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A study on the socio-economic status and constraints faced by the mango growers in adoption of improved post-harvest management practices in Jammu district of Jammu and Kashmir

Pratima Rana, Poonam Parihar, Priyanka Shah and Neeraj Singh Parihar

Abstract

Horticultural crops form a significant part of total agricultural produce in the country comprising of fruits, vegetables, root, tuber, flowers etc. and become key drivers of economic development in the country. They contribute 30 per cent to Agriculture GDP. Mango is a stone fruit and is produced in tropical and sub-tropical climates in more than 85 countries in the world. The total production area in the world is around 3.69 Mha and the production is around 35 million tonnes. Jammu division has vast potential for horticultural crops and is suitable for cultivation of sub-tropical fruits like mango. In order to find out the constraints faced by the mango growers, a study was conducted. Based on proportionate random sampling technique a sample of eighty mango growers were taken for the study. The findings revealed that majority of the farmers fell under middle age group, one-third of respondents were educated up to high school and around half of the respondents were observed to be small farmers. The farmers' primary source of information was the local Horticulture department (85.00%). A cent percentage of respondents expressed the constraints of lack of processing unit followed by marketing problems (88.75%) and lack of technical knowledge (86.25%).

Keywords: Constraints, post-harvest management, proportionate, temperate and tropical

Introduction

India has experienced a considerable degree of crop diversification in term of changes in the area under various crops since the Green Revolution, which was largely oriented towards increasing food grains production to meet the objective of self-sufficiency and resolve the food security problem of the country. In the past decade, the change in cropping pattern is more towards the horticulture sector and commercial crops (Mittal, 2007) [10].

Horticultural crops play a unique role in India's economy by improving the income and status of the rural people. The country is the second largest producer of fruits and vegetables in the world, after China. India produces around 185 million metric tonnes of vegetables and 98 million metric tons of fruits which respectively accounts for nearly 11.90 and 15 percent of country's share in the world production of vegetables and fruits. Its role in the country's nutritional security, poverty alleviation and employment generation programmes is becoming increasingly important (NHB, 2018) [11].

Mango (*Mangifera indica*) is a fleshy stone fruit belonging to the genus *Mangifera*, consisting of numerous tropical fruiting trees in the flowering plant family Anacardiaceae. Mango (*Mangifera indica*) is produced in most frost free tropical and sub-tropical climates and more than 85 countries in the world cultivate mango. The total production area of mango in the world is around 4,946 thousand hectares and the production in the world is around 37.12 million tonnes by the year 2010. India occupies the top most position among mango growing countries of the world producing about 40.48 percent of the total mango production (Hussen and Yimer, 2013) [6]. The leading mango producing states in India are Andhra Pradesh, Uttar Pradesh and Gujarat, with popular varieties such as Neelum, Bangalora, Alphonso, etc. In Jammu and Kashmir (J&K), the major mango producing districts are Jammu (13,033MT), Kathua (6,081MT), Udhampur (3,700MT) and Samba (2,810MT) (Anonymous, 2021) [1].

Post-harvest management means the handling of an agricultural product after harvest to prolong its storage life, freshness and attractive appearance. The horticulture crops are perishable in nature and require special attention in their harvesting, handling, packaging,

storage and processing operations. It is observed by the experts that 10 percent losses occur at field level, 5 percent during transportation, 2 percent during packaging, 9 percent at storage and 4 percent at processing, aggregating to 30 percent. Jammu division with three agro-climatic zones *viz.* sub-tropical, intermediate (low hills) and temperate has vast potential for horticultural crops (Anonymous, 2021) [1]. The land is suitable for cultivation of tropical fruits like mango, citrus crops, guava, litchi, ber, papaya and other minor fruits.

