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Attitude Assessment of Farmers Towards Post-harvest Technologies and Value Addition of Horticultural Crops in Punjab

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ABSTRACT Attitude is an expression of favor and disfavor towards a person, component or idea. It is a component of human behavior, which is pre-requisite for any action and also plays a dominant role in adoption of new technologies like post-harvest management practices. The present study was conducted in Ludhiana district of Punjab state to evaluate the farmers' perceptions towards post-harvest management practices. SWOT analysis of selected villages was done during pilot survey. A Likert-type-scale was developed, which consisted of 14 items. The study reveals that farmers had positive attitudes towards post-harvest management practices. Constraint analysis was also done for farmers' perceived problems. Lack of technical guidance was perceived as the most important problem in adoption of post-harvest technologies followed by high cost of technologies. Organization of small farmers into groups, market-driven extension system and development of low cost post- harvest technologies can be options for overcoming above stated constraints.

INTRODUCTION

India is gone through a stimulating socio-economic transformation, which created influences to the important drivers of the world economy. India has about ten percent share in world for both production and export of fruits and vegetable (Porpino et al. 2015), but only two percent of the produce is being processed (Sundaram 2013). Worldwide post-harvest losses of fruits, vegetables and other horticultural crops ranges from thirty to forty percent (Kumar and Kalita 2017). In India, the loss is about thirty percent (Kitinoja and Barrett 2015). This loss is around 40 MT, which costs to USD 13 billion (Jessica et al. 2015). The factors, which are accountable for the post-harvest losses, include environmental (temperature, mechanical damage, excess moisture during harvesting and handling), inadequate post-harvest sanitation, and poor cooling and environmental control. The inadequacy of advanced supply system including cold chains has prevented the potency of the largest producer of the world from being fully leveraged for processing or exports. Two main reasons that restrict the expansion of a cold chain include a lack of feasibility and a lack of infrastructure support structure (quality benchmarks, human capital and food protocols). The modernization and adoption of advanced agricultural technologies plays a vital role in enhancement of productivity and farmers' welfare from limited resources (Kusz 2014).There is wide gap between agricultural technologies produced in research institutions and adoption of such technologies in field level especially by small and marginal farmers (Kravchenko et al. 2016). It is a need for the hour to pay extra attention for farmers' training programs in farm implements and post-harvest technologies through demonstrations (Noor and Dola 2011). Meena et al. (2009) observed that technological intervention through training and demonstration programs enhance the awareness of small and marginal farmers in food processing, preservation and storage aspects. Utilization of advanced post-harvest practices results in lesser wastage of food, enhanced nutrition quality of food, increased food safety and

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higher profit for growers and traders. The globalization and liberalization of global food system represents both an opportunity and a threat for marginal and small farm households (Wilhelmina et al. 2010).Innovation in post-harvest sector is very important to support the poor in many ways like production, income generation, nutritional security and value addition. It requires strengthening of post-harvest research and infrastructure facilities, establishing linkages and enhancing learning processes (Chaturvedi and Raj 2015). Farr et al. (2014) suggested that value addition of agricultural produce could reduce post-harvest losses and generate man-days for rural households. Modern agricultural technologies can enhance food and nutrition security in a developing country like India, while increasing employment generation (Hajirostamlo et al. 2015). Indian agro and food processing industries have enormous potential in terms of income and employment generation, poverty mitigation, encouragement of export potential and foreign money. Post-harvest management is also an important constituent for increasing food availability and food safety, which also can fetch foreign revenue (Kader 2013). Attitude, which is an important constituent of human behavior, is a requirement for any action and it plays an important role in adoption of new post-harvest practices. So, the investigation was undertaken to determine farmers' attitude towards post-harvest aspects of horticultural crops.

METHODOLOGY

For the present study five villages namely, Nurpur Bet, Kutbelwal Gujjar, Charh, Rasulpur and Rajjowal were selected randomly. The intention was to make some post-harvest technology intervention to improve livelihood of small and marginal farmers. From each village randomly selected 20 farmers were interviewed and a total of 100 farmers comprised total sample of the area. As the villages were situated nearby, its demographic characters had been almost similar to each other. The SWOT analysis of area (Table 1) was carried out to know strength, weakness, opportunities and threats of introducing post-harvest practices for income generation. The details of SWOT analysis is given below,

A Likert-type-scale was developed, which consisted of 14 items. Cronbach's alpha coefficient of reliability test was observed as 0.82, which indicates good internal consistency (Tavakol and Dennick 2011). Data was solicited from hundred horticultural crop growers on a five-point Likert continuum namely, Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree with the weights of 5, 4, 3, 2 and 1 for positive statements and 1, 2, 3, 4 and 5 for negative statements. The possible minimum and maximum scores were 14 and 70, respectively. The items were categorized into environmental, technological and economical related issues.

