

A Value Chain Analysis of Apple in Kashmir Valley: An Overview

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ABSTRACT

A study on “A value chain analysis of apple in Jammu & Kashmir” was carried out in the Baramulla district of the valley during 2014-15. Apple being main fruit in the district has predominant position in area, production and productivity. Both primary and secondary data was analyzed to interpret the results for this study. Primary data was collected from the 70 sample respondents from a cluster of 6 villages delineated from the Pattan zone along with market functionaries and other important players of value chain. The secondary data was collected from the relevant secondary sources. The apple value chain in Kashmir has been comprehensively analyzed in this study. The study revealed that the horticulture is an important area for development, and the valley grows mostly apple. The trends in the apple production showed that the acreage diversified towards crop increased at a faster rate during last ten years and the farmers witnessed more potential for the fruit. The fruit crop has performed differently across the districts with overall moderate growth and high variability in Kashmir division as indicated by growth and variability analysis. The study revealed that majority of the farmers were marginal farmers with upto 2 hectares of land under apple orchards. Cost of apple cultivation works out to be Rs. 206730 per hectare with net returns to the tune of Rs. 496395 per hectare. The processing and the cold store units, the major functionaries in the value chain of apple were also studied. During the study it was found CA store was lacking in the district, particularly for apple storage. However, one processing unit (JKHPMC) covering limited apple shed for producing apple juice concentrate was established long back in the district. The study in essence revealed that there is lack of convergence between production and apple based industrial and entrepreneurial value chain. The strategic alignment of the farm, the market functionaries, the processor and the cold chain needs to be realigned for ensuring productivity and adequate returns to each stakeholder. The emerging socio economic needs and increasing education in the valley has created a window of opportunities for large apple production base and needs to be converged and integrated into the value chain. The situation demands prospective planning in apple value chain in order to address the concerns of stakeholders.

Keywords: Apple, Marketing, Production, Value chain

1. INTRODUCTION

Apple is an ideal value chain in the temperate horticulture sector of India and is a profitable product for all value chain participants [1]. Apples in India are mainly grown in three mountainous states of North India viz. Jammu and Kashmir, Himachal Pradesh and Uttaranchal at an altitude of 4000 to 11000 feet. Jammu and Kashmir and Himachal Pradesh have roughly equal acreage under apple, but J&K has the highest average yield and accounts for 65 per cent of total apple production, hence important for economic growth [2]. Jammu and Kashmir State being endowed with natural advantage of topography, climate and enormous diversity of agro-climatic niches has immense scope for horticultural development. The apple cultivation in Jammu and Kashmir is an old age activity and around 200 varieties of apple were used to be cultivated in the state. Jammu and Kashmir contributes around 65 per cent of total apple production in the country and achieved a productivity of 13.07 metric tonnes per hectare which is highest in India and comparable to China, where the horticulture sector in the state contributed Rs. 5000 crores towards state gross domestic product during 2013-14 of which apple alone accounted for about 4000 crores [3]. Kashmir apple has lived upto its reputation for being one of the choicest fruits in India. A number of apple varieties are found indigenous to the state of which Ambri is “Par excellence”. Amongst all other fruit crops apple has found a better reception with the growers due to higher returns and ability to stand transportation stress [4].

In the horticulture sector of the state, apple proved to be the most important fruit crop by exporting 7 crore boxes annually. Apple is cultivated in almost all the ten districts of Kashmir region, with Baramullah, Kupwara, Shopian, Anantnag being the highest producers. The smaller quantities are also produced in a few pockets of Jammu and Ladakh regions. The harvesting of fruit begins from August for early maturing cultivars and continues till

November with peak activity in September and October. The apple crop dominates the horticultural industry and has an important role in economic scenario of the state. Involving around half a million households, apple plays a key role in the rural economy of the state. Nearly 30 per cent of total produce of apple crop going waste due to pre-harvest drop, making total annual quantum of such fruit about 0.25 million metric tonnes (MT) [5].

