Indian Research Journal of Extension Education
ISSN: 0972-2181 (Print), 0976-1071 (e-Print)
NAAS Rating : 5.22
Journal homepage: seea.org.in
RESEARCH ARTICLE
https://doi.org/10.54986/irjee/2022/apr_jun/73-77

Decision-Making Behaviour and Impact of Post-Harvest Losses on Tomato Growers

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Received on April 25, 2022, Accepted on June 12, 2022 and Published Online on June 20, 2022

ABSTRACT

Postharvest losses in tomato is a matter of concern for all tomato growers. Postharvest technology is an integral part of agriculture production and utilization system and it plays key role in loss reduction, value addition, food security, employment and income generation. The present study was conducted in four districts of state Haryana, namely Nuh, Sonipat, Gurugram and Palwal. From each of these districts, two blocks were selected randomly. From each block two villages were selected and from each village ten tomato growers were selected, thus a total of 160 respondents were selected for the proposed study. With regards to socio economic profile of the respondents, it was revealed that majority of farmers belonged to middle age group educated up to high school and intermediate school educational level. Further, it was revealed that majority of the respondents had small (2.51-5.00) land holding size, with major occupation as agriculture (particularly tomato farming) and earning Rs. 3-7 lakhs annually. Nearly half of the respondents belonged to medium category of mass media exposure and extension contact. The paired 't' test indicated 71.746 't-value' significant at 1% level of probability, this showed that there was significant impact before and after the adoption of post-harvest management practices on the socio-economic profile of the tomato growers.

Key words : *Post-harvest; Socio-economic; Tomato; Post-harvest losses; Farmers and impact.*

The vegetable sector plays a vital role in farm income enhancement and alleviation of poverty in many developing countries. Food and agricultural sector in developing countries are being transformed as the relative importance of grains and staple foods declines and high-value agriculture, including as the vegetables, increases (*Birthal et. al., 2005; Gulati et. al., 2007*). Today there is created a high demand for fresh vegetables but major challenge in meeting this high demand for fresh vegetables is a post-harvest loss which accounts about 30.00 per cent in India (*FAO, 2018*). Tomato (*Lycopersicon esculentum* Mill.) is a vegetable crop popularly consumed all over the world. The global tomato processing in the year 2020 was approximately 38.777 million MT whereas, India accounts for 130 million tons of tomato processing. In India the total production of tomato is 205.72 lakh tones from 796.87 thousand hectares area (FAOSTAT 2019-20), which is 08.00 per cent higher than the normal production as well as last year production. Postharvest losses in tomato are a matter of concern for all tomato growers. Postharvest technology is an integral part of agriculture production and utilization system and it plays key role in loss reduction, value addition, food security, employment and income generation. Therefore, there is urgent need for post-harvest technology revolution in the country. Most tomato handlers from developing countries may not use high tech post-harvest technologies in addressing postharvest losses in tomatoes, understanding simple and the best postharvest practices has been found to be beneficial.

This study will analyse the adoption behavior of tomato growers for postharvest practices *viz.* washing, sorting and grading, preserving and cooling, dehydration or drying, packaging and labeling and storage for value

addition etc. The post-harvest technologies should be the part of normal developing process in agriculture, and especially for vegetable production. Between 10.00 per cent and 30.00 per cent losses occur during the post-harvest handling of vegetables and more than 40.00 per cent occur in tomato alone which need to be minimized. The present investigation was an attempt to study the socio-economic profile of the tomato growers and to highlight the impact of post-harvest losses on their socio-economic attributes.

METHODOLOGY

The present study was conducted in four districts namely; Gurugram, Nuh, Palwal and Sonipat of the Haryana state, these districts were selected purposively as these districts are contributing highest production and area of tomato cultivation. Further, two blocks were selected, randomly from each of four districts and from each of eight blocks, two villages were chosen, randomly and thereby a total number of sixteen villages were selected for the data collection. From the selected villages ten respondents were selected, randomly. Thus, a total of 160 respondents were finalized and interviewed personally at their farms and home by the researcher. The data was collected with the help of a well-structured and pretested interview schedule comprising the items for assessment. The socio-economic profile, decision making pattern and impact of post-harvest practices were computed with the help of statistical measures like frequency, percentages, weighted mean score, rank order and paired t-test to analyze the data to draw the tangible and meaningful inferences from the investigation.

RESULTS AND DISCUSSION

The results along with the relevant discussion have been presented in prime heads as socio-economic attributes, communication profile and social and economic impact of post-harvest losses of tomato perceived by the tomato farmers in adoption of post-harvest management technologies and practices.