Importance of post-harvest management practices in mango lies in the fact that it has the capability to meet the requirement of growing population by elimination losses, making more nutritive items from its pulp by proper processing and fortification. Even though, a number of post-harvest management practices are being recommended to maximise benefits, the mango growers are not adopting the recommended practices. Thus, the technologies vary from farmer to farmer according to their personal and socio-economic characteristics, perceived training needs, factors of production and the problems in post-harvest management. A thorough knowledge of the post-harvest management practices by the mango growers/orchardists would help them in reducing the loss and obtaining the higher yields. The constraints encountered by the farmers in adoption of post-harvest management practices will serve as feedback for identifying the interventions which can facilitate the adoption process. The finding will help the extension agencies and administrators to lay more stress in removing the constraints of the mango growers/orchardists towards the adoption of post-harvest management practices. As a result, the primary goal of this study was to examine the socio-economic position of mango growers in Jammu district, as well as the many barriers they faced in adopting improved post-harvest management measures.

Material and Methods

Jammu is located at 32.73°N 74.87°E and has an elevation of 300 m on average (980 ft). Jammu is situated on low-lying uneven ridges in the Shivalik hills. The Shivalik range borders it to the north, east, and southeast, while the Trikuta Range surrounds it to the northwest. Mango is grown extensively in the Jammu district. The study on the post-harvest management practices was therefore undertaken in Jammu district. The mango cultivating blocks of Jammu *viz.* Marh, Balwal, Khour, Akhnoor, and Dansal were selected for the study.

A descriptive research design was selected for the study purpose. Purposive cum proportionate random sampling technique was applied to select a total of eighty respondents. The highest number of orchardists/growers was chosen as the criterion for selecting different blocks. As a result, five out of eight blocks *viz.*, Marh, Bhalwal, Dansal, Khour, Akhnoor were identified for the study. The list of the mango growers was procured from the Department of Horticulture, Government of Jammu and Kashmir. The responders were chosen based on the quantity of mango trees owned by the orchardist. The orchardists who had fifty or more trees were considered for the study. The block wise selection of respondents was done by proportionate random sampling technique. The final selection of eighty respondents was

conducted through random number generator from the selected blocks in Jammu district.

Results and Discussion

Socio-economic profile of the respondents

The socio-economic profile of the respondents is given in Table 1 and described as under:

1. Age

The background information of the respondents was gathered in order to determine their socioeconomic profile. According to the results in Table 1, 37.50 percent of respondents in the Jammu district were between the ages of 30 and 50, while 23.75, 20.00 and 18.75 percent were between the ages of 50 and 59, 30 to 50, and 70-82 years, respectively.

2. Education

According to Table 1, the total average number of formal schooling years completed in Jammu district was seven years, whereas it was thirteen years in Marh, nine, eight, six, and five years in Bhalwal, Dansal, Khour, and Akhnoor blocks, respectively. Overall, 23.75 percent of respondents studied up to 'matriculation' level, and 20.00 percent studied up to 'middle' level. At the same time, 8.75 and 10 percent of respondents studied up to 'higher secondary' and 'primary' levels, correspondingly. Furthermore, only 10.00 percent of respondents possessed a 'graduate and above' qualification, while 27.50 percent were illiterate.

3. Family size

In terms of family size, the average total family size in Jammu district was seven members, with five adult members and two minors. The average family size in Bhalwal block was 10 people, but it was nine members in Khour, eight members in Dansal, six members in Akhnoor, and four members in Marh block. Overall, 56.25 percent of respondents in Jammu district have a family size of 1-7 members, 35.00 percent have a family size of 7-13 members, and only 8.75 percent have a family size of 13-23 members.

4. Operational land holding and farm size

The overall average operational land holding in the Jammu district was 2.05 hectares, with 51.25 percent irrigated land and 48.75 percent unirrigated land. Furthermore, in terms of farm size, 15.00 percent of respondents in Jammu district fall into the marginal category with less than one hectare of land, 47.50 percent fall into the small category with one to two hectares of land, 26.25 percent fall into the semi medium category with two to four hectares of land, 8.75 percent fall into the medium category with four to ten hectares of land, and only 2.50 percent fall into the large category with more than ten hectares of land.

