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## **GROWTH, PROFITABILITY AND PROJECTION OF MAJOR FRUIT CROPS IN J AND K STATE, INDIA**

**Jyoti Kachroo**

### **ABSTRACT**

. An attempt has been made to study the growth trend of area, production, yield and export of fresh and dry fruits of Jammu and Kashmir State of India. The results had shown that the overall trend of total fruits for area was 3.74 per cent, production 4.52 per cent, yield 1.21 per cent and export 4.32 per cent. State's major fruits like apple, pear, cherry, walnut and almond had the overall growth of 3.363 per cent, 4.294 per cent and 3.340 per cent for area, production and yield respectively. Marketing of fruits was the most expensive one involving Rs. 8.12/kg followed by production cost with Rs. 5.72/kg and then by other expenses with Rs. 3.38/kg. Almond was giving the highest returns with Rs. 77.55/kg. The Benefit Cost Ratio on an average was more than Rs3. Co-operative marketing was emerging as the important marketing agency for marketing the fruits of the state. From 1993-94 to 2001-02, the overall growth rate of marketing the state's fresh fruits to different states of India was significantly negative (-0.363 per cent) which compels the state to restructure its marketing base line in view of the present marketing challenge under WTO tie-ups.

### **I. INTRODUCTION**

Globalization of economies and liberalization of trade has led an urgent need for prioritizing the potential areas for investment in order to earn handsome amount of income. Even the entrepreneurs, small as well as marginal farmers aspire to take advantage of global opportunities. Diversification to horticultural crops has been found to be best option as they make more profit, generate additional employment for rural masses and conserve natural resources. Agro-climatic suitability equips the state of Jammu & Kashmir with a unique comparative edge in the cultivation of a variety of horticultural crops. Apple, pear, citrus, mango, olive, apricot, peach, grapes, ber, walnut, almond etc are the fruits mostly grown in the state. The state accounts for sixty per cent production of the apple in the country and is also known as the walnut state of the country. The state has got the monopoly of trade in cherry. The state had an annual turnover of Rs.1500 crores in 2001-02 from horticultural crops. Apple, pear, cherry, walnut and almond are the major fruits grown in the state, which cover an area of 80 per cent and production of 96 per cent out of the total area and total production of horticultural crops respectively (Anonymous, 2002-03). The state imported fruits to the extent of 144549.5 MT and exported 663000 MT (2001-02). The sale of these fruits takes place in

almost all the states of India besides export of walnut to countries like Spain, France, UAE, Netherlands, Denmark, Italy, U.K. and Australia. Again in 2001-02, 66 per cent of the fresh fruit out of the total fresh fruit marketed was dispatched to Delhi followed by Mumbai (23 per cent) and Kolkata (22 per cent). In 2001-02, 30 per cent of the total apples dispatched were sent to terminal markets like Mumbai, Kolkata, Bangalore, Lukhnow, Chennai, Indore etc. For further horticultural development, the commercialization, diversification, value addition and export-orientation of these crops under the free market economy is the need of the hour and due to WTO tie ups and with the entry of China into the WTO, the apprehensions of fruit growers in the country as a whole, and in the state, in particular have increased manifold. Growers will have to face tough competition both on price and quality. The fruit industry in the state can survive only if it becomes competitive on both these counts.

Keeping these facts in view, the present study was undertaken with the following specific objectives:

- (1) To examine the general emerging trends of fruit industry in J&K State
- (2) To examine the trend of area, production and yield of major fruits like apple, pear, cherry, almond and walnut in J&K state
- (3) To estimate the export trend of fresh fruits to various markets of India from the state
- (4) To estimate net returns and benefit cost ratio of major fruit crops of the state

## II. MATERIAL AND METHODS

To achieve the stipulated objectives, the present study has been carried out on the basis of time series data pertaining to the period 1974-75 to 2001-02, which were collected from secondary sources, obtained from various issues of Statistical Abstract, Annual Report of Directorate of Horticulture Planning and Marketing (2002-03), Jammu and local daily. Both tabular and functional techniques were applied for the analysis and interpretation of data. For working out the growth rates of area, production and yield of fresh and dry fruits and then of apple, pear, cherry, almond and walnut (major fruit crops grown in the state) separately, the time period had been divided into different phases as:

- (i) Period I (1974-75 to 1983-84)
- (ii) Period II (1984-85 to 1993-94)
- (iii) Period III (1994-95 to 2001-02) and
- (iv) Overall Period (1974-75 to 2001-02)

Further, compound growth rate of export of fresh fruits to various states of India was also evaluated as per the availability of data. In order to work out the trend of above mentioned variables, compound growth rate calculated as follows (Acharya, 1988):

$$y_t = y_0(1+g)^t \text{ or } a(1+g)^t$$

$$y_t = ab^t \quad (\text{Where } b=1+g)$$

$$\text{or } \log y = \log a + t \log b$$

Then, Compound growth rate (r) = (Antilog b-1)\*100

Where,

y = absolute value

a = initial value of y or constant

t = time (years)

b = estimated regression coefficient (parameter)

The growth rates were tested statistically for their significance through t-test as given below:

$$t = \frac{r}{\text{S.E.}(r)} \sim t_{\alpha, n-2}$$

$$\text{S.E.} = \frac{b \left[ \left( \sum \log y^2 - \frac{(\sum \log y)^2}{n} - \log b^2 \right) \sum x_i^2 \right]}{0.43429(n-\alpha)(\sum x_i^2)} \times 100$$

By using the calculated growth rates of area, production and export of fresh and dry fruits the estimated values for 2005, 2010 and 2015 were also calculated. Area, production and yield values were also projected for the major fruit crops for the periods already mentioned for fresh and dry fruits.

Further net returns were estimated by NR = Wholesale Price – Cost of Production. The retail prices differed from one area to another, that is why, the wholesale prices were taken into consideration. The cost concepts used in the present study are as follows:

**Production cost** = Land revenue & Sur-charges, Manure/Fertilizer including labour charges, Pruning charges, Darment spray, Fungicide/pesticide including spray charges, Watch and ward.

**Marketing cost** = Cost of shooks, Picking charges, Grading and packing, Cost of packing material, Carriage to godown/loading/unloading, forwarding charges, Freight charges, Toll tax, Commission charges, Other charges like Postage, telephone etc.

**Other expenses** = Managerial cost, Rent of land

$$\text{BCR (Benefit Cost Ratio)} = \frac{\text{Total Returns}}{\text{Total Cost}}$$

### III. RESULT AND DISCUSSIONS

#### Trends in Area, Production, Yield and Export of All Fresh and Dry Fruits

The compound growth rates of area, production, yield and export of fresh and dry fruits of Jammu and Kashmir State for the period of 1974-75 to 2001-02 were depicted in Table 1.

**Table 1. Trends in area, production, yield and export of fresh and dry fruit crops for the period 1974-75 to 2001-02**

Variable	Period I (1974-75 to 1983-84)	Period II (1984-85 to 1993-94)	Period III (1994-95 to 2001-02)	Overall Period (1974-75 to 2001-02)
Fresh Fruit				
Area	5.753* (0.537)	2.872* (0.276)	1.836* (0.130)	3.333* (0.169)
Production	9.621* (2.022)	2.204* (0.269)	3.215* (1.362)	4.282* (0.437)
Yield	3.657* (2.071)	-0.805** (1.955)	2.538*** (4.331)	0.919* (0.374)
Export	9.563* (2.042)	3.898** (2.419)	-0.217** (2.213)	4.331* (0.504)
Dry Fruit				
Area	10.131* (0.900)	2.845* (0.221)	3.095* (0.375)	4.600* (0.302)
Production	2.116* (1.897)	16.695* (4.502)	4.497* (0.830)	8.448* (0.766)
Yield	-7.364* (2.150)	13.320* (4.366)	1.306* (0.837)	3.684* (0.933)
Export	0.973** (1.461)	14.287* (3.857)	-10.145* (5.895)	3.476* (0.928)
Total				
Area	7.081* (0.650)	2.863* (0.246)	2.274* (0.184)	3.737* (0.206)
Production	9.322* (1.976)	2.623* (1.887)	3.333* (1.227)	4.523* (0.414)
Yield	2.678* (1.994)	-0.233** (1.985)	1.035** (1.055)	1.208* (0.352)
Export	9.294* (2.001)	3.538** (2.420)	-0.584** (2.094)	4.315* (0.494)

Note: \*, \*\* and \*\*\* denote estimated co-efficient significant at 1 per cent, 5 per cent and 10 per cent level of significance respectively. Figures in parentheses denote the standard errors of their respective co-efficient