Although apple production in the state is increasing with positive growth momentum but there is not a significant growth in exports. Weak production and supply chain along with poor marketing strategies, low transparency in the marketing system have together completely eroded incentive for producers to improve quality and productivity of apple. The low quality of apple is linked with mono-culture of a few old cultivars; faulty pruning and training practices; use of seedling rootstock of unknown performance; deficiency of suitable pollinizers; ineffective control of pests and diseases; lack of institutional credit and efficient factor inputs are some other bottlenecks which have turned the terms of trade against producers.

The improvement in the production is quite important, but marketing has also an equal role to give a crop commercial orientation. There have been multi-dimensional efforts to increase the production of apple in the state but market regulation has not received proper attention [6]. Apple marketing being complex phenomena requires special treatment and utmost care in the Kashmir Valley. Present marketing system in the state has an inherent tendency to shift more benefits to intermediaries at the cost of apple growers. The present marketing structure is such that 87 per cent of the marketing functions are solely performed by these powerful intermediaries [7].

Apple produced in India is used for fresh consumption, with only small quantities used for processing into products such as apple juice, jelly, or jam. As per the horticulture census 1999-2000, about 30% of A grade, 40% of B grade and 30% of C grade of prefalls and culled apples account for substantial quantum of around 50 thousand tonnes which also needs to be exploited as raw material for processing industry [8].

2. OBJECTIVES AND METHODOLOGY

In the present study on “Value chain analysis of apple” we analyzed the overall performance of apple industry in Jammu and Kashmir. The study brought some salient features in value and supply chain responsible for augmentation of apple production in Jammu and Kashmir. The study was based on the null hypothesis that it will provide a guideline to flag agenda for policy planners so as to boost apple production with efficient delivery system, which is the main source of livelihood and contributor to the economy of the region, vs. the alternate hypothesis that it will not provide the same. The main objective of the study was to provide a concise picture of the entire value chain of apple in order to identify the constraints and opportunities.

A combination of secondary and primary data was collected followed by quantitative and qualitative assessment for comprehensive analysis to achieve the desired results and objectives of the study. District Baramulla of the Kashmir valley was delineated because of having maximum area (24952 ha.) under apple cultivation with the production of 423637 M.T. during 2014-15. Moreover, district experiences tremendous inclination of the farming community towards diversification of agriculture through apple cultivation [9]. One block viz. Pattan with the largest area/production from the selected district was selected to ensure wider coverage of the sample. Multistage Random Sampling was used to select the 75 farmers from 5 villages with 15 randomly selected farmers from each village. Primary data collection was followed by the personal interview method using pre-structured schedules.

3. RESULTS AND DISCUSSIONS

A value chain is the full range of activities including design, production, marketing and distribution; businesses go through to bring a product or service from conception to delivery. For companies that produce goods, the value chain starts with the raw materials used to make their products, and consists of everything that is added to it before it is sold to consumers. The value chain is the core business process in an organization that created and delivered a product or service from concept through development and manufacturing into a market for consumption and the integrated supply chain consisted of suppliers & organization [10;11]. This segment of this chapter gives an overview of the whole value chain of the Kashmiri apple in a value chain map with the main focus on the primary value chain actors, which make this value chain functional.

3.1 Value chain map

Fig 1 illustrates the value chain map of various actors involved in the apple value chain, from producers at the bottom all the way to the ultimate consumers. On the left, various functions are shown of the primary value chain actors, while on the right-side the various service providers or support organizations can be seen. Especially, the government support organizations have a strong role in determining the enabling environment through policies, subsidies, etc.