5. Distance of village from different places

In terms of distance, the general average distance of the village from the local market was 8.94 kilometres, and pesticides shop was 7.79 kilometres; fertiliser shop was 15.38 kilometres, and department of horticulture was 9.61 kilometres, and private horticulture nursery was 20.69 kilometres.

Table 1: Descriptive statistics regarding socio-economic status of the mango growers

Parameter	Marh (n=07)	Bhalwal (n=13)	Khour (n=05)	Akhnoor (n=49)	Dansal (n=06)	Total (n=80)
Age (% farmer)						
30-50 years	02 (28.57)	06 (46.15)	01 (20.00)	07 (14.29)	00 (0.00)	16 (20.00)
50-59 years	03 (42.86)	01 (7.69)	00 (0.00)	14 (28.57)	01 (16.67)	19 (23.75)
59-70 years	02 (28.57)	05 (38.46)	03 (60.00)	18 (36.73)	02 (33.33)	30 (37.50)
70-82 years	00 (0.00)	01 (7.69)	01 (20.00)	10 (20.41)	03 (50.00)	15 (18.75)
Education level						
Illiterate	00 (0.00)	01 (7.69)	01 (20.00)	18 (36.73)	02 (33.33)	22 (27.50)
Primary	00 (0.00)	00 (0.00)	03 (60.00)	05 (10.20)	00 (0.00)	08 (10.00)
Middle	00 (0.00)	06 (46.15)	00 (0.00)	10 (20.41)	00 (0.00)	16 (20.00)
Matric	02 (28.57)	03 (23.08)	00 (0.00)	12 (24.49)	02 (33.33)	19 (23.75)
10+2	01 (14.28)	02 (15.38)	00 (0.00)	04 (8.16)	00 (0.00)	07 (8.75)
Graduate and above	04 (57.14)	01 (7.69)	01 (20.00)	00 (0.00)	02 (33.33)	08 (10.00)
Size of family						
1-7 members	07 (100.00)	02 (15.38)	03 (60.00)	31 (63.27)	02 (33.33)	45 (56.25)
7-13 members	00 (0.00)	08 (61.54)	00 (0.00)	17 (34.69)	03 (50.00)	28 (35.00)
13-23 members	00 (0.00)	03 (23.08)	02 (40.00)	01 (2.04)	01 (16.67)	07 (8.75)
Average number of adults	28	88	29	256	33	5.43
Average number of children	01	46	14	50	14	1.56
Land holding						
Total area	2.21 ± 0.99	4.90 ± 5.10	3.08 ± 1.03	1.23 ± 0.61	1.50 ± 0.76	2.05 ± 2.55
Irrigated	07 (100.00)	04 (30.76)	04 (80.00)	25 (51.02)	01 (16.67)	41 (51.25)
Unirrigated	00 (0.00)	09 (69.92)	01 (20.00)	24 (48.98)	05 (83.33)	39 (48.75)
Farm size*						
Marginal (<1 ha)	01 (14.28)	01 (7.69)	00 (0.00)	10 (20.41)	00 (0.00)	12 (15.00)
Small (1-2 ha)	00 (0.00)	03 (23.08)	00 (0.00)	31 (63.26)	04 (66.67)	38 (47.50)
Semi medium (2-4 ha)	05 (71.42)	03 (23.08)	04 (80.00)	07 (14.28)	02 (33.33)	21 (26.25)
Medium (4-10 ha)	01 (14.28)	04 (30.76)	01 (20.00)	01 (2.04)	00 (0.00)	07 (8.75)
Large (>10 ha)	00 (0.00)	02 (15.38)	00 (0.00)	00 (0.00)	00 (0.00)	02 (2.50)
Average distance of village (km)						
Market/mandi	15.00	13.31	12.60	4.37	26.67	8.94
Pesticide shop	1.57	13.31	13.00	4.37	26.67	7.79
Fertilizer shop	1.57	13.31	13.00	4.37	26.67	15.38
Department of horticulture	10.00	14.62	13.00	5.19	31.67	9.61
Private horticulture Nursery	10.00	15.00	34.00	21.22	30.00	20.69