Fresh fruits accounted for roughly 91 percent of the production of total fruits in the state in 2001-02 and their growth trend during period I was significantly higher as compared to their period II and period III for area (5.75 per cent), production (9.62 per cent), yield (3.66 per cent) and export (9.56 per cent). Though during period II and period III, the trend had decreased for the variables under study, yet they were significantly positive except for yield (-0.806 per cent) which showed negative trend for the period II and export (-0.217 per cent) for the period III. Overall increase in production and export of fresh fruits may be attributed mainly to increase in acreage. Dry fruits account for roughly 9 per cent of the total production of fruits. As these fruits are high value crops and are demanded not only at the national level but also globally, their growth trend was better than fresh fruits for all the variables under consideration and for all the three periods except for export which had shown high negative trend for period III. It may be due to the political instability in the state and WTO rules and regulations. The overall trend of dry fruits increase in area, production, yield and export was 4.60 per cent, 8.45 per cent and 3.68 per cent and 3.48 per cent respectively. The increase in production of dry fruits may be attributed due to increase in acreage and yield. On the whole, the overall increase in fresh and dry fruits was to 3.74 per cent, 4.52 per cent, 1.21 per cent and 4.32 per cent for area, production, yield and exports respectively, thereby indicating that the fruit growers in the state should invest in the fruit industry as there were assured returns.

**Trends in Area, Production and Yield of Major Fruit Crops**

Table 2 presented the compound growth rate of area, production and yield of major fruit crops grown in the state i.e. apple, pear, cherry, almond and walnut separately. The perusal of the data indicated that on an average the area under apple (2.33 per cent) and almond (2.55

**Table 2. Trends in area, production and yield of major fruit crops for the period 1974-75 to 2001-02**

Variable	Period I (1974-75 to 1983-84)	Period II (1984-75 to 1993-94)	Period III (1994-95 to 2001-02)	Overall (1974-75 to 2001-02)
Apple				
Area	3.823* (0.345)	1.320* (0.173)	2.568* (0.128)	2.333* (0.088)
Production	10.015* (2.198)	0.670* (1.968)	3.254* (1.412)	3.917* (0.477)
Yield	5.972* (2.181)	-0.626** (1.961)	0.662** (1.295)	1.547* (0.430)
Pear				
Area	13.075* (1.980)	4.864** (3.101)	4.584* (1.382)	5.360* (0.726)
Production	12.12* (2.019)	22.913 <sup>ns</sup> (10.856)	11.009 <sup>ns</sup> (2.647)	11.533* (1.924)
Yield	8.731** (2.754)	21.880 <sup>ns</sup> (10.866)	6.201* (1.338)	6.155* (2.030)
Cherry				
Area	7.008* (0.952)	4.913* (1.294)	6.418* (1.523)	4.911* (0.242)
Production	8.061* (3.580)	24.113 <sup>ns</sup> (7.560)	15.340 <sup>ns</sup> (5.266)	9.759* (1.153)
Yield	1.804* (3.827)	18.342 <sup>ns</sup> (7.940)	8.458 <sup>ns</sup> (5.662)	4.507* (1.187)
Walnut				
Area	11.271* (0.669)	3.371* (0.293)	4.477* (0.678)	5.550* (0.296)
Production	2.231* (2.163)	15.667 <sup>ns</sup> (4.410)	5.038* (0.970)	8.306* (0.746)
Yield	-8.281* (2.134)	11.992** (4.125)	0.533* (0.663)	2.622* (8.892)
Almond				
Area	8.311* (1.418)	1.605* (0.179)	-1.798* (0.275)	2.546* (0.396)
Production	2.716* (5.318)	23.487 <sup>ns</sup> (8.602)	1.268* (4.621)	9.572* (1.486)
Yield	-5.122* (4.633)	22.070 <sup>ns</sup> (8.408)	3.104* (4.601)	6.631* (1.615)
Total				
Area	6.468* (0.613)	2.260* (0.266)	2.809* (0.319)	3.363* (0.178)
Production	9.431* (2.035)	2.393* (1.910)	3.616* (1.255)	4.294* (0.438)
Yield	0.687* (1.589)	-.373* (1.992)	2.576* (0.699)	3.340* (2.081)

