Socio-Economic Analysis of Apple Beneficiaries in Kashmir Valley

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ABSTRACT

This present study attempts to examine apple production system of the Kashmir valley of J&K state. High growth and low instability in apple production is an ideal condition for achieving sustainable agricultural performance in the state. 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 Baramulla district 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.

Keywords: Apple, Kashmir, socio-economic, schemes

Apple is an ideal value chain in the temperate horticulture sector and is a profitable product for all value chain participants (Weinberger and Thomas, 2007; Zbanca and Negritu, 2013). 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 more than 65 per cent of total apple production, hence important for economic growth (Masoodi, 2003). 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 (Swarup and Sikka, 1987; Deepa, 2008). 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. Kashmir apple has lived up to its reputation for being one of the choicest fruits in India (Wani *et al*. 2015). Amongst all other fruit and field crops apple has found a better reception with the growers due to higher returns and ability to stand transportation stress (Mir, 2014).

The apple crop involving around half a million households dominates the horticultural industry and has an important role in economic scenario of the state (Malik and Choure, 2014). The trends in the apple production showed that the acreage has been increasing at a faster rate in the last five years and the farmers see more potential for the fruit. But the continued cultivation of apple in districts that are not best endowed naturally such as Budgam, Anantnag, Kulgam, etc., results in sub-optimal application of scarce resources (Ahmed, 2013). Increasing acreage

seems to be a spontaneous response to the need for higher incomes, rather than improved productivity and efficiency.

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 to large acreage under senile plantations; planting of varieties requiring cross pollination; shortage of quality planting material; low planting density; low quality of farm inputs; lack of irrigation ;inappropriate pruning practices; poor orchard management – including disease and pest control and inadequate extension services (Lone, 2014). Since the socio-economic characteristics of the households have an immense influence on the decision making process and profitability of apple enterprise, therefore, an attempt was made to study the Socio-economic characteristics of apple growers in Kashmir valley. The efficiency of farming is influenced more or less by the resource availability at the command of an individual farmer and socio-economic overheads. Formulation of various developmental programs and their implementation necessitate a critical examination of the existing resource endowments at farm level.

MATERIALS AND METHODS

The methodology adopted for the selection of study area, sampling design and analytical tool and concepts used in the study has been discussed under the following heads.

Selection of the study area

The study was an attempt to describe and quantify the various beneficiaries of apple value chain. District Baramulla of the Kashmir Valley was selected purposively 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.

Sampling design

Apple forms the most important fruit crops in J&K state. 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 as it experiences tremendous inclination of the farming community towards diversification of agriculture through apple cultivation (Hakeem *et al.* 2006). 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. Commensurate with the objective of the study, the sampling design adopted in the study was stratified simple random sampling technique and the sampling process consisted of following steps:

Selection of zone and villages

In the first stage of sampling, out of eight tehsils of the district Baramulla, the Pattan zone (tehsil) of the district was delineated. The zone is located 25 kms away from Srinagar, the summer capital of the state. This zone is rich in horticulture and the zone represents an aggregation of Baramulla district/ Kashmir valley that form extensive territorial zones characterized by dominance of the common physical, economical and social peculiarities. The list of villages from the delineated zone was prepared along with the area under apple cultivation. A cluster of 6 villages were delineated randomly from the pattan zone, located within a radius of 5 to 10 kilometers from the tehsil headquarters. The villages, namely, *Malpora, Nihalpora, Choker, Chekser, Palhalan* and *Hanjiwera Payeen* from the zone represent the cluster for the present investigation.