Socio-economic profile of the respondents : The findings in Table 1 reported that majority of the respondents were belonged to middle age (50.00) category followed by young (31.90) and old (18.10), respectively. It showed that the middle and young age group farmers were more efficient in adopting post-harvest management practices as compared to old aged farmers. Therefore, it was probably due to the reason that farmers of middle age are enthusiastic, having higher perception ability and work efficiency compared to younger and older ones. Similar, observation also recorded by *Lokhande (2010) and Dohare (2014).* With regards to education, the data revealed that majority of farmers, 26.30 per cent were found had middle school education level, followed by high school (21.90) and pre-university diploma (21.30), respectively. Whereas, only 06.30 per cent of the respondents were found illiterate. Since, the farmers were aware of importance of education

Table 1. Socio-economic profile of the respondents (N=160)

Variables	Categories	No.	%
Age	Young (Upto 35 yrs.)	51	31.90
	Middle (36-50 yrs.)	80	50.00
	Old (above 50 yrs.)	29	18.10
Education	Illiterate	10	06.30
	Primary school	17	13.80
	Middle school	56	26.30
	High school	35	21.90
	Pre-university/diploma	34	21.30
	Graduation and above	08	10.60
Land holding	Marginal (upto 2.50)	18	11.25
	Small (2.51-5.00)	47	26.30
	Semi-medium (5.01-10.00)	44	27.50
	Medium (10.01-25.00)	32	20.00
	Big (above 25.00)	19	11.87
Major occupation	Agriculture (Particularly tomato farming)	160	100.00
	Agriculture + Livestock	109	68.10
	Agriculture + service	51	31.90
Annual income	Upto Rs. 3 lakhs	12	07.50
	Rs. 3-7 lakhs	97	60.60
	Above Rs. 7 lakhs	51	31.90
Farm mechanization	Tractor	143	89.37
	Harrow	46	28.75
	Super bedder	97	60.62
	Rotavator	17	10.62
	Spray machine automatic/ hand driven	134	83.75
	Drip system	119	74.37
	Solar panels	12	07.50
	Rear mounted cultivator	83	51.87
	Mould Board Plough	14	08.75
	Others (transplanter, mulcher, pullers, power tiller, weeder, fertilizer injectors etc.)	94	58.75

hence, it was found that most of the respondents were well educated. Other contributing reasons may be mass media exposure and rural social environment. Similar results were indicated by *Chandrashekhar (2010)* in his study revealed that majority (26.67%) of the vegetable growers had high school education, followed by middle and illiterate, respectively. Further was also concluded from the Table 1 that the majority of the respondents were belonged to small (29.38 %) landholding category, followed by semi-medium (27.50%), medium (20.00%), big (11.87%) and marginal (11.25%) categories, respectively. This might be due to partition of families; the land being fragmented and another probable reason is due to increase in the population. Therefore, it implies that more the fragmentation will decrease the farm size of the farmers. The similar findings were suggested by *Rani et al, (2022)*.

The data presented in Table 1 depicted that cent per cent of the respondents were engaged in agriculture (particularly tomato farming) alone, while, about 68.10 per cent engaged in agriculture+livestock and 31.90 per cent were found engaged in agriculture+service. This can be predicted from the findings that majority of respondents were young and middle age famers. Therefore, they were taking more interest in farming and majority of farmers were doing tomato farming. The similar observation was recorded by *Rajasree et. al., (2019)*. Pertaining to data presented in Table 5 it was revealed that the majority, 89.37 per cent of the farmers had tractors as their major farm mechanization, followed by 83. 75 per cent had spraying machines i.e. automatic or hand driven and 74.37 per cent had drip systems, respectively. whereas, about 60.62 per cent had super bedder, followed by 58.75 had other farm machineries, 51.87 per cent had rear mounted cultivator, 28.75 per cent had harrow, 10.62 per cent had rotavator, 08.75 per cent had mould board plough and only 07.50 per cent were had solar panels, respectively. Therefore, it can be concluded that farmers had sufficient farm mechanization had adopted post-harvest management practices and reduce their losses and will maintain their livelihood. The results were found on the similar line of *Sharma (2021)* reported in her study that majority (85.83%) of farmers had tractor as their major farm mechanization technology.