Note: \*, \*\* and ns denote estimated co-efficient significant at 1 per cent, 5 per cent and non significant respectively. Figures in parentheses denote the standard errors of their respective co-efficient

per cent) had increased significantly almost at par but with respect to production almond had shown much better performance as compared to apple i.e. it was 9.57 per cent and 3.92 per cent respectively. The data further revealed that the percentage increase in walnut area (5.55 per cent) was highest followed by pear (5.36 per cent) and then by cherry (4.91 per cent) whereas pear had maximum production growth rate (11.53 per cent) with apple as the minimum (3.91 per cent). Cherry in which the state has got the monopoly of trade (Anonymous, 2002-03) had significantly positive production trend of 9.76 per cent. Similarly walnut had shown a positive production trend of 8.31 per cent. The overall picture was showing that all the three variables under consideration had increased significantly at 3.36 per cent (area), 4.29 per cent (production) and 3.34 per cent (yield). Though, production trend was better than area but yield was almost same as area, which means that the state has to lay emphasis on yield because in future production has to be increased vertically not horizontally. Further apple was showing a gloomy trend in all the three variables due to the diversification of horticultural crops towards other fruit crops like pear, walnut etc. but it becomes necessary to increase the production and yield of Apple as it is the traditional fruit crop of the state and its varieties like delicious, kesri, razakwari, hazratbali etc are the world known. As other fruits like cherry, walnut, almond and pear were showing a good growth trend, the farmer could grow these crops because they are highly demanded not only nationally but internationally as well.

#### **Costs/Returns and Benefit Cost Ratios**

Net return and benefit cost ratio from a crop are more critical factors in resource allocation decision by the farmers. At what net return does a farmer decide to grow depends on the value of the crop in rotation? For this purpose of understanding the cost price relationship, net returns and benefit cost ratio (BCR) from apple, cherry, walnut and almond were calculated in Table 3 and 4 for the years 1999-00, 2000-01 and 2001-02 as per the availability of data. Here pear was not taken into consideration due to non-availability of its data. The perusal of the data indicated in Table 3 that the major fruit crops like apple, cherry, almond and walnut on an average involved more marketing cost as compared to production cost and other expenses for 1999-00 and 2001-02. The marketing cost was almost double the production cost for the years 1999-00 and 2000-01. The marketing cost was Rs. 8.56/kg and Rs. 8.27/kg for 1999-00 and 2000-01 respectively whereas production cost was Rs. 4.78/kg for both the years. But for the year 2001-02, production cost had exceeded marketing cost by seven paise. The reason being for the increase in production cost was that cherry's production cost had increased tremendously which pushed up the overall production cost.

Table 3. Cost-Price Relationship of Major Fruit Crops (Rs./Kg)

Year	Apple			Cherry			Almond			Walnut			Average		
	A	B	B-A	A	B	B-A	A	B	B-A	A	B	B-A	A	B	B-A
<b>Production Cost</b>															
1999-00	1.99	40.00	38.01	2.71	36.58	33.87	14.25	91.50	77.25	0.18	52.20	52.02	4.78	55.07	50.29
2000-01	1.99	42.00	40.01	2.71	26.60	23.89	14.25	92.10	77.85	0.18	50.10	49.92	4.78	52.70	47.92
2001-02	2.42	45.00	42.58	12.42	38.50	26.08	14.42	-	-	1.18	60.00	58.82	7.61	47.83	40.22
<b>Marketing Cost</b>															
1999-00	5.00	40.00	35.00	9.38	36.58	27.20	12.45	91.50	77.25	7.42	52.20	44.78	8.56	55.07	46.51
2000-01	5.23	42.00	36.77	7.80	26.60	18.80	12.53	92.10	77.85	7.51	50.10	42.59	8.27	52.70	44.43
2001-02	5.62	45.00	39.38	9.32	38.50	29.18	-	-	-	7.69	60.00	52.31	7.54	47.83	40.29
<b>Other Expenses</b>															
1999-00	1.61	40.00	38.39	2.50	36.58	34.08	5.00	91.50	77.25	5.00	52.20	47.20	3.53	55.07	51.54
2000-01	1.61	42.00	40.39	2.50	26.60	24.10	5.00	92.10	77.85	5.00	50.10	45.10	3.53	52.70	49.17
2001-02	1.72	45.00	43.28	2.55	38.50	35.99	-	-	-	5.00	60.00	55.00	3.09	47.83	44.74
<b>Overall Cost</b>															
1999-00	8.60	40.00	31.40	14.59	36.58	22.04	31.70	91.50	77.25	12.60	52.20	39.60	16.87	55.07	38.20
2000-01	8.83	42.00	37.17	13.01	26.60	13.59	31.78	92.10	77.85	12.69	50.10	37.41	16.58	52.70	36.12
2001-02	9.76	45.00	35.24	24.29	38.50	14.21	-	-	-	13.87	60.00	46.13	18.24	47.83	29.59
CV (%)	6.2	6.0		33.8	18.7		0.0	0.0		4.3	9.8				