Figures in the parentheses are percentages

*Categorization of farm size as per MoA (2014)

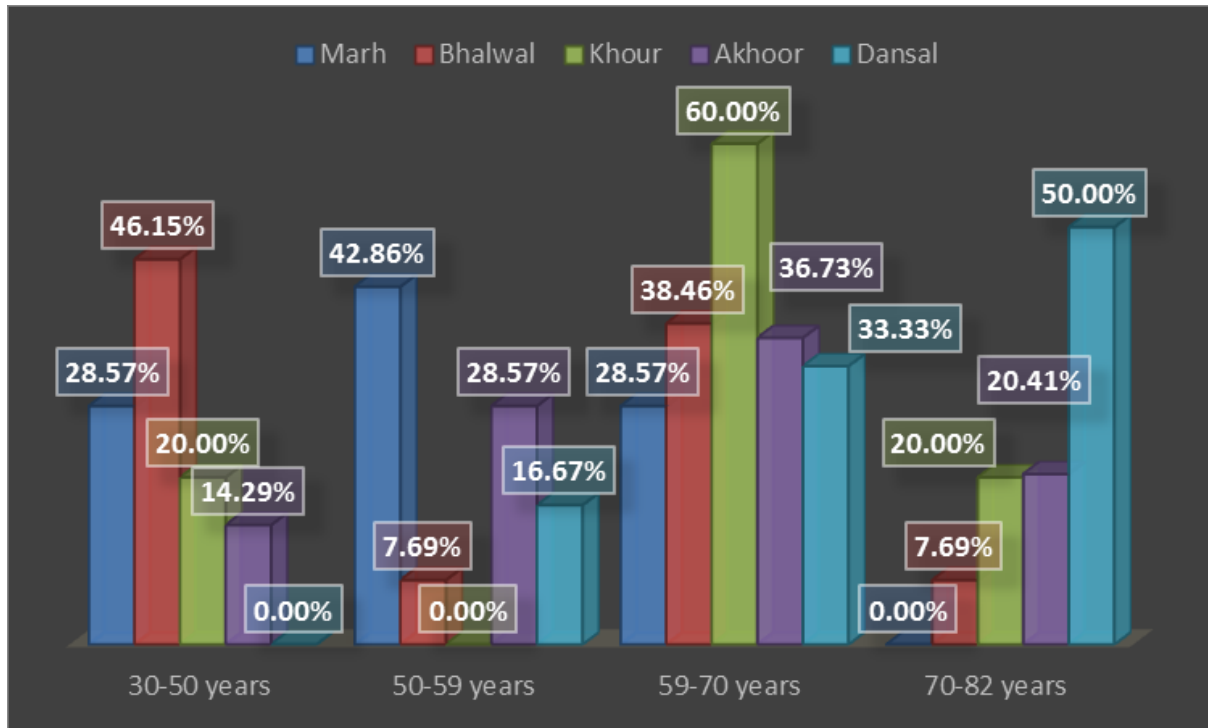


Fig 1: Distribution of the respondents according to their age group

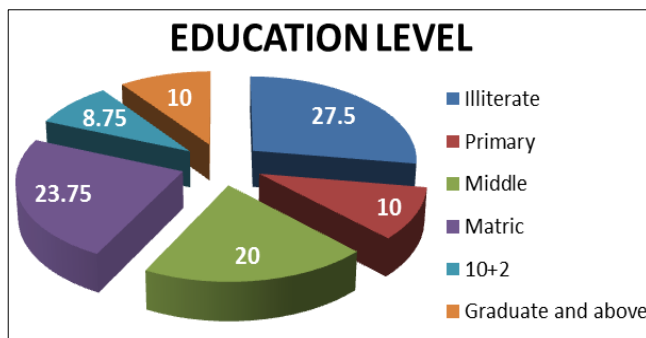


Fig 2: Distribution of the respondents according to their education level

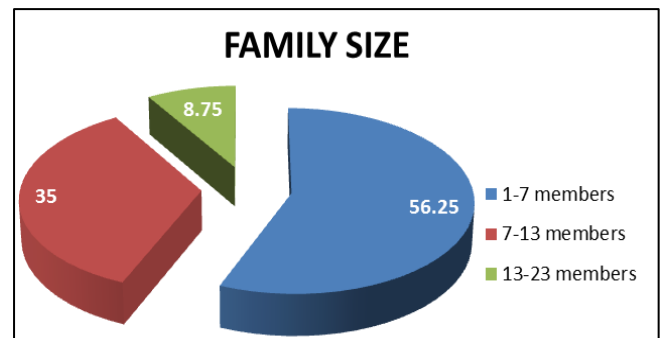


Fig 3: Distribution of the respondents according to their family size

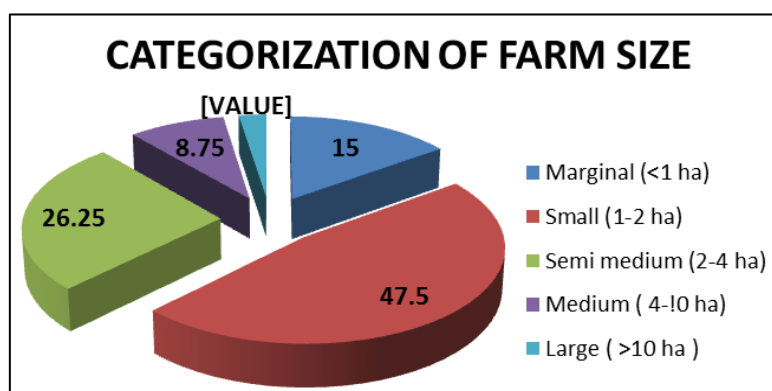


Fig 4: Distribution of the respondents according to their family size

6. Farmers’ sources of irrigation

The irrigation sources used by the sampled farmers under study are given in Table 2. In Jammu district, 48.75 percent of respondents relied on rainwater for irrigation, while 35.00, 10, and 6.25 percent had access to electric tube wells, canal water, and water collection structures (talab), respectively. Dansal block had 83.33 percent of respondents who supplied irrigation water by canal, followed by Bhalwal and Akhnoor sub-divisions with 61.54 and 44.90 percent, respectively. In