3.2 Value chain actors

The apple value chain map shown in Figure 1 is based on the Kashmir region, which is the main centre for commercial apple production (68%) and trade in India. Other areas of production, include Himachal Pradesh and Uttarakhand, and have similar production marketing structures. The main actors involved in production and trade are described below:

3.2.1 Production

Small farmers with apple surfaces of between 0.1 ha and 0.7 ha, for whom apple production constitutes a major component of household revenue but is unlikely to be the most important source of income. These farmers will have a volume of production generally under 1000 boxes of apple that justifies some effort spent at harvesting and marketing,

but they do not treat apple production as a commercial activity with a rationalized system of production that seeks to maximize returns to land or labour. Large farmers cultivating surfaces of over 0.8 ha (and up to 7 ha in one outlying case) that operate as true commercial apple orchards. Such farmers will invest in certified saplings of good genetic quality, prepare the soil on an annual basis, apply fertilizer and use gravity-fed flood irrigation. Mostly apply pesticides, although recommended dosages and spraying schedules are rarely respected. These farms generally produce over 2000 to 3000 boxes of apples in a season and many more if areas cultivated exceed one hectare. Yields may be similar to small farmers if no improved production technologies are used, but most farmers in this category can achieve yields in the 35 to 50 thousand kg per hectare range. Apple production for this category of farmer appears to be fairly profitable.

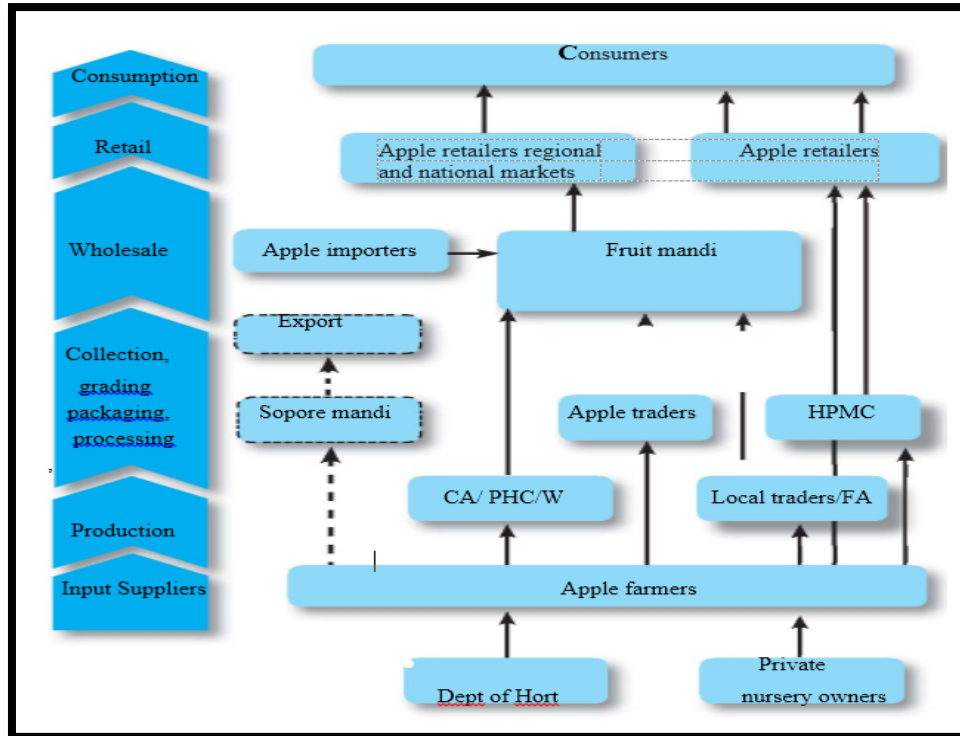


Figure 1: Value Chain Map

3.2.2 Pre-Harvest Contractor

Pre-harvest contractors are the persons specialized in performing various marketing functions. They are efficient marketers of fruits. They overcome the difficulty of small produce by way of contracting more than one orchard at a time and perform most of the marketing functions themselves.

3.2.3 Forwarding agents

These are specialized persons operating in the apple producing areas. Their main business is to arrange the transportation of produce of their clients to different markets. For performing this function they charge commission on per box basis. These agents also supply packaging and other material to the orchardists.

