of net producers share in consumer rupee. The shepherd's idea is also a base to measure the market efficiency. Moreover, this method eliminates the problem of measurement of value added. Higher the value of shepherd's Index, higher will be the efficiency and vice-versa. It is seen from the table that shepherd's Index of marketing efficiency for Delecious and American varieties are same i.e. 2.16 while this figure is low for Bahari varieties (1.44). The figures clearly indicate that the market is relatively efficient in case of Delecious and American varieties as compared to Bahari varieties.

### **5.6 PROCESSING OF APPLE :**

The apples which are wasted due to pre-harvest drop, under development of colour, inferior grade and other reasons are utilised for the purpose of processing. These apples cannot be marketed as they give negative returns to growers. There is only one processing plant in the study area with a capacity of 10,000 metric tones. The per quintal processing cost, cost of apple culls, recovery, gross return, net return and input-output ratios are presented in table through 5.18 to 5.20.

**Table : 5.17 : Marketing efficiency for different varieties of Apple**

Particular	Varieties	
	Delectious	American Bahari
1. Net producer share (Rs./box)	138.49	134.63 62.00
2. Total marketing cost and margins	119.30	115.62 122.37
3. Consumer price (Rs./box)	257.79	250.25 184.37
4. Shephered index of marketing efficiency	2.16	2.16 1.44
5. Modified index of marketing efficiency	1.16	1.16 0.44

### 5.6.1 Processing cost of Apple :

The component-wise per quintal processing cost is presented in table 5.18. The total processing cost is divided into variable cost and fixed cost. More than 70 per cent of the total processing cost is constituted by variable cost. The wages and salaries to staff and casual labourers is the major cost component of the variable cost on which processing plant is spending more than 50 per cent of the total variable cost. The total variable cost is computed as Rs. 1995.12 per quintal on an average. The second important cost item is fuel which account for 28.26 per cent of the total variable cost. The scope lies for reduction of cost in this component if power could be supplied to the plant continuously. At present, plant runs on diesel because of non-availability of continued power-supply. Costs can be minimised considerably on this component if electricity could be provided by the government.

The costs on chemicals and lubricants and repairs and maintenance account for 7.02 per cent and 7.63 per cent of the total variable cost, respectively. The other cost components are pomace lifting and overhead expenditures which combinedly account about 6.00 per cent of the variable cost on an average.

**Table 5.18 : Per Quintal Processing Cost of Apple**

Particulars	YEAR			Average
	1997-98	1998-99	1999-2000	
<b>(A) Raw Material (Apple culls)</b>				
1. Quantity	84229.69	47886.97	75000.00	69038.80
2. Rate (Rs./Qtl.)	76.00	76.00	78.00	76.70
<b>(B) Processing cost</b>				
<i>(a) Variable cost</i>				
1. Fuel	512.46(34.10)	624.73(23.84)	589.47(26.75)	563.89(28.26)
2. Chemicals & Lubricants	85.04( 5.66)	191.05( 7.29)	178.94( 8.12)	140.14( 7.02)
3. Repairs & maintenance	100.58( 6.70)	194.78( 7.43)	191.57( 8.70)	152.00( 7.63)
4. Pomace lifting	35.92( 2.39)	30.78( 1.17)	52.63( 2.39)	39.82( 2.00)
5. Wages to casual labour	61.73( 4.11)	60.78( 2.32)	105.26( 4.77)	74.95( 3.75)
6. Wages to security staff	22.28( 1.48)	37.63( 1.45)	36.84( 1.67)	30.45( 1.53)
7. Salaries to permanent staff	672.14(44.73)	1302.63(49.71)	947.36(43.00)	913.07(45.76)
8. Overhead expenditures	12.47( 0.83)	177.89( 6.79)	101.26( 4.60)	80.80( 4.05)
<b>Variable cost</b>	<b>1502.62(100.00)</b>	<b>2620.27(100.00)</b>	<b>2203.33(100.00)</b>	<b>1995.12(100)</b>
<i>(b) Fixed cost</i>				
1. Tax, insurance & licensing fee	127.75(20.46)	285.65(27.66)	194.25(21.41)	187.28(23.06)
2. Interest on working capital	398.78(63.88)	569.07(55.11)	572.54(63.12)	494.60(60.92)
3. Depreciation on plant	97.75(15.66)	177.89(17.23)	140.35(15.47)	130.13(16.02)
<b>Fixed cost</b>	<b>624.28(100)</b>	<b>1032.61(100.00)</b>	<b>907.14(100.00)</b>	<b>812.01(100)</b>
Total processing cost (a+b) (Rs. / Qtl.)	2126.90	3652.88	3110.47	2807.13
Total cost (A+B) (Rs. / Qtl.)	2202.90	3728.88	3188.47	2883.83

The fixed costs (Rs. 812.01 per quintal) include the expenditure incurred on taxes in form of toll tax, sales tax, licensing fee, insurance premium, interest on working capital and depreciation on the plant. This cost constitutes about 29.00 per cent of the total processing cost. The major cost component of the fixed cost is interest on working capital which constitutes 60.92 per cent of the fixed cost. The costs on tax, insurance and licensing combinedly constitute 23.06 per cent while depreciation on plant account for about 16.00 per cent of the fixed cost.

The per quintal processing cost of Concentrated Apple Juice (CAJ) is Rs. 2807.13 as an average for three years. It is observed from the table that per quintal processing cost is highest (Rs. 3652.88) for the year of 1998-99 due to the diseconomies of scale as the quantity processed was less for the said year.

#### **5.6.2 : Economics of Apple Processing :**

Economics of apple processing is presented in table 5.19. The capacity utilised by the plant is highest (84.22 per cent) in the year 1997-98, while it is lowest (47.88 per cent) in year 1998-99. The average capacity utilisation of plant is 69.03 per cent. On an average, the recovery is observed 7.42 kgs of concentrated Apple Juice (CAJ) from one quintal of raw apple culls. It is observed from the table that the recovery percentage is decreasing continuously over the period of three

**Table 5.19 : Economics of Apple Processing**

Particulars	1997-98	1998-99	1999-2000	Average
(A) Capacity utilised( per cent)	84.22	47.88	75.00	69.03
(B) Apple Juice Recovery(kg/Qtl.)	8.10	7.93	6.33	7.42
(C) Price of Juice(Rs/Qtl.)	4900.00	5100.00	5300.00	5073.06
(D) Total cost				
Processing cost(Rs./Qtl.)	2126.90	3652.88	3110.47	2807.13
Total cost (Raw material+ Processing cost)	2202.90	3728.88	3188.47	2883.83
(E) Net Return (Rs./Qtl.)	2697.10	1371.12	2111.53	2189.23
(F) Input-Output Ratio	1:2.22	1:1.36	1:1.66	1:1.76

years. During first two years the recovery is almost same (about 8 per cent) while during third year it has drastically reduced to a level of 6.33 per cent. The less water content in the fruit due to drought during this year is the main reason for low recovery percentage.