Selection of apple growers

During the second and final stage of sampling, a complete list of apple growers in selected cluster of villages was compiled along with their land holdings from the data generated by the revenue

department. Keeping in view the resource constraint and to present a complete picture of apple value chain, only 70 farmers were selected for the present study. These farmers were selected randomly from the sampled villages through proportional to size allocation method to the total number of farmers in each stratum by the following formula:

$$n_i = \frac{N_i}{N} \times n \; ; \; I = 1,2,3,4,5,6\ldots$$

Where,

n_i = Number of farmers to be sampled in i[th] village

N_i = Total number of farmers in i[th] village

N = Total number of farmers in all the selected villages

n = Total sample size to be chosen

The farmers were post stratified into three categories *viz.,* small, medium and large on the basis of their total holding size for the present study. The orchardists having less than 1 hectare of land were classified as small farmers, those having 1-2 hectares of land were classified as medium farmers, and the farmers with more than 2 hactares of land were designated as large farmers. However, in the sampled area no farmer was found to be present in category of large farmers, hence only two categories of farmers, viz: small and medium were taken into consideration.

Compound annual growth rate (CAGR)

Growth rate was used to measure the past performance of economic variables. CAGR is a business and investing specific term for the smoothed annualized gain of an investment over a given time period. CAGR is not an accounting term, but remains widely used, particularly in growth industries or to compare the growth rates of two periods because CAGR dampens the effect of volatility of periodic returns that can render arithmetic means irrelevant. CAGR is often used to describe the growth over a period of time of some element of the business.

$$CAGR(t_0, t_n) = \left\{ \frac{V(t_n)}{V(t_0)} \right\}^{\frac{1}{t_n - t_0}} - 1$$

Where, $V(t_0)$: start value, $V(t_n)$: finish value, $t_n - t_0$: number of years.

RESULTS AND DISCUSSION

Efficiency of farming is influenced more or less by the resource availability at the command of an individual farmer and socio-economic overheads. Formulation of various developmental programs and their implementation necessitate a critical examination of the existing resource endowments at farm level. The socio-economic characteristics of sample households have immense influence on the decision making process and profitability of apple enterprise. An effort has been made to compare and contrast the resource endowments of apple producers in the zone under following sub-sections.

Growth and Variability of Apple in the District Baramulla at Disaggregate Level

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 Baramulla district of Kashmir region was estimated by using time series data from 2001-02 to 2014-15. Based on the annual compound growth rates, the fruit crops can be classified into four categories: Category A (high growth rate) – growth rate of 5% or above, category B: (moderate growth) - growth rate of >1 and 5%, category C (slow growth) - growth rate upto 1% and category D (negative growth rate) - growth rate of < 0%. Similar classification has been followed by Cuddy and Della (1978), Deb *et al*. (1999) and Shaheen and Shiyani (2004).

The Table 1 represents the growth in area and production under apple for the last decade (2001-02 to 2014-15) in the district. Apple has shown a remarkable growth in area with a percentage increase of 4.71 per cent compound annual growth rate (CAGR) in the valley. However, the growth rate in terms of area under apple cultivation has been seen in the Baramulla district (1.86%) shows a significant trend. The performance of apple crop over the period in the valley is a bit pronounced on production front with CAGR of 0.23 per cent. In terms of yield of apple, yield depicted a negative

Table 1: Growth & variability in area, production & yield of apple at disaggregate level

District/Region	Area			Production			Yield		
	CGR	R2	CV	CGR	R2	CV	CGR	R2	CV
Baramulla*	1.86	0.89	7.82	0.23	0.0001	19.34	-1.60	0.16	17.08
	Moderate growth and moderate variability*			Low growth and high variability			Negative growth and high variability		
Kashmir	4.71	0.98	≤0.000	3.28	0.43	21.20	-1.37	0.16	14.31
	Moderate growth and high variability*			Moderate growth and high variability*			Negative growth and high variability		

Data Source: Directorate of Horticulture (P&M), Kashmir (Significant at 5% level); *Includes district Bandipora.

trend because most of the area brought under cultivation is in transition phase. It is general hypothesis that production instability has increased due to technology transfer. In order to confirm this hypothesis, the variability was also computed and classified into <6% - low variability, 6%-10% - moderate variability, >10% - high variability. For period 2001-14 the apple has registered moderate growth with moderate instability in area and low growth with high instability in production front while as negative growth with high instability on the productivity front in the valley which may be attributed to the many factors.