3.2.4 Commission agents (Arhatias)

A commission agent is a person operating in the wholesale market who acts as a representative of either a seller or a buyer. Orchardists consign their produce to commission agents in a particular market and take over physical handling of the produce and make arrangements for its sale, collect the money from the buyer, deduct his expenses and commission and remits balance to the seller. They sometimes provide advance money to the farmers for arranging packing material etc. with the stipulation that produce will be consigned to him for sale.

3.2.5 Wholesale trade

The wholesale markets in major cities are the critical link in the apple value chain that is characterized by a diversity of relatively fluid and unspecialized actors. An estimated 90% of all apples (both domestic and imported) pass through the wholesale markets of Kashmir. The market provides the physical space where farmers, traders, and retailers come together in the greatest volumes. Although some actors bypass the wholesale market, it is clear that the main tendencies of the Kashmir apple market are determined within the confines of the wholesale markets—and particularly the one in Sopore. This category of actor is practically the only true specialist in the entire apple value chain; they limit their activities to the import and wholesaling of imported food products, including apples. They do not sell in less than pallet sized loads, whereas all other actors deal in 18-to-20 Kg crates of domestic apples.

3.2.6 Distributors

These traders, who are largely unincorporated “physical persons,” assemble a variety of fresh produce from different sources, including imported and local products, and offer a basket of different fruits and vegetables that meets the desired needs of retailers. They generally rent smaller depots inside the wholesale market around the parking area

where small wholesaler trucks park when they arrive to sell in the market. Others are located near vicinity of the market. They purchase pallets of imported products, which they stack and combine with purchases of domestic products of all types from small wholesalers arriving in the market (or apples from larger wholesalers/importers). They usually purchase domestic produce in crates. While the mix of both Kashmiri and imported products changes during the seasons, distributors will seek to constitute a relatively constant array of the main fruits and vegetables so that they can attract a regular clientele of retailers who appreciate the convenience of rapid shopping and not having to conduct too many transactions with different small wholesalers.

3.2.7 Retail trade

No data on the breakdown of fruit sales volumes between the different retail market segments was found during the research for this study. Thus it is extremely difficult to assess trends in changing market shares of fruit and vegetables in general, or apples, in particular. Anecdotal observation and the reported opinion of market actors tend to support the view that the retail sector remains largely dominated by small neighbourhood retail grocery stores (including stores with a range of products and fruit and vegetable specialty retailers) and, especially, by the green (retail) market vendors. All categories of retailers buy local and imported apples mainly from distributors and occasionally from other sellers in the wholesale markets. No clear quality or product differentiation is practiced at the retail level, although market observers agree that some retailers in wealthier areas tend to buy and sell produce that is of better and more standard quality than retailers in lower income areas. The retailer earns his income from the difference in the sale and purchase price.

3.2.8 HPMC

The Horticultural Produce Marketing and Processing Corporation Ltd. was established in the year 1974 in Jammu & Kashmir. The main function of this corporation is to modernize apple marketing system by developing infrastructure for the post-harvest handling of apples on scientific lines. This HPMC has set up many mechanical grading and packing houses, cold storage facilities in producing areas and consuming markets, transportation facilities both ordinary and refrigerated and fruit processing plants. In addition, they have to make arrangements for the sale of fresh fruits and processed products in various markets, supply of packing material to orchardists, etc. these facilities are offered to apple growers in the form of integrated marketing system to make use of them for better returns, through value addition.

3.3 Returns from Apple Farming and Factors

Returns from bearing orchards were calculated on per hectare basis so as to present the actual picture of the economics of apple growing orchards. Results revealed that orchards exhibited gross returns of Rs 7,03,125 and net returns of Rs 4,94,063 (TABLE 1). Average production per hectare was 1875 boxes of apple, where one box contains 18 kg of fruit. Net returns from apple can be increased if the extension services are strengthened to educate the farmers about proper input use which was found below merit during the course of investigation. Average production cost per kg was found to be Rs 6.19 with the cost benefit ratio of 1: 3.39.