The per quintal price of final product (CAJ) is Rs. 5073.06, with a net return of Rs. 2189.23 per quintal on an average. The input-output ratios are computed as 1:2.22, 1:1.36 and 1:1.66 for the years 1997-98, 1998-99 and 1999-2000, respectively with an over all average of 1:1.76. The highest net return of Rs. 2697.10 per quintal is in the year of 1997-98, while it is lowest (Rs. 1371.12 per quintal) in year 1998-99. It clearly indicates that the processing unit had not fully exploited the economies of scale of the plant during last two years.

If the plant runs at full capacity and power supply is made available, the per quintal cost of production of CAJ will be reduced. This will not only increase the net return of the processing plant but the consumer will also get benefit in terms of low price of the product.

### **5.6.3 : Potential of Apple Processing Industry :**

The potential of apple processing industry is estimated on the basis of secondary data of area and production of apple in various districts as well as some estimate based on primary information collected

from the apple growers. Based on primary information, about 36 per cent of the total produce is going waste in terms of culled apples. If this figure is multiplied with the total production of fresh fruit in Kashmir province it will yield about 0.28 million M.T. of apple culls. With the help of quantity of total waste apple and area under apple cultivation, the per hectare apple culls production is estimated as 3.74 M.T. This figure varies from 1.17 M.T. per hectare in Pulwama district to 6.41 M.T. per hectare in Barramulla district mainly based on productivity of the crop. Accordingly the per hectare income of apple producers is varying from Rs. 912.60 in Pulwama to about Rs. 5,000.00 in Barramulla district with an average of Rs. 2,917.20 from these waste apples.

The recovery per cent is estimated about 8 per cent in the present study which will produce 22,377.60 M.T. of Concentrated Apple Juice (CAJ) if the whole quantity of waste apple could be utilised by the processing plants. Taking Rs. 53,000 per M.T. as price of CAJ, the total quantity of CAJ will give a revenue of about Rs. 118.60 crores to the state. In addition to this, apple industry will make a good platform to generate the considerable employment in the state.

At least 4 processing plants of 50,000 M.T. processing capacity per annum can be established in the Kashmir province where the raw material is more than sufficient to run them at full capacity. These

**Table 5.20 : Processing Potential of Apple Industry in Kashmir Province of J & K state**

DISTRICT	Total fresh # apple prod. (M.T.) (1998-99)	Total waste apple prod. (M.T.)	Area under # apple (ha)	Per ha wastage of apple culls. (M.T.)	Per ha income from apple culls (Rs.)*	Production of CAJ (M.T.) (8% recovery)	Revenue / Income (crores) @Rs.53,000/ M.T.
1. Srinagar	39,000	14,040	4,141	3.39	2644.20	1123.2	5.95
2. Budgam	47,000	16,920	7,709	2.19	1708.20	1353.6	7.17
3. Pulwama	41,000	14,760	12,600	1.17	912.60	1180.8	6.26
4. Anantnag	1,30,000	46,800	12,240	3.82	2979.60	3744.0	19.84
5. Baramulla	4,40,000	1,58,400	24,700	6.41	4999.80	12672.0	67.16
6. Kupwara	80,000	28,800	13,310	2.16	1684.80	2304.0	12.21
Kashmir	7,77,000	2,79,720	74,700	3.74	2917.20	22,377.6	118.60

# Area and Production, Source (Directorate of Horticulture, Srinagar, J & K)

\* @ Rs 780 / M.T. based on 1999-2000

facts clearly indicate that the state government as well as other entrepreneurs should come forward in this direction to exploit the potential of this industry.

## **5.7 CONSTRAINTS IN APPLE PRODUCTION, MARKETING AND FINANCING :**

The Problems faced by the apple growers in production, marketing and financing are described under this sub-section.

### **5.7.1 Constraints in Production :**

The constraints in apple production are presented in table 5.20. The table reveals that majority of the farmers (95 per cent) faced the problem of irrigation water due to drought which directly reduced the apple production as well as quality of produce. The lack of extension services was responded positively by 90 per cent of the farmers. There is technological gap because of this reason as the extension wing of Department of Horticulture is not making proper and sincere efforts to disseminate the technical know-how from research stations to the farmers. There is also non-availability of improved cultivars as 63 per cent of the farmers responded to this problem positively.

The lack of resources is generally faced by small category farmers, with the result, these farmers are not able to invest for better production technology. Here is need for creation of co-operative

societies which can cater the needs of the farmers. The shortage of labour is another problem as 57 per cent of farmers perceived it. This problem becomes more acute at the harvesting stage of apple when it clashes with the paddy harvesting. Consequently the farmers have to pay higher wages in order to complete the work in time.

At present scenario, the farmers facing with problem of diseases and pests like apple scab, sanjose scale, red mite etc. which are menace to apple industry. As per the study conducted, the common opinion among the farmers is that the fungicides and insecticides available in the market are not effective and liable to rectify the problem. So, it is common conception that the pesticides prevailing in the market are not genuine. The monitoring authority are also responsible for this grim situation faced by apple growers.

It is observed that about 65 per cent of the farmers are in lack of adequate farm machinery and equipments like power tiller, power sprayer, pumps, scissors etc. Most of the farmers in the study area are marginal and small orchardists which are not financially sound. It is suggested by the farmers that the government should make available these equipments on subsidised rates. The financial institutions should also provide loans to growers at low rate of interest in order to purchase these equipments.

**Table 5.21 : Constraints in Apple Production**

Problems faced	No. of respondents	
	Yes	No
1. Lack of latest technical know-how	32 (56)	25 (44)
2. Lack of improved and high yielding varieties	36 (63)	13 (23)
3. Lack of resources	31 (54)	26 (46)
4. Lack of irrigation water	54 (95)	3 (05)
5. Shortage of labour	21 (57)	36 (63)
6. Lack of extension services	51 (90)	6(10)
7. Prevailing of take fungicides and pesticides	47 (82)	10 (18)
8. Lack of equipment and machinery	37 (65)	20 (35)
9. Lack of servicing facilities for equipment and machinery	22 (39)	35 (61)

**Note** : Figures in parentheses represent the percentage to total number of respondents

### **5.7.2 Constraints in Marketing :**

The constraints in marketing of apple is present in table 5.21. Lack of regulated market and co-operative marketing societies was responded positively by 96 per cent of the farmers. Due to non-regulatory system of marketing, growers are at the mercy of middle men. Various malpractices such as deduction of more charges, payment by instalment, quoting of lower prices than actual, deduction of undue charges etc. are generally followed by these middle men. Moreover, the farmers consent is not being taken before selling the produce.

The market infrastructure for the fruit crop is poor in terms of cold storage, transportation facility and undependable roads. It is imperative to mention here that the failure of state government in creating the cold storage facility have added to the crisis. Due to uncertainty of Srinagar-Jammu road, the farmers rush their crop to terminal markets, thinking the closure of road. This increase the supplies against a meagre demand which results finally in less prices. Moreover, the farmers are also exploited by the transporters due to non-availability of sufficient trucks at the time of peak season.