Decision making behaviour of the respondents : The decision-making pattern of a farmer is operationally defined as the degree of weighing the available alternatives in terms of their desirability and choosing the most appropriate one for achieving maximum profits from his farming. The data presented in Table 2 indicates that majority of the farmers had good decision-making ability regarding to attend agricultural meetings ranked first with weighted mean

Table 2. Distribution of the respondents according to their decision-making behaviour (N=160)

Statement	Decision making pattern			Total Score	WMS	Rank
	Not considered	Considered after consultation with others	Decision taken independently			
Adoption/selection of new varieties	10 (06.30)	84 (52.50)	66 (41.30)	376	2.35	II
Hire farm labour	37 (23.10)	29 (18.1)	94 (58.80)	377	2.35	II
In purchase of farm improvements/equipment	05 (03.10)	142 (88.80)	13 (18.10)	328	2.05	VIII
Choosing and using of fertilizers and pesticides	06 (03.80)	129 (80.60)	25 (16.60)	339	2.11	V
To attend agricultural meeting	04 (02.50)	78 (48.80)	78 (48.80)	394	2.46	I
About cultivation practices	07 (04.40)	103 (64.40)	50 (31.30)	363	2.26	VI
Borrow money for the farm improvements	02 (01.30)	102 (63.80)	56 (35.00)	374	2.34	III
Adoption of improved farm practices/ to start new farm practices	10 (06.30)	131 (81.90)	19 (11.90)	329	2.05	VIII
Regarding marketing	08 (05.00)	124 (77.50)	28 (17.50)	340	2.12	IV
To switch to new cropping plan/to change cropping pattern	09 (05.60)	128 (80.00)	23 (14.40)	334	2.08	VII
Post harvest measures	07 (04.40)	140 (87.5)	13 (8.1)	326	2.03	IX
Land improvements and others	07 (04.40)	140 (87.5)	13 (8.1)	326	2.03	IX

(**Multiple response*)

score 2.46, followed by decisions taken regarding adoption/selection of new varieties and hire farm labour both ranked second with weighted mean score 2.35 and borrow money for the farm improvements ranked third with weighted mean score 2.34. Further, decision making ability regarding marketing ranked fourth with weighted mean score 2.12, choosing and using fertilizers and pesticides ranked fifth with weighted mean score 2.11, about cultivation practices ranked sixth with weighed mean score 2.26, to switch to new cropping plan/to change cropping pattern ranked seventh with weighted mean score 2.08, in purchase of farm improvements/equipment improvements and adoption of improved farm practices both ranked eighth with weighted mean score 2.05. While, decision making regarding post-harvest measures and land improvements or others both were ranked ninth with weighted mean score 2.03.

Further Table 3 clearly shows that 64.38 per cent of the tomato growers were belonged to medium category of decision-making, followed by 18.75 per cent had low and 16.87 per cent had high decision-making categories. The possible reason might be that, nature of the decision making after consultation with others considered better way of taking decision to cope with the negative effects of post-harvest losses. The findings are in conformity with the findings of *Vijaykumar (2012)* revealed that majority of farmers (62.33%) having medium decision-making ability, followed by low and high decision-making categories, respectively.

Table 3. Overall distribution of the respondents according to their decision-making behavior

Categories	No.	%
Low (Less than 25)	30	18.75
Medium (25-27)	103	64.38
High (more than 27)	27	16.87

Table 4. Impact of post-harvest losses on socio-economic profile of the tomato growers

Paired sample t-test	SE Mean	't' value	Sig. (2-tailed)	df	Mean	SD
Pair 1 Before After	0.195	71.746**	0.000	159	14.05	2.477
N			160			
Correlation	0.583**			0.000		

**Significant at the 0.01 level of probability

Impact of post-harvest losses on socio-economic profile of the tomato growers : The paired-t test distribution was applied to assess the before and after socio-economic impact of farmers regarding adoption of post-harvest management practices. The data presented in Table 4 revealed that there is significant impact indicated with the 71.746 t-value which is significant at 1% level of probability. Therefore, it can be concluded that after adoption of post-harvest management practices the famers were able to reduce losses to some extent which leads to significant and positive impact on their socio-economic profile in terms of improve in their income and better livelihood security and farmers may also take advantage of remunerative markets. The results were on similar trend followed by *Kumar (2014)* reported that due to lack of scientific knowledge regarding post-harvest technology, poor transport and storage facilities had also contributed to the post-harvest losses in tomato respectively and these can be reduced by improve in knowledge and adoption of post-harvest management practices.

CONCLUSION

On the basis of findings and interpretation from the socio-economic profile of the respondents it could be concluded that the majority of farmers were belonged to middle age category (50.00%) educated up to middle school (26.30%) had small landholding (26.30%) size. With regards to major occupation, it was found that majority of the respondents engaged in agriculture (particularly tomato farming) and earning Rs. 3-7 lakhs (60.60%) annually. Further, majority of the growers had medium decision-making pattern ability followed by low and high respectively. The results also revealed that there was significant impact on the socio-economic profile of the respondents if they adopt the post-harvest management practices. Therefore, it can be concluded that if farmers will get need based trainings and equipped with knowledge regarding post-harvest management practices, then they will adopt new technologies for post-harvest management and it will have positive impact on their socio-economic status.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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