Estimates of regression function depicted in the same TABLE 1 revealed that plant protection chemicals and manures were the most significant and positive determinants of revenue from apple cultivation. Irrigation at the farm level also had a positive contribution to the improvement of revenue from apple, however its coefficient turned statistically insignificant. Pesticide level was found an important determinant of apple revenue due to the fact that more application of pesticides reduces the chance of losses in apple on scientific lines. Analysis further revealed that the irrigation and the labour component were also used efficiently on the farms.

Table 1. Returns from apple orchards and regression coefficient estimates

Returns from apple orchards during bearing stage		Regression coefficients explaining determinants on revenue		
Particulars	Cost (Rs ha ¹)	Independent variables	Estimated coefficients	P- value
Total production cost (Rs.)	208397	Fertilizers	0.36	0.015*
Average production (kg)	33750	Pesticides	9.03	0.045*
Gross returns (Rs.)	703125	Manures	1.30	0.000*
Net returns (Rs.)	494728	Irrigation	0.05	0.983
Production cost per kg(Rs.)	6.17	Labour	0.24	0.008*
Output/input ratio	3.37	Adjusted R ² (%)	92.10	

*Significant at 5% level of significance

Positive and significant coefficients indicated that revenue from the apple cultivation can be generated more by using efficiently these factors. Value of coefficient of adjusted R² shows that the exogenous variables specified in the model explained major variation (92.10%) in total revenue.

3.4 Marketing efficiency

Marketing efficiency essentially reflects the degree of market performance. An efficient marketing system is an effective agent of change and an important means of raising income level of orchardists and satisfaction level of consumers. It can be harnessed to improve the quality of life of the masses. The existence of competitive conditions and

desire to maximize profit are the main forces which induce firms to operate efficiently. During the course of study it was found that there are five prominent marketing channels in Kashmir valley for Apple [12], viz.

Channel-I: Producer-Wholeseller/Commission agent-Retailer-Consumer

Channel-II: Producer-Pre-harvest contractor- Wholeseller/Commission agent-Retailer-Consumer

Channel-III: Producer-Commission agent- Wholeseller-Retailer-Consumer

Channel-IV: Producer-Pre-harvest contractor- Commission agent- Wholeseller-Retailer-Consumer

Channel-V: Producer-Post-harvest contractor/potential growers-Commission agent-Wholeseller-Retailer-Consumer

The marketing efficiency of different channels as presented in the TABLE 2 revealed that the channel-I (0.68) turns out to be economically more efficient, followed by channel –III and channel- IV (0.43) and least efficient is channel-II (0.28). It was observed that producer got maximum share of consumers’ rupee in the channel where, produce was directly marketed to wholeseller. The contractor in turn trades his produce to wholeseller at higher prices than producer, because of higher bargaining power. An orchardist could earn maximum share of consumers price in the channel where he sells his produce directly to the whole seller. However, lack of liquidity potential, ignorance of market demand etc capitalizes into distress sale. Liberal cheap credit facility along with other incentives to apple growers would definitely increase their bargaining power.

Table 2 : Marketing efficiency of apple in different channels (in per cent)

S. No.	Particulars	Channels				
		I	II	III	IV	V
1.	Net price received by the farmer	68.17	28.92	43.35	39.46	28.92
2.	Total marketing cost	34.8	34.8	51.55	44.26	51.55
3.	Total marketing margin	65.19	66.7	48.45	48.45	48.57
4.	Marketing efficiency	0.68	0.28	0.43	0.43	0.29

Source: Field survey, 2015

3.5 Processing of apple

Nearly 30 per cent of total produce of apple crop going waste due to pre-harvest drop, making total annual quantum of such fruit about 0.25 million MT[13] . The apples which are wasted due to pre-harvest drop, under development of colour, inferior grade and other reasons are utilized for the purpose of processing. These apples cannot be marketed as they give negative returns to growers. Due to non-availability of adequate processing facilities in the state, such fruits do not find an appropriate outlet in the market. Though there have been multi-dimensional efforts to increase the production of apple in the state but processing sector has not received proper attention [14].