The high state tax for export of apple is further adding to the expenses of grower as 77 per cent of growers responded to this query

**Table 5.22 : Constraints in Apple marketing**

Problems faced	No. of respondents	
	Yes	No
1. Lack of market facilities	27 (47)	30 (53)
2. Lack of transportation and road infrastructure	31 (54)	26 (46)
3. Lack of regulated market and co-operative marketing societies	55 (96)	2 (04)
4. Lack of awareness about market news and intelligence	7(12)	50 (88)
5. Lack of storage facilities in growing area	45 (79)	12 (21)
6. Malpractice in selling method	52 (91)	3 (05)
7. High State tax for export of apple	44 (77)	1 (02)

**Note** : Figures in parentheses represent the percentage to total number of respondents

positively. The state tax was recently increased to Rs. 6.80 per box during current financial year 1999-2000 which was Rs. 4.80 per box earlier.

### **5.7.3 Constraints in Financing :**

Most of the apple growers in the state are marginal and small orchardists. The rising cost of inputs for maintenance of orchards have made the cultivation of the crop away from their reach. They have no capacity to invest in better production technology. Their access to financial institutions has been beset with innumerable problems.

More than 70 per cent of the farmers have not responded to problems related with financial aspect as the loan facility provided by banks and other government agencies are not found popular among the farming community. High financial cost and untimely availability of loan due to lengthy procedure are playing important role for this situation. Moreover, there is lack of finance at reasonable rate of interest as well as inadequate credit as a scale of finance. The scale of finance in Kashmir valley has not been revised for the last 7 to 8 years due to non-existence of Technical Committees. About 23 per cent of the sample growers have responded these problems positively.

**Table 5.23 : Constraints in Apple Financing**

Problems faced	Yes	<u>No. of respondents</u>	
		No	No response
1. Timely and sufficient availability of credit	5(09)	11 (19)	41 (72)
2. Lack of finance at reasonable rate of interest	13 (23)	3(05)	41 (72)
3. Inadequate credit as scale of finance	13(23)	3(05)	41 (72)
4. Problem faced by the farmer in dealing with banks	4 (07)	9 (16)	44 (77)

**Note :** Figures in parentheses represent the percentage to total number of respondents

**CHAPTER VI**  
**SUMMARY, CONCLUSIONS AND**  
**SUGGESTIONS**

**SUMMARY, CONCLUSION AND SUGGESTIONS**

**6.1 Summary :**

Horticulture development has been accorded high priority during 8th and 9th Five Year Plans with an impact of vastly improved production. The improvement in production is quite important but marketing has also an equal importance to develop a commercial crop, which is purely produced to sell in the market. Apple being the major fruit crop in India, is grown in various states among which Jammu and Kashmir is leading. Fruit industry plays a vital role in the economic scenario of J&K state. The state grows a number of fruits among which apple contributes about 90 per cent. Involving about half a million house holds, apple plays a key role in the rural economy of the state with an average yearly turn over of Rs. 750 crores. Though, there have been multidimensional efforts to increase the production of this crop in the state but marketing and processing sectors have not received proper attention. Only increase in production is not desirable without making proper arrangements for its marketing and processing.

Looking to the above facts, the present study is conducted with following objectives :

- I) To estimate the performance of area, production and productivity of apple in J & K state,
- II) To examine the marketing system prevailing in the apple trade,
- III) To estimate the marketing cost, margins and price spread in the apple marketing,
- IV) To evaluate the processing cost, economics of apple processing and potentials of apple processing,
- V) To examine the different constraints in financing, production and marketing faced by the apple producers and
- VI) To suggest some policy interventions to improve the production, marketing and financing of apple.

About 30 per cent area and 60 per cent production of the total area and production of apple crop in Jammu and Kashmir is in Barramulla district. Two apple processing plants are running in the state of which one plant comes under this district. Hence, Barramulla district is selected for the study. From Barramulla district, two tehsils out of total 8 are taken for study purpose, one having

highest production i.e, Sopore and other having relatively less production i.e, Bandipore. Eight villages (4 from each tehsil) are chosen for the study purpose. A 10 per cent sample of apple growers, who cultivate and market their produce, from these selected villages is considered for the purpose of study. Accordingly, 57 apple growers are selected for the present study. These farmers are classified into small (less than 2.50 ha), medium (2.51 to 5.00 ha) and large (above 5.00 ha) categories, based on area allocated by them under the apple crop. A proportionate sampling is done for studying the different market intermediaries and thereby 17 wholesalers and 25 retailers are selected for the study purpose. One processing unit is also considered while as other private unit refused to give the required information. All the information required is collected from these farmers, intermediaries and processing unit.

Simple analysis is done by taking averages and percentages to find out. the land use pattern, cropping pattern, category-wise, market-wise and variety-wise sale of apple by different categories, marketing cost incurred by farmers in different markets, economics of apple marketing, marketing channels prevailing in this trade and price spread. Similarly, processing cost (variable and fixed cost) returns, recovery, capacity utilisation and

input-output put ratio are also worked out by simple analysis. The shepherd's formula is used to compute the marketing efficiency.

The study revealed that the Barramulla district is contributing about 60 per cent production and 30 per cent area of the total production and area of state. The area and production of apple in the state reached a level of 82,091.31 hectares and 8,23,919.32 metric tones, after achieving a net gain of 15.64 per cent and 18.46 per cent in area and production respectively during 1991-1992 to 1998-1999. It is observed that Barramulla district shows least variability in area (1.98 per cent), production (7.81 per cent) and productivity (8.16 per cent), while it is highest in area (18.72 per cent) and productivity (32.96 per cent) in case of Badgam district. Production shows highest variability (28.10 per cent) in case of Anantnag district

The compound growth rate of production (4.45 per cent) in the state is the consequent of significant growth rate of area (2.35 per cent) and productivity (2.05 per cent) as well. The maximum growth rate of area (10.25 per cent) is seen in Budgam district, followed by Pulwama (4.85 per cent). On contrary, the compound growth rates of production and productivity is found to be either negative or non-significantly positive in these two districts.

The Anantnag district shows highest growth rate in production (12.43 per cent), followed by Srinagar (8.54 per cent), which is mainly due to higher growth rate in productivity in these two districts

The average size of land holding is observed to be 1.77 ha, 3.24 ha and 8.95 ha at small, medium and large farms respectively. Area under apple shows a positive relationship with the total cultivated area which varied from 54.91 per cent at small farmers to 86.28 per cent at large farmers. Apple is the main crop of the farmers as about 50 per cent, 78 per cent and 82 per cent of total cropped area is allocated under this crop by small, medium and large farms respectively. Paddy is the major cereal crop taken by these farmers. The total cropped area is observed to be 2.13 hectares, 4.44 hectares and 11.70 hectares at small, medium and large farms having the cropping intensity as 110.36 per cent 104.47 per cent and 104.09 per cent on these farms respectively.

The large farmers contributed about 64 per cent of the total produce marketed, while these figures are about 24 per cent and 12 per cent in case of medium and small farmers respectively. The markets selected by sample farmers are Sopore, Jammu, Delhi, Calcutta and Ahmedabad. The major share of produce sold by sample farmers is in Azadpur fruit market Delhi (54.41 per cent),

followed by Sopore (26.11 per cent). Jammu and Calcutta markets constitute almost equal share of sale (about 6.5 per cent) while this figure is least for Ahmedabad (3.09 per cent) market to total sale. The small farmers sold their major portion (60.87 per cent ) of produce in Sopore market while medium and large farmer sold 59.11 per cent and 62.56 per cent of their total produce in Delhi market respectively. The percentage share of large farmers in each market is highest except for Jammu where the share of medium farmers exceeds than large farmers.