Note: A= Cost of Production; B = Wholesale Price; B-A = Difference between Price and Cost; N.A = Data not available  
Source: Annual Report (2002-03) of Directorate of Horticulture Planning & Marketing, Government of Jammu and Kashmir, India



Other expenses like managerial cost or rent of land was also important. They also involved Rs. 3.53/kg, Rs. 3.53/kg and Rs. 3.09/kg for the years 1999-00, 2000-01 and 2001-02 respectively. The Table further clarified that the net returns from production cost and other expenses were better than marketing cost except for the year 2001-02 where production cost and marketing cost were almost at par. In 1999-00, the net returns from production cost were Rs. 50.29/kg, marketing cost it was Rs. 46.57/kg and from other expenses point of view it was Rs. 51.54. For the year 2000-01, the net returns from production cost was Rs. 47.92/kg, from marketing cost, it was Rs. 44.43/kg and from other expenses, it was Rs. 49.17/kg. For the year 2001-02, it was Rs. 40.22/kg, Rs. 40.29/kg and Rs. 44.74/kg taking into consideration production cost, marketing cost and other expenses respectively. So, for this it could be visualized that it is important to reduce the marketing cost. The Table further revealed that walnut involved least production cost among all major fruit crops grown in the state. It was 18 paise /kg for the years 1999-00 and 2000-01 whereas in 2001-02 it suddenly rose to Rs. 1.18/kg due to the reason its watch and ward charges had increased from 10 paise/kg to Rs. 1.10/kg. The marketing cost of walnut was very expensive as compared to its production cost. Once a walnut plant is planted, it does not require much cost of producing its fruit, but involves a good amount of marketing cost. Walnut is the only fruit, which besides exported nationally, is also exported internationally and the state had earned Rs. 117 crores as foreign exchange from its export to countries like Spain, Germany, U.K. etc. Its marketing cost was approximately 1000 per cent more than its production cost. Walnut crop also involved good amount of rent on land and managerial cost. It was Rs.5/kg for all the years. Walnut was followed by apple. Apple also had much less production cost as compared to its marketing cost but did not involve more management cost. Its production cost was Rs. 2.13/kg on an average for the three years under consideration, Rs. 1.64/kg, its other expenses but had Rs. 5.28/kg as its marketing cost. But when we compare the overall cost of walnut and apple, apple's cost was less than walnut. It was Rs. 12.60/kg for walnut and Rs. 8.60/kg for apple because walnut had more marketing cost and other expenses as compared to apple. Again regarding cherry, the only fruit in which the state has got the monopoly of trade, had lower production cost and other expenses as compared to its marketing cost for the years 1999-00 and 2000-01. On an average, it was Rs. 2.71/kg as production cost and Rs. 2.50/kg as other expenses but its marketing cost was Rs. 8.59/kg. But for the year 2001-02, its production cost had suddenly increased by 358 per cent from 2000-01 to 2001-02 due to the reason that its land revenue and surcharges had increased from Rs. 0.01/kg to Rs. 1.10/kg and other charges had increased from Rs. 0.35/kg to Rs. 6.03/kg. The overall cost involved in the cherry production was more as compared to apple and walnut and returns were less than these crops. Lastly, overall cost of almond (Rs.31 J4/kg) was much more than apple (Rs.9.06/kg), walnut (Rs.13.05/kg) and cherry (Rs.17.30/kg) as is clear from the Table 4 and its returns were also higher than these fruit crops. Its returns were 124 per cent more than apple, 212 per cent than walnut and 367 per cent more than cherry. To

be brief, Govt. should pay attention towards the marketing of these major horticultural crops. Thus these fruits are fetching good amount of returns per kg. Their contribution can be further clarified by explaining them with the help of Benefit Cost Ratio (BCR).