APEDA has identified Kashmir as Agri- Export Zone for apple. Two major processing plants are presently operating in Kashmir with a total annual installed capacity of 70,000 MT to process raw apple culls. The processing plant, owned by Jammu & Kashmir Horticulture Processing and Marketing Corporation (JKHPMC) is located at the hub of apple producing area, viz. Sopore of Baramulla district. The plant with installed capacity of 10,000 M.T. was established by CADBURY, India Pvt. Ltd. in early eighties and was purchased by JKHPMC in nineties. The other processing plant with an annual installed capacity of 60,000 MT was established in the year 1999, by a private entrepreneur, viz. FIL Industries at Rangreth, Budgam.

For the present study mega apple juice plant located in Budgam district was purposively selected to evaluate the economics of apple juice processing in the value chain because from last two years public sector JKHPMC plant is non-functional. Three years cross sectional data was collected from the processing plant for the reference years 2011-12

to 2013-14, to avoid any abnormal production period. On an average, plant realized a net return of Rs. 213.02 lacs per annum. The highest net return of Rs.270.21 lakh was in the year 2011-12, while it was lowest (Rs. 158.97 lakh) in the year 2013-14. The price of final product (CAJ) was Rs. 2151.21 lakh (TABLE 3). Overall, the results indicate that the processing unit had not fully utilized the installed capacity. Utilization of the plant to its installed capacity will not only reduce the cost of CAJ production and increase the net returns, but also will benefit the producers (orchardists) by utilizing their apple culls [15].

Table 3 Economics of apple processing (Rs. in lacs)

S. No.	Particulars	2011-12	2012-13	2013-14	Average
1.	Capacity utilized (%)	73.21	66.55	60.50	66.75
2.	Apple juice recovery	2583.66	2123.11	1746.86	2151.21
3.	Total processing cost	2313.45	1913.23	1587.89	1938.19
4.	Net returns	270.21	209.88	158.97	213.02

Source: Field survey, 2015, 25 % yield loss due to lack of processing @Rs 8 kg amounts to loss of Rs 1.25 lac per hectare

3.6 Apple storage

Advances in controlled atmosphere (CA) technology have had a dramatic effect on apple storage logistics and opened up markets hither to unavailable for fresh and processed apple products. This is an advantage not fully shared by apple in state whose shelf life extension by CA is much high in order to regulate supply and reduce mismatch in demand. The peak harvest season witnesses a glut in the market and depresses the price realization. This is caused by the absence of viable infrastructure to pack, transport and store apple in a manner designed to preserve quality and release the same in the market when the prices are attractive. Most of the outflow of the apples takes place during September to December, being the period of peak harvesting arrivals. The farmers will benefit from arrangements that reduce the peak arrivals during September to December, and delay the marketing till March-June of the next year. This will be possible if adequate storage facility suitable for apples is created and more importantly the holding capacity of farmer is increased through credit for stored apple.

There are 18 operational Cold Storages (CS) with a total capacity of 49769 MT in the state of Jammu & Kashmir, all of which are located in Jammu. These cold storages are multipurpose with a part of their capacity (say 30%, being about 15000 MT) used for storage of apples. There are 8 Controlled Atmosphere (CA) storages in the Kashmir valley with a total capacity of 42000 MT. The average capacity utilization is 60% during peak season and the annual average capacity utilization is estimated to be around 40%. The capacity is not fully utilized due to lack of awareness about grading, packing and storage as well as prevailing trading systems in the valley that focus on immediate sale after harvest. Due to seasonal nature of apple and no other commodity being stored in CA stores, capacity utilization is low. Better scientific cultivation practices, training, pruning, pre-harvest foliar sprays, proper harvesting and handling practices are likely to improve the availability of produce suitable for CA Storages. Although the importance and benefits of proper sorting, grading and packing is known to some of the growers, the same is done manually before bringing it to the market yards. Different grades are mixed up in manual sorting and grading which adversely affects the price realization to the growers and also reduces the bargaining power of the growers due to mixing of different grades. None of the market yards in the valley are equipped with any sorting, grading and packing facilities. Electronic sorting, grading and packing facilities are available with the CA Storages in the valley [16].