The main variety grown by sample farmers in all three categories is Delecious which constitute about 66 per cent of total produce. The Amercian, Mahraji and Bahari varieties account for 14.60 per cent, 7.49 per cent and 11.93 per cent respectively of the total produce sold by sample growers. More than 50 per cent of Delecious, American and Bahari varieties are sold in Delhi market while about 68 per cent of Mahraji variety is sold in Sopore market. The percentage share of all the varieties is found to be less than 10 per cent in case of Calcutta and Ahmedabad except 19.30 per cent share of American variety in Calcuttal market. Jammu market also account for less than 10 per cent of sale of all varieties except Mahraji.

The marketing cost across the categories and within the markets is almost same. Highest marketing cost of Rs. 134.16 per box is estimated in case of Calcutta market followed by Ahmedabad (Rs 114.72 per box) while it is minimum for Sopore (Rs. 60.51 per box). The main components responsible for the variation of marketing cost across the markets are transportation cost and commission charges. The combined expenditure on these two items varied from 32.92 per cent in Sopore market to 64.00 per cent in Calcutta market. The on farm costs, which include cost on harvesting, packaging and head load to road are same for all the markets. The marketing cost at different categories is almost equal within the market. The small variation in marketing cost at these categories is due to commission charges levied on varying prices of product.

Less price received by large farmers in Sopore (Rs. 165.48 per box), than the small (Rs. 183.26 per box) and medium (Rs, 185.41 per box) farmers is due to high percentage sale of low returning variety (Mahraji) by large farmers in this market. In Jammu and Dehli markets, the price of large category farmers are highest with Rs.202.26 per box and Rs. 218.00 per box respectively. On Contrary, the prices in Calcutta and Ahmedabad markets are highest for medium (Rs. 301.86 per box) and small (Rs.308.21 per

box) category farmers respectively. The overall average net share is highest for Ahmedabad market (Rs. 183.07 per box), followed by Calcutta (Rs. 154.98 per box), where as it is least in Azadpur fruit market Delhi (Rs. 112.98 per box).

The average prices for all the varieties is highest in Ahmedabad market followed by Calcutta while it is lowest in Sopore market. The variation in average prices across the markets is maximum for American (Rs. 163.80 per box), while it is least for Mahraji variety (Rs. 72.28 per box). The large category farmers have got highest price of Delecious and American variety in most of the markets with some exceptions . The net shares in Delhi for Delecious, Mahraji and Bahari varieties are less than the net share in Jammu and Sopore markets. The prices of these varieties are not much higher in Delhi market as compared to prices prevailed in Jammu and Sopore market while the marketing cost is proportionately higher in this market. Probably this may be the reason behind this phenomenon.

There are seven marketing channels patronised by the apple growers. Though channel V and VI had not been identified but both of these are existing in study area. These are :

Channel - I Producer- Commission agent - Whole saler - Retailer - Consumer

Channel - II Producer- Forwarding agent - Commission agent - Whole saler - Retailer - Consumer

Channel - III Producer- Pre-harvest Contractor - Commission agent - Whole saler - Retailer - Consumer

Channel - IV Producer -Pre-harvest contractor - Forwarding agent - Commission agent - Whole saler - Retailer - Consumer

Channel - V Producer - JKHMC - Retailer - Consumer

Channel - VI Producer - Retailer - Concumer

Channel - VII Producer - Contractor - Processor - Dealers - Retailers - Consumers

The highest percentage (51.37 per cent) of total produce is transacted through Channel-I followed by Channel-II (23.25 per cent) while channel-III and IV account for 19.75 per cent and 5.63 per cent of total produce transacted by these growers respectively. The channel VII exists in case of culled apples. Only 20 per cent of the total un-marketable surplus (culled apples) of sample orchardists is transacted through this channel.

The price spread is estimated only for Channel-I and III which terminates within the study area. The Maharaji variety is not considered to estimate the price-spread as it is not preferred by

consumers in local market. The producers share in consumers rupee is found to be about 54.00 per cent for Delecious and American variety while this figure is only 33.63 per cent in case of Bahari varieties. The highest expenditure incurred by producer is on packaging (about 13.00 per cent) followed by commission charges (about 7 per cent) of the consumer price. The marketing cost incurred by all agencies constitute about 30 per cent for Delecious and American varieties while it is 36.14 per cent in case of Bahari varieties. The total margin made by wholesalers and retailers of Bahari varieties is 31.58 per cent.

The apples which are wasted due to pre-harvest drop, under development of colour, inferior grade and other reasons are utilised for the purpose of processing. The per quintal processing cost for the production of Concentrated Apple Juice (CAJ) is Rs.2,807.13 of which more than 70 per cent is constituted by variable cost. The wages and salaries to staff and casual labour is the major cost component of variable cost on which plant is spending more than 50 per cent. The fixed cost account for about 29 per cent of the total processing cost among which the interest on working capital account for 60.92 per cent of the total fixed cost.

The average capacity utilisation of plant is 69.03 per cent. On an average the recovery is observed 7.42 kgs of CAJ from

one quintal of raw apple culls. The per quintal price of final product (CAJ) is Rs. 5,073.06, with a net return of Rs. 2189.23 on an average. The input-output ratios are computed as 1:2.22, 1:1.36 and 1:1.66 for the years 1997-98, 1998-99 and 1999-2000 respectively with an overall average of 1:1.76. The ratios clearly indicate that the plant had not fully exploited the economies of scale during last two years.

Against a huge un-marketable surplus of about 0.28 million m.t. of apple culls, the state has at present 60,000 m.t. processing capacity of apples. There is a need for at least four more processing plants of 50,000 m.t. capacity to utilise the remaining culled apples. The Concentrate Apple Juice (CAJ) obtained from these waste apples will give a revenue of about Rs. 118.60 crores to state. It will also increase the per hectare income of apple orchards by Rs. 2,917.20 on an average from these waste apples at present rates. It will not only be beneficial to growers and processors but will also help to create employment in the state.

Lack of irrigation water due to drought, lack of extension services, prevailing of fake fungicides and pesticides, lack of improved cultivars are the main problems in apple production. The marketing constraints include lack of regulated and co-operative marketing societies, lack of market infrastructure in terms of cold storages, transportation facilities, undependable roads,

malpractices adopted by middle men and high state tax for export of apple. Most of the farmers have not responded to the problems related with financial aspect, as the loan facility provided by banks and other government agencies are not found popular among the farming community due to high financial cost and untimely availability of loan because of lengthy procedure. More over, there is lack of finance at reasonable rate of interest as well as inadequate credit as a scale of finance.

**Policy Suggestions :**

1. Efforts should be made to bring the uncultivable land under cultivation in Anantnag and Srinagar districts where the compound growth rate in productivity of the crop is significantly higher.
2. Extension services need to be streamlined in order to disseminate the technical know how about the crop.
3. The government should take measures to control the spurious fungicides / pesticides prevailing in the market.
4. Establishment of local mandies at tehsil level in order to make the direct sale by apple growers with minimum expenditure.