Table 4 presented the data regarding Benefit-Cost Ratio. From the Table it was clear that the overall contribution of apple, cherry, almond and walnut on an average was Rs. 4.53, Rs. 2.06, Rs. 2.88 and Rs.4.05 for 1999-00, 2000-01 and 2001-02 respectively for every one rupee. Among the three costs, production cost was least burdensome for the grower because of its highest BCR of Rs. 61.87/rupee followed by other expenses (Rs.16.96/rupee) and then by marketing cost (Rs.6.45/rupee). The data further revealed that though almond had highest net returns as was clear from Table 3, but its BCR showed that it fetched only Rs. 2.88 per rupee. Walnut was fetching highest BCR while considering its production cost. It was Rs. 206.39 per rupee followed by apple (Rs. 19.94), cherry (Rs. 8.81) and almond (Rs. 6.44). The marketing of all the fruit crops showed that it fetched lowest amount of money per rupee as compared to their production cost and other expenses. Apple had lowest amount of money

**Table 4. Benefit Cost-Ratio of Major Fruit Crops**

Year	Apple	Cherry	Almond	Walnut	Average
	1	2	3	4	5
<b>Production Variable</b>					
1999-00	20.10	13.50	6.42	290.00	82.51
2000-01	21.11	9.82	6.46	278.33	78.93
2001-02	18.60	3.10	-	50.85	24.18
<b>Marketing Variable</b>					
1999-00	8.00	3.90	7.35	6.43	6.42
2000-01	8.03	3.41	7.35	6.37	6.29
2001-02	8.01	4.13	-	7.80	6.65
<b>Other Variables</b>					
1999-00	24.84	14.63	18.30	10.44	17.05
2000-01	26.07	9.82	18.42	10.02	16.08
2001-02	26.16	15.10	-	12.00	17.75
<b>Overall</b>					
1999-00	4.44	2.47	2.88	4.00	3.45
2000-01	4.67	2.08	2.88	3.85	3.37
2001-02	4.50	1.63	-	4.29	3.41

Source: Annual Report (2002-03) of Directorate of Horticulture Planning & Marketing, Government of Jammu and Kashmir, India

involved in its marketing as it had fetched the highest amount of money per rupee. It was Rs. 8.01, followed by almond Rs. 7.35, walnut Rs. 6.87 and lastly cherry Rs. 3.81. So, the fruit growers should think more on marketing lines as compared to production or managerial lines.

#### **Fruits Marketed Through Fruit Growers' Cooperative Marketing**

The success of any agricultural development programme lies on the efficiency of the marketing system. Agricultural marketing is a process, which starts with a decision to produce a saleable farm commodity, and it involves all aspects of market structure or system, both

functional and institutional based on technical and academic considerations and includes pre- and post- harvest operations. The state regulated its fruit market under APM Act (1997) with effect from 2001. The state is getting infrastructure development support from the national agencies like NHB (National Horticulture Board), DMI (Directorate of Marketing and Inspections), NCDC (National Co-operative Development Corporation), APEDA (Agriculture Produce and Export development Authority) etc. The government in order to protect the growers particularly the small and marginal growers to fall under the clutches of middlemen has established an apex body in the shape of Kashmir Fruit Growers Co-operative Marketing Federation to take care of different marketing societies and also help growers for their direct participation in sales. Table 5 indicated that one of the society's like FGCM (Fruit Growers Co-operative Marketing) in 1993-94 got fruits directly from the growers and then sent to different markets of India. In the beginning, its contribution was in the sale of fresh fruits was only 0.86 per cent out of the total fresh fruits marketed. Within a short span of time

**Table 5. Percentage of fruits marketed through FGCM\* society out of total fruits marketed**

Year	Total Fruits Marketed	Fruits Marketed through FGCM society	Percentage of Fruits Marketed through societies out of total Fruit Marketed
1993-94	755000	6610	.875
1994-95	598000	9034	1.511
1995-96	715000	8898	1.244
1996-97	656000	8332	1.270
1997-98	696000	7679	1.103
1998-99	610000	4606	0.755
1999-00	785000	2551**	0.325
2000-01	517000	101968	19.723
2001-02	663000	247544	37.337

Source: Deputy Director Horticulture (Planning and Marketing), J&K State

\* Fruit Growers Co-operative Marketing

\*\* For most of the districts, data was not available

i.e. less than a decade in 2001-02, 37 per cent of the fruits were marketed through this society, which implied that growers were becoming aware of the co-operative marketing and thus needed more futuristic attention.