For the estimation purpose, three working cold store units were taken which allowed the farmer to store their produce in them at the rate of Rs.1.50 for four months and the results (TABLE 4) revealed that the net returns from storage to be greater than zero in all the three cases, hence, accounting for the positive returns on storage.

Table 4. Costs and returns from storage (Rupees per kg)

Name of the cold store unit	Market price (storage)	Selling price (destoring)	Storage cost	Gross returns	Net returns
Fruit Master Agro fresh Pvt Ltd. (Lassipora, Pulwama)	60	75	7.50	15	7.50
Golden Apple (Lassipora, Pulwama)	70	80	6.00	10	4.00
Fil Industries Pvt.Ltd. (Rangreth, Budgam)	55	65	5.00	10	5.00

Source: Field Survey, 2015

4. MAJOR ISSUES CONFRONTING

4.1 Lack of resources

Lack of resources generally faced by marginal farmers, results in lower investment for better production technologies. There is a need for creation of durable resources through contract/co-operative /corporate farming to cater such needs of the growers.

4.2 Shortage of effective fungicides and pesticides

In present scenario, farmers face the problems of disease and pests which are threat to industry and with this menace growers harvest less than thirty per cent grade A apple as against more than 50% in HP and 80% in Europe. A study conducted in Jammu & Kashmir, revealed that the fungicides and insecticides available in the market are not effective to rectify the problems. Other common glitches are poor adoption of spray schedule, advent of unregistered agencies/Spurious fungicides, loan market linked with pesticide trade and resistance & resurgence

4.3 Deficiency of labour

The shortage of skilled labour is another problem perceived by apple growers. This problem becomes more acute at the harvesting stage of apple when it overlaps with the paddy harvesting operations. Consequently, the farmers have to pay higher wages in order to complete the work in time

4.4 Deficiency of latest technical know-how

There is lack of latest technical know-how among the growers. Field functionaries do not make proper and sincere efforts to disseminate the latest technical know-how to the growers which is considered to be one important cause for low production and productivity in apple.

CONCLUSION

Apple production and marketing is an important economic pursuit and source of livelihood to 35 lakh people of the state of J&K. The state in recent years has given lot of attention to the development process of apple industry. However, there exists wide and marked gap in productivity of apple as compared to major apple producing countries of the world. This study being a humble stride to study apple production system of the state, emphasizes that the cost of cultivation is of wide interest to the users of cost data and assumes importance in the area of planning. The utility of data on the cost of cultivation of horticultural commodities for planning assumes importance as it guides the planners about the area where it is economical to produce and the regions which would accordingly be most suitable for the development of industries based on the agricultural raw material. High growth and low instability in production is pre-requisite for sustainable agricultural performance. There is a growing concern that with technological change in production, variability has increased. Since the magnitude of growth and instability in production has serious implications for policy makers, the period-wise growth and level of instability in area, production and yield of apple in the various districts of Kashmir region were estimated by using time series data from 2001-02 to 2014-15. The relative peace in the state has made it possible for farmers to focus on improving their livelihoods. The apple sector has the potential to influence several households and improve their economic prospects. New market players have to be invited in, resources found for investments, change in policy and support systems from the government and building capacities in individuals and institutions for effective and remunerative participation in the value chain. Some of the measures required to improve prospects of apple farmer can be taken at farm level and enterprise level. But a number of measures that are critical for ensuring an equitable return to the farmers have to be taken at a sector level in close coordination with the government. Hence, the revamp of apple sector has to be planned with a mix of investments, capacity building, innovations and committed institutional leadership.

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