Categorization of apple growers

The survey from the study area showed that the area under fruit trees was 29367 hectares out of which an estimated 84% were apple farms—implying that the Baramulla district has a total area of 24675 hectares under apple farms. Of this number, 40 % are estimated to have land areas under 0.1 ha allotted to fruit-tree cultivation. Such farmers cannot be considered to be real fruit producers in any commercial sense because little, if any, of their production reaches the market. The apple growers can be grouped into two major categories:

Small growers with land holding under apple upto 1.0 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 labor. They have limited receptivity to improved technologies and little ability to make new investments in apple production. Yields among farmers in this category are estimated to be in the 18 thousand kg per hectare range.

Medium growers are those farmers who are cultivating over 1.0 - 2.0 ha of land under apple 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.

Most also 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 40 to 50 thousand kg per hectare range. Apple production for this category of farmer appears to be fairly profitable (Table 2 & 3).

Table 2: Categorization of sample farm households

Farm category	No. of farmers	Percentage
Small (0-1 ha)	26	37.14
Medium (1-2 ha)	44	62.86
Large(> 2 ha)	Nil	—
Total	**70**	**100**

Source: Field survey, 2015.

The small size of most orchard plots is a major constraint for apple orchard development because

it limits capital investment possibilities and, in the absence of any collective marketing, makes for a multiplicity of farm level points of sale that add to collection costs.

Table 3: Categorization of apple growers in different villages (In Number)

Name of the village	Small farmers	Medium farmers	Total farmers
Nihalpora	3	12	15
Chekser	4	6	10
Choker	2	7	9
Malpora	3	2	5
Hanjivera Payeen	6	5	11
Palhalan	8	12	20
Total	**26**	**44**	**70**

Source: Field survey, 2015.

Family size, sex ratio and earning members

The economic growth and employment generation depends on the availability of labour force in the family, which ultimately depends upon family size. The type and size of the family, work force and literacy among the apple growers are the important factors influencing the apple crop enterprise, which happens to be family labour based occupation at the village level. These factors determine the socio-economic well-being of the family in particular and the area under consideration at large. It plays a vital role in farm business and marketing activities. Information on family profile was collected from the sample households in the study area and the results are presented in Table 4. The overall average family size was 8.63 persons consisting of about 3.68 males, 3.24 females and 1.70 children. The average family size was found to be 8.29 persons in case of small sample households as compared to 8.97 persons on medium farms in this region. On an average it was observed that there were 880 females for every 1000 males and were in close proximity to the figures obtained in the human census of 2011. Each family consisted of earners, helpers and dependents. The number of agricultural earners included those who were deriving their livelihood from agriculture and allied activities and included agricultural labourers on other farms. On an average each family possessed 26.25 per cent earners.

Table 4: Family size, sex ratio and earning members (Number/family)

Particulars	Jammu & Kashmir		Overall average
	Small	**Medium**	
No. of sample households	26	44	70
Males	3.72	3.65	3.68
Females	3.19	3.29	3.24
Children	1.38	2.03	1.70
Total per family	8.29	8.97	8.63
Sex Ratio	858	901	880
Earning members (%)	25.38	27.13	

Source: Field survey, 2015.

Educational indicators

Literacy level plays a catalytic role in the scientific management of farming and more so in case of new technology adoption. Education plays a vital role in the betterment of socio-economic conditions and provides healthy as well as clear environment for a good standard of living through a developmental change in social and cultural life of the people, living both in plains and hilly regions. The educational status of farm families is an indicator of human capital formation and economic status. An educated head of household is an important indicator to influence decision making process in managing his livelihood sources efficiently and effectively. Better formal education helps the farmer in improving his/her ability to know modern science and technology and in utilizing them for betterment of living.