#### **Compound Growth Rate of Export of Fresh Fruit to Different Markets of India from the Period 1993-94 to 2001-02**

The Compound growth rate of fresh fruits marketed to different states of India from Jammu and Kashmir State for the period 1993-94 to 2001-02 was depicted in Table 6. The data for export of these major fruits to different markets was not available. As the state mainly exports these major fruit crops to various states of India and if the overall data of fresh fruits was given it indirectly meant the overall export of these major fruits. That is why,

it was thought better to have an idea of growth of marketing of fresh fruits to various parts of India. The data revealed that the dispatch of fresh fruits to Mumbai, Hyderabad, Lucknow, Amritsar and Ahmedabad had increased significantly at the rate of 16.55 per cent, 16.24 per cent, 70.13 per cent, 4.71 per cent and 0.017 per cent, respectively. Thus, it becomes necessary for the policy makers to adopt further promotional activities for enhancing the marketing of these fruits to markets. The other states like Delhi (-.139 per cent), Chennai (-47.18 per cent), Calcutta (-1.85 per cent), Bangalore (-6.17 per cent), Jaipur (-7.52 per cent), Chandigarh (-46.53 per cent) and Bhopal (-6.70 per cent) had shown a negative trend. Here it is important to see the loopholes that are leading towards decreased sale in these markets. The export trend on

**Table 6. Compound growth rate of export of fresh fruit to different markets of India from the period 1993-94 to 2001-02**

S.No.	Market	Compound Growth Rate
1	Delhi	-0.139* (2.518)
2	Mumbai	16.549* (7.730)
3	Chennai	-47.176** (15.761)
4	Calcutta	1.846* (6.101)
5	Hyderabad	16.239* (12.320)
6	Bangalore	-6.173* (2.382)
7	Jaipur	-7.524* (4.024)
8	Lucknow	70.132** (84.001)
9	Amritsar	4.705* (2.921)
10	Ahmedabad	0.017* (3.004)
11	Chandigarh	-46.530** (16.824)
12	Bhopal	-6.696** (38.714)
13	Patna	145.466 <sup>ns</sup> (132.917)
14	Others	-4.944 <sup>ns</sup> (9.602)
15	Total	-0.363* (2.386)
16	Import of fresh fruits (1996-97 to 2001-02)	7.223* (1.766)

Note: \*, \*\* and ns denote estimated co-efficient significant at 1 per cent, 5 per cent and non significant respectively. Figures in parentheses denote the standard errors of their respective co-efficient

the whole was -0.363 per cent whereas the import trend was found to be positive (7.22 per cent) from 1996-97 to 2001-02 which indicated that the govt. has to think on present marketing strategy is to be redesigned in order to increase the market share of fresh fruits in all the states of India besides exporting to world market. The reason of market diversification was that the sellers now preferred Mumbai and Calcutta market more than other markets because it fetched them more money and part of the fruits could be easily exported to foreign countries from these ports. Moreover, the sellers opine that the markets nearer to J&K State exploit them and that was why they preferred to market lesser quantity of these fruits to these places.

### Projections of Area Production and Export of Fresh and Dry Fruit Crops

The estimated figures for area, production and export of fresh as well as dry fruits based on linear function were presented in Table 7. The data revealed that by 2015, the area under fresh fruits will be 191868.00 ha and dry fruits 111026.51 ha whereas production for the same period will be 1310490.15 MT for the fresh fruits and 131290.38 MT for the dry fruits. The export of fresh fruits will be 937616.57 Mt and dry fruits 2715464 MT.