5. The market infrastructure in terms of cold storage should be created in the state in order to overcome the glut in the markets.
6. In order to provide better marketing facilities and also to eliminate the role of middlemen, the state govt. should revive the fruit growers co-operative marketing societies and activate the department as well as JKHPMC.
7. Need for strengthening and streamlining the arrangements for enforcement and inspection to ensure a regulated system of open auctions, trading practices and margins of intermediaries.
8. The level of market intelligence should be increased with adequate current information on demand, supply and highest & lowest prices of the various varieties in different terminal markets.
9. The government should focus on processing sector on priority basis. Both govt. and private companies should come forward to invest in this sector in order to utilise the apple culls.
10. The total processing cost for the production of Concentrated Apple Juice can be suitably reduced, if the power supply is made available to processing unit and also if the existing processing capacity could be fully utilised.

11. The govt. should announce the support prices in case of culled apples as given by Himachal Pradesh.
12. There is need for the provision of crop insurance in case of natural calamities like drought, hail storm etc.
13. Looking to the rising costs of inputs, there is a need for the revision of scale of finance, as it had not been revised from last 7 to 8 years due to non-existence of Technical Committees appointed by NABARD..
14. Costs like packaging and transportation should be taken into consideration by Technical Committee while fixing the scale of finance for apple. :
15. The procedure of financing should be made easy and convenient for the farmers in order to make it popular among the apple growers.

***ABSTRACT***

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# **ECONOMICS OF MARKETING AND PROCESSING OF APPLE IN BARRAMULLA DISTRICT OF J & K STATE**

**By**

**F. A, Shaheen**

## **ABSTRACT**

The present study is undertaken in the Barramulla district of J & K state to examine the performance of area, production and productivity of apple, marketing system prevailing in the apple trade, marketing cost, margins and price spread, economics and potential of apple processing along with the different constraints in production, marketing and financing faced by the apple producers. The study is based on 57 apple growers selected from 8 villages of two tehsils viz., Sopore and Bandipore of the district. All these farmers are classified into small (less than 2.50 ha), medium (2.51 to 5.00 ha) and large (more than 5.00 ha) categories based on area under apple crop. Seventeen wholesalers and 25 retailers along with one processing unit are also taken into consideration for this study. The study is related to crop year 1999-2000.

The study revealed that the state experienced about 15 per cent and 18 per cent increase in area and production respectively during the period of 8 years. The compound growth rate of area, production and productivity is observed to be 2.35 per cent, 4.45 per cent and 2.05 per cent respectively in the state. The average cultivated area is estimated as 1.77 ha, 3.24 ha and 8.95 ha at small, medium and large farms respectively of which more than 50 per cent area is allocated under apple crop. Maximum produce (57.41 per cent) sold by sample growers is in Azadpur fruit market Delhi as

compared to all other markets (Sopore, Jammu, Ahmedabad and Calcutta) selected by apple producers. The large farmers contributed about 64 per cent of the total produce sold in different markets. It is observed that about 66 per cent and 40 per cent of total produce is sold by small and medium farmers respectively within the state while this figure is 25.87 per cent in case of large farmers.

Delectious variety constitutes about 66 per cent of total produce followed by American (14.60 per cent), Bahari (11.93 per cent) and Mahraji (7.49 per cent). The marketing cost across the categories and within the markets is almost same. The highest marketing cost of Rs. 134.16 per box (20kg) is estimated in case of Calcutta, followed by Ahmedabad (Rs. 114.72 per box) market while it is least for Sopore market (Rs.60.51 per box). The main components responsible for the variation of marketing cost across the markets are transportation cost and commission charges. The over all average per box net share is maximum in Ahmedabad market (Rs. 183.07), followed by Calcutta (Rs.112.98), Jammu (Rs.125.55), Sopore (Rs.112.79) and Azadpur fruit market Delhi (Rs. 112.98). Seven marketing channels are prevailing in apple trade. The variety-wise price spread is calculated for only the channel which gets completed within study area. The producers share in consumer rupee is found to be about 54 per cent for Delectious and American varieties while this figure is only 33.63 per cent in case of Bahari varieties. The net margin made by wholesalers and retailers in case of Bahari varieties is almost double (30.23 per cent) than other two varieties. The Shepherd's Index for marketing efficiency is estimated as 2.16 for Delectious and American varieties while it is 1.44 in case of Bahari varieties.

The per quintal processing cost of Concentrated Apple Juice (CAJ) is Rs. 2,807.13 with a net return of Rs. 2,189.23 as an

average. The processing unit utilised about 70 per cent capacity on an average which varied from 48 per cent to 84 per cent during last three years. Against a huge un-marketable surplus of about 0.28 million M.T. of apple, the state has at present 60,000 M.T. processing capacity. These figures suggest that apple has good processing potential in the state. Four more processing plants of 50,000 M.T. capacity will be required to utilise the remaining waste apples in the state. This will not increase the per hectare income of apple orchards by Rs. 2,917.20 but also give about Rs. 118.60 crores revenue to the state. It will also create good opportunities to generate the employment in the State

The problems are complex and ranged from agronomic aspects to pest and disease management, post harvest handling, marketing and financing. For promotion of the crop, there is a need for creation and strengthening of such agency which would address these problems and also train the man-power for handling these constraints coming in the way of gigantic job and full potential exploitation of this core sector of the economy of state.

**College of Agriculture  
I.G.A.U, Raipur**



**( Dr. S.P. Gupta )  
Chairman,  
Advisory committee**

## ***BIBLIOGRAPHY***

## BIBLIOGRAPHY

- Akimoto, K. and Maezawa, S. (1996). Promotional plan for fruit growers in a disadvantaged district - a case study in Kuguno town, Gifu, Japan. *Research Bulletin of the Faculty of Agriculture, Gifu University*, No. 61 : 69-74; 7 ref.
- Appeltans, D.(1994). Effective marketing of our fruit. *Fruit-Belge*, 62(451): 149-152.
- Asif,M. and Hashmi, A.H. (1998). Economics and constraints of apple production and marketing in Swat. *Journal of Rural Development and Administration*, 30(1): 127-137; 14 ref.
- Atteri, B.R. and Ray, A.K. (1998). Impact of Himachal Pradesh Horticultural Produce Marketing Corporation on the wholesale price behaviour of apple - a spectral approach. *Agricultural Situation in India*, 47(7), 581-586; 2 tab.; 10 ref.
- Bose, T.K.; Som, M.G. and Yadav, *Temperature Fruits*. Allied Publishers.
- Carvalho, J.M.; Mendonca, M.C.A.; Chitarra, A.B.; Reis, A.J.Dos and Dos, Reis A.,J.(1997). The economical importance of commercialization and post-harvest operations for the productive chain of Brazilian apple. *Ciencia e Agrotecnologia*. 21 (4): 403-412; 22 ref.