the case of an electric tube well, 60.00, 42.86, 23.08, and 16.67 percent of respondents in Khour, Akhnoor, Bhalwal, and Dansal blocks, respectively, had access to a source of irrigation. Canal water was used by approximately 10 and 20 percent of respondents in the Marh and Khour areas, respectively. And 20.00, 15.38, and 4.08 percent of responders in Khour, Bhalwal, and Akhnoor blocks, respectively, had a water harvesting structure.

Table 2: Source of irrigation

Source of irrigation	Marh (n=07)	Bhalwal (n=13)	Khour (n=05)	Akhnoor (n=49)	Dansal (n=06)	Total (n=80)
Canal water	07 (100.00)	00 (0.00)	01 (20.00)	00 (0.00)	00 (0.00)	08 (10.00)
Electric tube well	00 (0.00)	03 (23.08)	03 (60.00)	21 (42.86)	01 (16.67)	28 (35.00)
Rain water	00 (0.00)	08 (61.54)	00 (0.00)	26 (53.06)	05 (83.33)	39 (48.75)
Talab/ water harvesting structure	00 (0.00)	02 (15.38)	01 (20.00)	02 (4.08)	00 (0.00)	05 (6.25)

Figures in the parentheses are percentages

7. Occupational status of the mango growers

The results from Table 3 show that in the overall Jammu districts (N=80), the workforce consisted of 222 members, with 47 members (58.75 percent) relying solely on agriculture

for a source of income, 28 members (35.00 percent) relying on agriculture + service, and only 5 members (6.25 percent) relying on agriculture + business.