Table 5: Distribution of head of household according to educational status (in per cent)

Educational status	Small	Medium	Overall average
Illiterate	45.34	42.02	43.68
Primary/Middle	17.60	17.66	17.63
High school	23.94	25.22	24.58
Graduate and above	13.12	15.10	14.11
Total	**100**	**100**	

Source: Field survey, 2015.

Education also helps in adopting better cultivation practices of the crops as well appropriate technologies. Keeping this point in view the respondents were

categorized into four categories viz. illiterate, primary/middle education, high school education and college education. The distribution of sample households according to the education of the head of the family is shown in Table 5. On an average 43.68 per cent heads of respondents were illiterate. The persons having primary/middle level education, high school and graduates comprised of 17.63, 24.58 and 14.11 per cent respectively. The analysis among the farm categories revealed that incidence of illiteracy was on higher side and was more pronounced among small orchardists compared to medium orchardists.

Occupational distribution

Occupational distribution of the head and other members of the family is very important in determining the economic status of the family. It is assumed that more developed is the area, the more diversified the employment pattern and same would result in increased income to the household. Across all the surveyed villages of the zone, the main livelihood activities were agriculture with about 67.56 per cent of working force (Table 6).

Table 6: Main and subsidiary occupation of the respondents (% of households)

Particulars	Small	Medium	Overall average
Main occupation			
Agriculture	64.02	71.10	67.56
Livestock	4.48	1.70	3.09
Labour, artisans, others	6.63	1.70	4.17
Business	4.28	6.10	5.19
Service	3.49	4.11	3.80
Subsidiary occupation			
Agriculture	10.16	9.45	9.80
Livestock	1.07	0.68	0.88
Labour, artisans, others	3.20	1.11	2.15
Business	1.07	1.35	1.21
Service	1.60	2.70	2.15
Total	**100**	**100**	

Source: Field survey, 2015.

Although, not significant, there is general tendency for the relative importance of agriculture as the main and livestock rearing as subsidiary activity. Other occupations i.e. labour/rural artisans, business etc. could not find a significant place as an occupational source in various villages. On an average, business, labour and service are the major occupations of 5.19, 4.17 and 3.80 per cent respectively. To sum up one may conclude that wage labour is more prominent among small category farms, while service and business is more predominant among medium category farms. Agriculture is the subsidiary occupation of nearly 9.80 per cent workers in the total work force. The workers whose subsidiary occupation is the wage labour were present mainly among small orchardists.

Livelihood resources

The natural resources in the surveyed villages primarily comprise land, water and livestock. The income of a household largely depends upon the utilization of available resources. These are the basic building blocks upon which households are able to undertake production, engage in labour markets and participate in reciprocal exchanges with other households (Ellis 2000, Singh, *et al.* 2007). The important livelihood resources are discussed under following categories.

Average land holding

Land is the main resource base of farmers in the production process. The economic and social progress of the farmers in India largely depends on the size of operational holding (Dhaka *et al.* 1998). The small size of holdings is one of the principle causes of inefficiency of our agriculture with perceptible tendency towards a continuous decrease in size due to rapid population growth.

Table 7: Average land holding (ha/household)

Particulars	Small	Medium	Overall average
Irrigated land	0.37	0.97	0.67
Orchard land	0.87	1.84	1.36
Fallow land	0.01	0.03	0.02
Land put to other uses	0.06	0.14	0.10
Operational land	1.24	2.81	2.03
Total	**1.31**	**2.98**	**2.15**

Source: Field survey, 2015.

Land distribution pattern among landholders was highly skewed with high proportion of smallholders. The average holding size is so low in the state that if scientific farm practices/diversification not followed livelihood asset is not economically viable (Wani *et al.* 2004). The data presented in the Table 7 revealed that the operational area in case of sample households from small and medium farms was 1.24 and 2.81 hectares respectively. On the average, of the total land holding, orchards occupied nearly 1.36 hectare area, followed by irrigated land (0.67 ha). The area occupied by the fallow land and other land uses comprised of 0.02 and 0.10 hectares respectively.