- Ceroni, F.R. and Rinaldi Ceroni, F.(1996). Establishment and production costs in Emilia-Romagna: difficult balance for fruit growers. *Rivista di Frutticoltura e di Ortofloricoltura*, 58(5): 25-28.
- Cheng Hsiang Tai, Criner, G.K., Kezis, A.S. and Cheng, H.T.(1996). The impact of consumer characteristics on preferences for selected apple varieties. *Journal of Food Products Marketing*. 3(4): 1-11; 8 ref.
- Data Base Horticulture (1998). Ministry of Agriculture, Department of Agriculture and Co-operation, Krishi Bhavan, New Delhi, 110001.
- Digest of statistics, (1997-98). Directorate of Economic and Statistics Planning and Development Department, Jammu and Kashmir.
- District Census Handbook (1981). Barramulla district, census of India.
- Gijsberts, L.(1998). Structural problems in apple sales. *Fruitteelt Den Haag*. 88(1): 9-11.
- Grimster,S. (1997).Tropical fruits market summary. *Technical Bulletin Northern Territory*, Department of Primary Industry and Fisheries. 252, pp. 22.
- Kainth, G.S. (1998). Consumption of apples: consumer view, pattern and determinants. *Bihar Journal of Agricultural Marketing*. 2(2) : 131-144; ref.

- Kiss, L. and Kahaber, A.(1992). Is apple storage profitable? *Kertgazdasag*.24(3): 15-21.
- Leyrer, H.J. (1993). Future fruit marketing. *Erwerbsobstbau*, 35(4): 109-110.
- Love, J.M. (1992). Forecasting fresh apple prices for selected months in the marketing season. *Fruit and Tree Nuts Situation and Outlook Report*, No.TFS-262, 34-36; OQEH; 1 ref.
- Mai Chand and Chand, M.C. (1997). Constraint analysis of tribal farmers of Himachal Pradesh in adoption of improved apple cultivation. *Research and Development Reporter*, 14(1-2) : 83-87; 2 ref.
- Martinez Damian, M.A.A. (1997). An example of spectral analysis applied to apple prices. *Agrociencia.* , 31(4): 479-483; 7 ref.
- Marothia, D.K.; Gupta, S.P; Choudhary, V.K. and Gauraha, A.K. (1993). Economic Analysis of Mustard Processing Units : A case study. *The Bihar Journal of Agricultural Marketing*, 1(4):383-389.
- Mouron,P. and Carint, D. (1997). Consumer prices for apples, oranges and bananas between 1990 and 1997 in Wadenswil square. *Obstund Weinbau*.133(26): 663-664.
- Nagi, V.S., Prasher, R.S. and Tiwari, S.C. (1997). Marketing of Himachal Apples : A spatio-temporal analysis, *Agriculture Economic Research Review*, 10(1):88-94.

- Rourke, A.D. (1994). The world apple market., xvi+237 pp.; 10 pp. ref.
- Prashant, D.S. (1999). "An economic analysis of marketing and processing cashewnut in North Goa district of Goa state", Thesis submitted to Department of Agricultural and Natural Resource Economics, College of Agriculture, Indira Gandhi Agricultural University, Raipur, M.P.
- Prasher, R.S. and Negi, Y.S. and Tewari, S.C. (1996). Economics of apple cultivation: a case study of tribal belt on North-western Himalayan Region. *Bihar Journal of Agricultural Marketing*,4(1): 35-43; ref.
- Qadri, J.A. (1976). Some aspects of marketing of apple in Jammu and Kashmir, *Indian Journal of Horticulture*. 33(1): 44-45.
- Report on Horticulture development in J & K with reference to Kashmir valley, Paper presented to Rajya Sabha, June 1997.
- Robinson, T.L.; Hoying S.A.; Smith, W,H, and Bramlage, W.J.(1997). Training strategies for high density orchards of the future. *New England Fruit Meetings*. 103:27-36; 3 ref.
- Rosa, S.; Kirby, Strzeleck, K. and Strzelecki, K.K.(1997). World fresh apple situation and US export prospects. *World Horticultural Trade and US Export Opportunities*. 3: 11-15.
- Rosa, S.(1998). Outlook for concentrated apple juice production and trade in selected countries. *World Horticultural Trade and US Export Opportunities*. 4:26-32.

- Saraswat, S.P. (1994). Marketing of Himachal apple in Delhi. *Bihar Journal of Agricultural Marketing*.2(4) 395-404.
- Saraswat, S.P. and Vaidya,C.S. (1995). Apple trade in India with special reference to western Himalaya region, *Bihar Journal of Agricultural Marketing*,3(2) : 191-200.
- Saraswat, S.P. (1995). Marketing of Himachal apple at Delhi. *Agricultural-Marketing*. 38(1): 24-28.
- Schotzko, R,T, (1998). How the market will treat the 1998 apple crop. *Good Fruit Grower*.49(10): 38-39.
- Shah, G.H. (1999). Present status and future potential of fruit processing industry in J & K state, "Fruit processing in J & K state" seminar organised by FICI New Delhi and J & K SIDCO on 5-6-1999, at Srinagar.
- Singh, D.V. and Chauhar, K.C. (1998) Role of co-operatives in organising production and Marketing of Agricultural Produce : A case of successful society in H.P., *Indian Journal of Agriculture Marketing*, 12(3): 112.
- Singh, S.R. and Sikka, B.K. (1992). Production and marketing system of apples in tribal areas of Himachal Pradesh. *Agricultural Situation in India*. 47(7): 595-597.
- Tripathi, R.S.(1997). Economics of production and marketing of apples in the Garhwal hills of Uttar Pradesh. *Annals of Agricultural Research*.18(1): 5-11; 2 ref.

- Tronstad, R., Huthoefer, L.S. and Monke, E. (1992). Market windows and hedonic price analyses: an application to the apple industry. *Journal of Agricultural and Resource Economics*, 17(2): 314-322; 22 ref.
- Vadnal, K.; Stampar.F.; Kranjc.M.(1996) Opportunities of and threats to market oriented apple production in Slovenia. *Sodobno Kmetijstvo*.29(6): 264-271; 4 ref.
- Wani, M.H.; Mattoo, M.S. and Sofi, A.A. (1995). Resource use and economic efficiency of various marketing cost components in apple. *Agricultural Marketing*. 37(4): 38-40.
- Wani, M.H.; Wani, S.A. and Mir, N.A. (1998). Economic analysis of different age orchards in apple. *Agricultural Situation in India*. 48( 9): 657-660; 6 ref.