Table 3: Occupational status of farmers

Occupational status	Marh (n=07)	Bhalwal (n=13)	Khour (n=05)	Akhnoor (n=49)	Dansal (n=06)	Total (n=80)
Workforce (no.)						
Farmer	04 (57.14)	08 (61.53)	03 (60.00)	30 (61.22)	02 (33.33)	47 (58.75)
Farmer + service	03 (42.86)	05 (38.46)	01 (20.00)	15 (30.61)	04 (66.67)	28 (35.00)
Farmer + business	00 (0.00)	00 (0.00)	01 (20.00)	04 (8.16)	00 (0.00)	05 (6.25)
Total family size (no.)	29	134	43	306	47	559
Work force (no.)	15	73	08	110	16	222

Figures in the parentheses are percentages

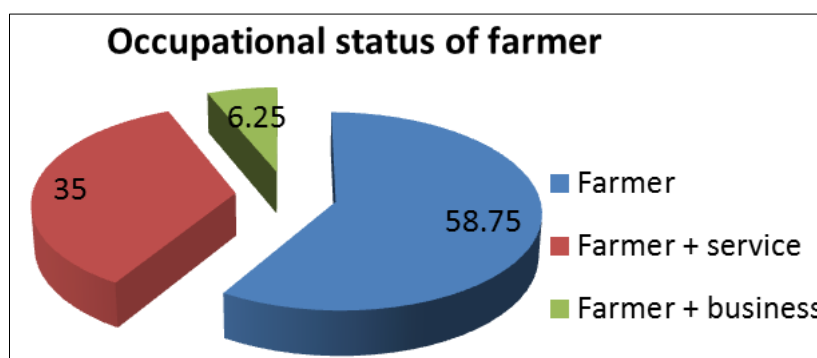


Fig 5: Distribution of the respondents according to their occupational status

8. Horticulture and field crops cultivated by the mango growers

According to Table 4, the average area under mango was 1.23 hectares. Other field crops cultivated by mango orchardists

included wheat (1.10 ha), rice (0.10 ha), maize (0.70 ha), vegetables (0.15 ha), fodder (0.03 ha), pulses (0.21 ha), bajra (0.40 ha), and mustard (0.10 ha).

Table 4: Horticulture and field crop cultivated

Average area	Marh (N=07)	Bhalwal (N=13)	Khour (N=05)	Akhnoor (N=49)	Dansal (N=06)	Total (N=80)
Average area under mango (ha)	2.21	1.67	1.20	0.99	01	1.23
Other crops (ha)						
Rice	0.96	0.058	00	0.01	00	0.1
Wheat	0.96	1.31	1.9	0.96	1.17	1.1
Pulses	00	0.48	0.26	0.23	00	0.21
Maize	00	0.89	1.4	0.59	1.17	0.7
Vegetables	0.43	0.19	0.47	0.08	00	0.15
Bajra	00	0.17	0.8	0.45	0.17	0.4
Mustard	00	0.12	0.48	0.10	00	0.1
Fodder	0.28	00	0.12	00	00	0.03

9. Source of information of the mango growers

According to the findings in Table 5, in Jammu district, 85.00 percent of respondents had contact with the Horticulture Department, while 15 percent had interaction with other farmers and neighbours. In Dansal and Khour blocks, 100 percent of respondents had contact with the Horticulture

department, whereas in Akhnoor, Bhalwal, and Marh, the figures are 89.79, 92.31, and 14.28 percent, respectively. In addition, 85.71 percent of respondents in Marh block had touch with a fellow farmer or neighbour, and 10.20 and 7.69 percent of respondents in Akhnoor and Bhalwal blocks, respectively, followed their forebears or progenitors.