**Table 7. Projections of area, production and export of fresh and dry fruit crops**

(Unit : Area-ha; Production-MT; Export-MT)

Variable	Proj. for 2005	Proj. for 2010	Proj. for 2015
<b>Fresh Fruits</b>			
Area	159443.45	175655.72	191868.01
Production	1065736.22	1188113.33	1310490.63
Export	761130.53	849373.55	937616.57
<b>Dry Fruits</b>			
Area	89470.75	100248.63	111026.51
Production	97959.78	114625.08	131290.38
Export	22217.58	24686.11	27154.64
<b>Total</b>			
Area	248914.14	275904.32	302894.51
Production	1163696.22	1302738.37	1441780.51
Export	783348.12	874059.67	964771.22

### Projections of Area, Production and Yield of Major Fruit Crops

Table 8 depicted the estimated figures for area and production of major fruit crops of Jammu and Kashmir State. The projected data revealed that the area under apple, pear, cherry, walnut and almond will be 107068.30 ha, 14522 ha, 3034 ha, 83662 ha and 26005.54 ha respectively by the year 2015 and the corresponding production will be 1154909.10 MT, 43723.45 MT, 7466.62 MT, 115482.10 MT and 13926.25 MT respectively. The projections in terms of production and export of fruits ultimately depend upon the political stability and other facilities to be provided to the growers in the state.

**Table 8. Projections of area, production and yield of major fruit crops of J&K State**

(Unit Area – ha, Production – MT, Export – MT)

Variable	Proj. for 2005	Proj. for 2010	Proj. for 2015
Apple			
Area	92090.25	99579.29	107068.30
Production	951483.92	1053196.00	1154909.10
Yield	10.882	11.462	12.042
Pear			
Area	11663.71	13092.99	14522.28
Production	32443.43	38083.44	43723.45
Yield	3.20	3.57	3.94
Cherry			
Area	2414.76	2726.36	3037.96
Production	5562.10	6514.36	7466.62
Yield	2.71	3.04	3.38
Walnut			
Area	66169.29	74915.66	83662.03
Production	86560.31	101021.20	115482.10
Yield	1.36	1.48	1.60
Almond			
Area	22462.62	24239.08	26005.54
Production	10324.88	12125.56	13926.25
Yield	0.43	0.51	0.59
Total			
Area	194800.62	214548.45	234296.14
Production	1086375.11	1210941.63	1335507.00
Yield	3.75	4.05	4.35

## VI. CONCLUSION AND SUGGESTIONS

Jammu and Kashmir State of India being the horticultural state of the country had contributed Rs. 1500 crores to the state exchequer in 2002-03. According to the results of the present study, dry fruits have shown better overall growth trends as compared to fresh fruits for all the variables like area (4.60 per cent, 3.33 per cent), production (8.45 per cent, 4.20 per cent), yield (3.68 per cent, 0.92 per cent) except for exports where it was 3.48 per cent for dry fruits and 4.33 per cent for fresh fruits. Apple, pear, cherry, walnut and almond are the major fruit crops grown in J&K state. The compound growth of all these major fruit crops was significantly positive with increase in overall area 3.63 per cent, production 4.29 per cent and yield 3.34 per cent. Among these fruit crops almond was showing best growth with increase in area only 2.55 per cent but production growth as 9.57 per cent and yield 6.31 per cent and also with best returns of Rs.77.55/kg. But its BCR was 2.88, which was lower than apple and walnut. Pear had also shown a good growth trend. Though cherry's growth trend was better than apple and walnut yet its returns and BCR were less than these two fruits.

Further co-operative marketing of fruit crops had emerged as an important sector and marketing through FGCM had increased by 36 per cent over a period of nine years. But it is of great concern that the state had shown a significantly negative trend for exports, which is not a healthy sign for the economic development of the state. The reasons for negative exports were quality of the fruits, promotional activities for their marketing, packaging, marketing cost etc. Thus to increase the sale of these crops, firstly quality products are to be produced, which requires better research and development wing with best scientific know-how. Though the state is having 60 per cent of the apple production of the country and Kashmir's apple like Delicious, Maharaji, Kesri, Razakwari, Hazratbali etc was the world known but now Hamachali apple is demanded more even at the international level due to its best size, packing etc which is as per the WTO standards. In case of walnut, the major problem occurs in handling and storing the produce especially during the months of hot climate. The cost of storage varies from Rs.6 to Rs.8/ bag , per month, which is beyond the limits of small walnut sellers. The cherry growers and dealers are facing serious problems of marketing due to lack of rail/air transport reservation. Thus for enhancing its returns, its quick marketing is needed because it is the most perishable fruit and needs immediate transportation. To be brief, setting up of modern and improved storage structure at reasonable prices, best research and development wing, remunerative prices to growers, political stability etc is needed to a great extent.

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