**APPENDIX**

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**APPENDIX**  
**DEPARTMENT OF AGRICULTURAL & NATURAL RESOURCE**  
**ECONOMICS INDIRA GANDHI AGRICULTURAL UNIVERSITY ,**  
**RAIPUR (M. P.)**

**FARMERS SURVEY**

**(A) General Information:**

1. Name of head of family \_\_\_\_\_ 2. Age \_\_\_\_\_  
 3. Name of respondent \_\_\_\_\_ 4. Age \_\_\_\_\_  
 5. Education \_\_\_\_\_ 6. Caste \_\_\_\_\_  
 7. Village \_\_\_\_\_ 8. Tehsil \_\_\_\_\_  
 9. Distance from local mandi \_\_\_\_\_  
 10. Distance from pucca road \_\_\_\_\_  
 11. District \_\_\_\_\_  
 12. Date of Interview \_\_\_\_\_

**(B) Family Information:**

S.N.	Agricultural	Ser.	Bus.	Wage earners	Education
1. Adult Male (No.) (12-60 Year) Ear.					
2. Adult Female (No.) (12-60 Year) Ear.					
	Primary	Middle	Intermediate	Graduate	

**(C) Land Information:**

1. Owned land (ha) \_\_\_\_\_  
 2. Leased in Land (ha) \_\_\_\_\_  
 3. Leased out Land \_\_\_\_\_  
 4. Total cultivated area (ha) \_\_\_\_\_  
 5. Area under horticulture (ha) \_\_\_\_\_  
 6. Area kept fallow (ha) \_\_\_\_\_  
 7. Area not cultivated (ha) \_\_\_\_\_ Yes / No  
 8. If yes, then reasons for not cultivation \_\_\_\_\_

## 9. Source of irrigation:

Name of source	Area Irrigated (ha)
(i)	
(ii)	
(iii)	

**(D) Cropping Pattern:**

Particulars	Area(ha)	Production (Qtls)
1. Kharif		
a. Paddy		
b. Maize		
c. Moong		
d. M.P. cherry (Fodder)		
e. Lacern		
f. Trifolium		
g. Sesamum		
h. Sunflower		
i. Beans		
j. Vegetables		
i)		
ii)		
iii)		
2. Rabi		
a. Mustard		
b. Wheat		
c. Oats		
d. Pea		
e. Broad Beans		
f. Cabbage		

3. Perennial fruits:	Trees/ha	Production (in boxes)
(a) Apple		
(i) Soori Sahranpuri		
(ii) Hazratbal		
(iii) Kesri (cox,s Orange pippin)		
(iv) Razaqwari		
(v) Red Delicious		
(vi) Summer kund		
(vii) Shandigund		
(viii) Delicious (Golden delicious )		
(ix) American apirogue		
(x) Maharaji (White dotted red )		
(xi) Lal Farooshi		
(xii) Production of culled fruits/ha		

Particulars	Area(ha)	Production(Qtls)
b) Pear		
c) Apricot		
d) Peach		
e) Plum		
f) Cherry		
g) Grape		
i) Walnut		
j) Almond		
k) Chestnut		

**(E) Operational Costs:**

Cost components	Unit	Cost/Unit	Quantity	Value or cost(Rs.)
a) Labour used:				
1. Preparation & maintenance of bassins				
2. Interculture				
3. FYM & Fertilizer application				
4. Plant protection				
5. Pruning /Training				
6. Irrigation				
7. Others (Including Watch & Ward)				
8. Total Labour used				

## b) Material used:

1. FYM
2. Fertilizer
3. Pesticide /fungicides
4. Diesel
5. Miscellaneous

---

GRAND TOTAL

---

**(F) Marketing cost:**

Particulars	Months	1	2	3	4	5
1. Name of the crop (Apple variety )						
2. Quantity in each month sold (boxes )						
3. To Whom sold						
4. Selling place						
5. Price (Rs. /box ) (variety wise )						
6. (i)						
(ii)						
(iii)						
5b Harvest cost:						
1. Picking						
2. Assembling						
3. Total Harvest cost						
6 Distance from marketing place						
7. Means of transportation						
8. Transportation cost (Rs/ box )						
9. Octroi charges (Rs)						
10. Mandi charges or fees (Rs)						
11. Loading & unloading charges						
12. Commission charges						
13. Packaging cost (Rs/box )						
14. Tax imposed by J&K Government for export						
15. Road tax imposed by HP Government						
16. Entry tax by Delhi state						
17. Others expenses (Rs)						

**(G) Constraints in production of crop:**

(1) Lack of Latest technical know-how about the crop yes/no If yes, why?

(i) Govt non-approaching Yes/No

If yes, than what you want /suggest

(ii) Farmer,s Disinterest (iii) Poor knowledge of technology

(iv) Any Other specify

2. Lack of improved & high yielding varieties Yes/No  
 If yes, then  
 i) Non availability of plant material  
 ii) Old farms  
 iii) Any other, specify  
 If no, then  
 (i) Give reasons why you don't use HYV varieties of Apple
3. Lack of recommended package of practices of crop in the region. Yes/No  
 If yes, then  
 i) No such type of recommendation  
 ii) No frequent visit of extension workers  
 iii) No proper interest of farmers  
 iv) Any other, specify
4. Lack of resources i.e. money, equipment etc. Yes / No  
 If yes, then how you are managing money ?  
 i) From bank            ii) From relatives  
 iii) From traders/commission agents Yes / No  
 If yes, then what benefits he wants to take ? -----  
 iv) Any other source, specify
5. Lack of irrigation water Yes / No  
 If yes, then how you irrigate your crop ?  
 i) With own irrigation    ii) Crop depends on rains
6. Lack of labour  
 If yes, then how do you manage ? -----
7. (a) Does the fragmentation of operational holding affect the efficiency/management of farming Yes / No  
 If yes, then how -----
- (b) Number of fragments do you have ? -----
8. Visit of extension agents Monthly/Quarterly/Half yearly/ None  
 9. Whether he solve problems posed by you or not Yes / No  
 10. Name of innovation adopted -----  
 11. Whether any subsidy is given by govt. Yes / No  
 If yes, indicate the kind of subsidy -----  
 12. Will the cultivator continue to adopt the innovation even if subsidy is withdrawn Yes / No  
 13. Is there proper availability of fungicides & pesticides in the market Yes / No

14. Have you faced the problem of fake fungicide ? Yes / No
15. Is the govt. non-approachable in controlling the fake pesticides & fungicides prevailing in the market Yes / No
16. Indicate whether the existing implement and machinery are adequate Yes / No  
 a) If not, indicate the items required .....  
 b) What are the financial & maintenance problem ?
17. Whether sufficient services / repair facilities are available in the village or nearby area for the implements Yes / No
18. Natural constraints  
 How much is the affect of natural parameters on production.  
 Period of occurrence
- |                 |                      |
|-----------------|----------------------|
| i) Rainfall     | More / less / normal |
| ii) Temperature | More / less / normal |
| iii) Snowfall   | More / less / normal |
| iv) Hailstom    | More / less / normal |
| v) Drought      | More / less / normal |
| vi)             |                      |
19. What are the major constraints experienced by you in increasing production & income ? (Preference wise)
- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_
- v) \_\_\_\_\_

### (H) Constraints in Marketing of Crop

1. Less producers share in consumer rupee Yes / No  
 If yes, then
- Due to long marketing channel
  - High marketing cost
  - Less price
  - Any other specify
2. Do you feel that available market facilities are sufficient Yes / No  
 If No, what are the problems you face in marketing ?
3. Did you get expected returns from the crop ? Yes / No  
 If No, What are the reasons

ii) \_\_\_\_\_

iii) \_\_\_\_\_

4. Lack of transportation facilities and road from village to market ? Yes / No

5. Whether you face problem because the quantity is small ? Yes / No  
If yes, then what steps you take to solve this problem ?