Table 5: Source of information of the mango growers

Extension contact	Marh (N=07)	Bhalwal (N=13)	Khour (N=05)	Akhnoor (N=49)	Dansal (N=06)	Total (N=80)
Horticulture department	01 (14.28)	12 (92.31)	05 (100.00)	44 (89.79)	06 (100.00)	68 (85.00)
Agri. Department, KVK, University	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)
Fertilizers and pesticide shop	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)
Farmer and neighbours	06 (85.71)	01 (7.69)	00 (0.00)	05 (10.20)	00 (0.00)	12 (15.00)

Figures in the parentheses are per cent ages

The similar results were also observed by Nagesh (2006)^[12], Basanayak (2009)^[4], Meena *et al.* (2009)^[8], Bennur (2011)^[5], Mehta and Sonaware (2012)^[9] and Radhakrishnan *et al.* (2014)^[13].

Constraints

It is a measure of limitations faced by the mango orchardists in the adoption of recommended mango production technologies and was measured in terms of percentage of farmers reporting the constraints in the adoption of mango production technologies.

The constraints as expressed by respondents in adoption of post-harvest management practices has been depicted in Table 6. It was observed that, cent per cent of the respondents had highlighted the lack of processing unit as a major constraints faced by the respondents. There is no processing unit in those areas. A high per cent of respondents (88.75%) expressed other constraint as marketing problem, lack of technical knowledge and guidelines about improved post-harvest management practices (86.25%), and shortage of labour (62.50%). Day by day, the scarcity of labourers is increasing in the agricultural sector. There is a further dearth of skilled labour in the horticultural sector. These results are in

correspondence with the findings of Abdul and Kaul (1988)^[2], Ajay Kumar (1989)^[3], Shukla *et al.* (2013)^[16], Nagesh (2006)^[12] and Thorat *et al.* (2012)^[17].

A moderate percentage of farmers expressed the problem in transportation (60.00%), lack of irrigation facility (47.50%) and lack of storage facility. There were no cold storages in the area. Cold storage requires high investment and proper maintenance. The similar constraints were also reported by Kumar (2004) and Nagesh (2006)^[12].

Around one-fourth of respondents expressed the constraints of high cost of pesticides and other inputs. The cost of major inputs like chemical fertilizers and plant protection chemicals is increasing every year resulting in perception of these inputs as costly. The usual procedure of getting the inputs from commission agents and inputs dealers with the condition of selling their produce through them only were the compelling situations. Similar constraints were noticed in the studies of Sharma (1997)^[15] and Reddy and Reddy (2009)^[14].

A moderate percentage of farmers expressed the constraints of lack of irrigation facility (47.50%) and 37.50 per cent expressed lack of storage facility as a constraints. Lastly, the constraint of high cost of chemicals was highlighted by only 22.50 per cent of respondents.

Table 6: Constraints faced by mango growers in the adoption of post-harvest management practices

Constraints	Frequency	Percentage	Rank
Lack of technical knowledge and guidance about improved post-harvest management technologies	69	86.25	III
High cost of chemicals	18	22.50	VIII
Problem in transportation	48	60.00	V
Lack of irrigation facility	39	47.50	VI
Shortage of labour	50	62.50	IV
Lack of processing unit	80	100.00	I
Marketing problem	71	88.75	II
Lack of storage facility	30	37.50	VII

Figures in the parentheses are percentages

*multiple responses

Conclusion

The various constraints faced by the mango growers in the Jammu district includes the lack of processing unit, marketing problems, lack of technical knowledge and guidelines about improved post-harvest technology of mango, labour shortage and high wages of labour, transportation facility, lack of irrigation facility, lack of storage facility and high cost of chemicals.

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