Distribution of area under fruit crops

The distribution of area under fruit crops is given in Table 8. The perusal of the table showed that, apple occupied more than 89 per cent of fruit area, followed by pear, peach and cherry in almost both the categories of the farms. These figures are also in agreement at the state level.

Table 8: Area under fruit crops in the sampled region

Category	Area under orchards (hectares)	Apple	Pear	Peach	Cherry
Small	0.87	91.48	4.05	3.08	1.38
Medium	1.84	87.96	6.17	4.56	0.88
Overall average	1.36	89.72	5.11	3.82	1.13

Source: Field survey, 2015.

Cropping pattern and intensity

Agriculture in the state is characterized by subsistence farming a prominent feature of hill agriculture. The cropping pattern shows the spatial distribution of different crops with respect to area at a particular point of time and thus, indicates the relative importance of each crop in the total cropped area. Allocation of area under crops depends mainly on physical and environmental factors like the type of soil, climate, etc. It is also governed by the economic factors such as prices of the outputs, income, cost of inputs, farm size, availability of inputs, marketing outlet, etc. The spatial allocation of area under different crops grown in the study area has been

given in Table 9. Overall apple farming dominates the whole cropping scenario, occupying on an average more than 1.36 hectares per farm. Paddy and vegetable crops were found to be most important kharif crops in the zone. These field crops were grown by orchardists to meet their domestic demand. The cropping intensity was higher (108.4 %) on small farms than the medium farms (106.4 %), with an overall average of 107.0 per cent. Low cropping intensity could be attributed due to perennial crops dominating the production system.

Table 9: Cropping pattern and intensity (ha/household)

Particulars		Small	Medium	Overall average
Kharif	Paddy	0.37	0.97	0.67
	Fruit crops	0.87	1.84	1.36
	Fodder	0.01	0.03	0.02
	Vegetables	0.06	0.14	0.10
Total *kharif*		**1.31**	**2.98**	**2.15**
Rabi	Oilseeds	0.04	0.02	0.03
	Fodder	0.01	0.03	0.02
	Vegetables	0.06	0.14	0.10
Total *rabi*		**0.11**	**0.19**	**0.15**
Gross cropped area		1.42	3.17	2.30
Net cropped area		1.31	2.98	2.15
Cropping intensity (%)		108.4	106.4	107.0

Source: Field survey, 2015.

Livestock resources

Livestock is an important sub sector to agriculture in Jammu and Kashmir, providing gainful employment and nutritional security to a large section of rural population. The surveyed households maintain livestock for milk production, draught power and small ruminants for additional source of income. The productivity of apple orchards is greatly affected by the use of farm yard manure. The detailed view of different types of livestock being kept on different categories of selected farms is presented in the Table 10. One of the significant features of the table is that small orchardists keep more number of animals as compared to medium category in order to supplement their farm income. Low availability of per capita land, substantial availability of common property resources, and lack of other income

generating activities compels the small farmers to rear more number of animals.

Table 10: Livestock density in the sampled household (No./household)

Livestock	Small (No.)	Medium (No.)	Overall average
Cows	2.28	2.00	2.14
Bullocks	1.00	1.25	1.12
Young stock	1.08	0.30	0.69
Small ruminants	2.22	2.86	2.54
Total	**6.58**	**6.41**	**6.49**

Source: Field survey, 2015.

The Table 10 depicts that, on an average, each orchardist keeps 6.49 animals in the study area. Of the total livestock population, crossbred cows being an important source of milk production dominates the livestock based production system in both the categories of farms. They are the major source of milk production. Next in importance are the small ruminants with an average of 2.54 animals per household. Bullocks, which constitute the major source of draft power varied from 1.00 to 1.25 on various farms. The share of young stock worked out to be 0.69 animals per household.

CONCLUSION

Apple production is an important economic pursuit and source of livelihood to 35 lakh people of the state of J&K and particularly to the people of Baramulla district. 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. 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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