i) \_\_\_\_\_

6. Lack of regulated market and co-operative marketing societies in the region / area Yes / No

7. Whether you visit market regularly Yes / No  
If no, give reasons

i) \_\_\_\_\_

8. Whether you like to store your produce in cold storage to get higher prices Yes / No

9. If yes, to create storage facilities will be helpful in getting higher prices of produce Yes / No

10. Do you feel necessary that govt. should give support prices both for fresh as well as culled apples Yes / No

11. Does the price fluctuate severely during the season ? Yes / No  
If yes, what measures can be adopted to check the fluctuation

i) \_\_\_\_\_

ii) \_\_\_\_\_

Hi) \_\_\_\_\_

12. Does the support price will affect the production of crop ? Yes / No  
If yes, then how

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

13. Lack of awareness about market news & intelligence Yes / No

14. What media do you have for marketing news ?

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

15. How soon the news is disseminated / spread in producing area :
- i) within 2 days -----
  - ii) within 4 days -----
  - iii) within a days -----
16. Whether the market news has some special importance in production and marketing of crop Yes / No  
If yes, then in what respect
- i) \_\_\_\_\_
  - ii) \_\_\_\_\_
17. What type of market news you will prefer and in which form
- i) Demand of produce
  - ii) Supply of produce
  - iii) Price of produce
18. Do you depend upon the middle-men for the disposal / sale of produce  
If yes, then what are his conditions
- ii) \_\_\_\_\_
19. Whether you are satisfied with present method of sale & purchase of produce prevailing in Mandi Yes / No  
If no, then given you suggestion
- i) \_\_\_\_\_
  - ii) \_\_\_\_\_
20. Will the import of apples have an adverse affect on production of crop Yes / No
21. Is the govt. leiving high taxes on the export of apple outside the state - Yes / No
- i) \_\_\_\_\_
  - ii) \_\_\_\_\_
22. Is there any kind of mal-practices prevailing on the Apple marketing  
If yes, then mention it
- i) \_\_\_\_\_
23. Give your suggestions / meures to overcome such mal practices

**(I) Constraints in Financing**

1. How much you require for one ha. Apple orchard in a crop year ?

2. How much your own resource ?

3. How much you have taken from

i) Bank

ii) Friends

iii) Relatives

iv) Traders

v) Commission agents

vi) Any other, specify

4. What rate of interest you paid ?

5. Did you repaid all amount ?

Yes / No

If No, Then how much is remaining & give reasons for overdues ?

6. Whether any, problem is faced by the farmer's in dealing with banks

If yes, then mention the problem

i) \_\_\_\_\_

ii) \_\_\_\_\_

iii) \_\_\_\_\_

7. How much visits you have made to bank to take the loan ?

8. How much loan was sanctioned ? \_\_\_\_\_

9. What was your requirement ? \_\_\_\_\_

10. How much really you have got ?

i) \_\_\_\_\_

ii) \_\_\_\_\_

11. Do you feel that the credit available is sufficient & timely ? Yes / No

12. If no, indicate problems & suggestions

13. Is there lack of finance at reasonable rate of interest Yes / No

b) What is the rate of interest \_\_\_\_\_

14. Is there inadequate credit as a scale of finance Yes / No

If yes then how much it should be. \_\_\_\_\_

15. Is there need for the revision for scale of finance Yes / No

16. Do you think that there is need for the insurance of crop in case of natural calamities

Yes / No

17. In case of failure of crop due to drought / hail storm, does govt. give the compensation Yes / No  
If yes, then what percentage of crop the give

18. Are there any problem in getting it Yes / No  
If yes, then mention it

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_

19. Do you favour that horticulture should be given industrial status in state Yes / No  
If yes, then

20. Will it play a positive role in developing the crop in state Yes / No  
21. If yes, then how it will affect

- i) \_\_\_\_\_
- ii) \_\_\_\_\_

22. If no, then what will be its bad effects on the development of crop in state ?

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_

**(J) Farmer's Perceptions about the crop :**

1. What feature prospects do you see in the crop ?

2. As per your suggestions, what step should give, take for the development of the crop ?

3. Would you like to increase the area under production of crop Yes / No

If yes, then what crops you will replace

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_
- iv) \_\_\_\_\_

4. If you have increased the are under the crop in subsequent years, what crops had you replace ?

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_
- iv) \_\_\_\_\_

5. What type of help you need to increase the area under this crop ?

- i) Govt. subsidies
- ii) Establishment loan
- iii) Market Infrastructure
- iv) Processing facilities
- v) Any other, specify
- vi) Cold storage and warehousing

### WHOLE SELLER/COMMISSION AGENT SURVEY

1. Name of the whole seller / commission agent . . . . .—
2. Name of market \_\_\_\_\_
3. Date of interview \_\_\_\_\_
4. Total quantity of produce purchase in the season variety  
i)

Month	Total quantity purchased (boxes) (mention also variety)	Price paid (Rs./box)	Prices received (Rs./box)
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- 1.
- 2.
- 3.
- 4.
- 5.

5. Quantity spoiled during storage/transportation or any other reason\_\_\_\_\_
6. Either purchased through commission agent or directly from producer \_\_\_\_\_  
(a) If purchased from commission agent then commission charges paid by him (Rs./box)\_\_\_\_\_
7. No. of worker's employed / day \_\_\_\_\_
8. Cost incurred on labour (monthly / daily)\_\_\_\_\_
9. Other costs :
  - i) Mandi fee\_\_\_\_\_
  - ii) Loading / unloading charges (Rs./box)\_\_\_\_\_
  - iii) Transportation charges (Rs. / box)\_\_\_\_\_
  - iv) Licence fee (Rs./year) \_\_\_\_\_
  - v) Maintenance expenses (Rs. year)\_\_\_\_\_
  - vi) Expenditure on stationaries (Rs./year )\_\_\_\_\_
  - vii) Rent of shop (Rs./Month )\_\_\_\_\_
  - viii)Capital invested and interest rate.....
  - ix) Any other\_\_\_\_\_
- 10.To whom produce is sold .....

### RETAILOR'S SURVEY

1. Name of retailer \_\_\_\_\_
2. Name of market \_\_\_\_\_
3. Date of interview \_\_\_\_\_
4. Total quantity of produce purchased in the season, variety-wise

Month	Total quantity purchased (boxes) (mention also variety)	Price paid (Rs./box)	Prices received (Rs./box)
1.			
2.			
3.			
4.			
5.			

5. Agency from whom purchased \_\_\_\_\_
6. Distance from market to selling place \_\_\_\_\_
7. Name of the place of selling \_\_\_\_\_
8. To whom produce is sold \_\_\_\_\_
9. Quantity spoiled during, storage/marketing or due to some other reason \_\_\_\_\_
10. Cost incurred by retailer :
  - i) Cost of transportation (Rs./box ) \_\_\_\_\_
  - ii) Rent of shop /selling place (Rs./box) \_\_\_\_\_
  - iii) Capital invested & interest rate \_\_\_\_\_
  - iv) Cost incurred on labour (monthly / daily ) \_\_\_\_\_
  - v) Mandi fee \_\_\_\_\_
  - vi) Loading / unloading charges (Rs./box) \_\_\_\_\_
  - vii) Maintenance expenses (Rs. year) \_\_\_\_\_
  - viii) Stationary expenses \_\_\_\_\_
  - ix) Miscellaneous.