RESULTS AND DISCUSSION

Attitude of Farmers on Various Aspects of Post-harvest Technologies and Value Addition

Perception of farmers towards post-harvest aspects has been assessed on technological, environmental and economic issues. The responses from the farmers on various statements are presented in Table 2. Most of the farmers agreed the condition of diverse agro-climatic conditions make it possible to grow almost all

Table 1: SWOT analysis of locality regarding post harvest technology and value addition

S (Strength)	*W (Weakness)*
- Fertile land - Interested population for income generation activities - Good connectivity with city - Large amount of youth force - Women are interested about income generation	- Most of the farmers possess no agricultural land - No cold storage structures nearby villages - Very less amount of household income
O (Opportunities)	*T (Threats)*
- *Atta chakki* in village - Co-operative is situated in village	- Social problems (Drug addiction in village) - Less diversifying farming system - No savings habit among villagers

Table 2: Farmers' attitude towards post-harvest aspects of food grains (N = 50)

Attitude statements	*Response mean (x)*	*Standard deviation (σ)*
Environmental Aspects		
Diverse agro-climatic condition allows farmers to grow most of the processing varieties of horticultural crops throughout the year	4.08	0.45
Technological Aspects		
Pre-harvest treatments do not affect post-harvest quality.	4	1.01
Processing and storage of fruits and vegetables do not help in avoiding distress sale	4.07	0.74
Poor infrastructure for on-farm storage and handling affects the quality	4.28	0.55
For enhancing shelf life of horticultural crops, cool chain is not essential	4.12	0.91
Value addition at large level can sustain multi-national pressure	4.25	0.56
Economic Aspects		
Graded materials get sold quickly and fetch better price	4.03	0.51
For competition in international market, good quality raw material is required	4.1	0.73
Cost of packaging should be reduced to boost up the processed goods	4.01	0.87
Diversification of on-farm processing is needed in present day competitive world	4.12	0.73
Post-harvest technologies are neither profitable to producers nor consumers	4.35	0.59
Technological advances in processing and preservation will enable the product availability throughout the world	4.3	0.51
Exports of good quality products / by-products can increase valuable foreign exchange	4.02	0.81
Value addition is a way to solve the unemployment problem	4.1	0.51

Rating Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree

the varieties of horticultural crops throughout the year for processing ($\overline{X}$=4.08). They also expressed that though the environmental aspects are not under the control of farmers directly, it helps in decision-making to grow the most suitable crop from the post-harvest viewpoint. Horticulture farmers used to face various technological issues and implemented them in their own way. Respondents strongly agreed that pre-harvest treatments affected the post-harvest quality ($\overline{X}$= 4.0). Farmers tended to agree that storage and value addition of fruits and vegetables help in avoiding distress sale ($\overline{X}$= 4.07) and poor infrastructure for on-farm storage and handling results in compromise in the quality of product ($\overline{X}$= 4.28). A concurrence was found among farmers about the statement that cool chain is necessary for enhancing the perishability of horticultural produce ($\overline{X}$= 4.12) and value addition at commercial level can uphold global food demand ($\overline{X}$= 4.25). An agreement to these statements showed their inclination of farmers towards post-harvest practices, provided the suitable post-harvest technology for horticultural crops. Respondents experienced necessity for standardization and grading of horticultural crops, which helps in better marketing and fetch higher profit ($\overline{X}$= 4.03), and quality of raw material affects competitiveness in the global market ($\overline{X}$= 4.10). It was agreed that, low cost and reduced volume of packaging material could enhance marketing of processed foods ($\overline{X}$=4.01). Respondents believed that diversification in on-farm processing is needed in today's competitive market ($\overline{X}$= 4.12) and value addition is profitable for both producer and consumer ($\overline{X}$= 4.35). Technological development in processing and preservation of horticultural crops may enable the product availability throughout the year ($\overline{X}$= 4.30), and exports of good quality products can increase the valuable foreign exchange ($\overline{X}$= 4.02). Farmers agreed that value addition is a strong way to solve the unemployment problem ($\overline{X}$= 4.10).

Positive attitude among respondents is necessary for starting off any activity (Ogunsumi and Omobolanle 2011). Farmers' attitude towards farming and post-harvest technologies was judged in selected areas and presented in Table 3. Most of the farmers agreed that value addition could enhance farmers' income. Majority of respondents also opined that they are ready to receive training about post-harvest technologies and value addition for enhanced income. As establishment of an enterprise is an option for income and employment generation, and most of the farmers are ready to form groups for starting of any entrepreneurial activity when it is supported by an organization. But, negative at-

Table 3: Farmers' attitude towards post-harvest technologies and value addition

S. No.	*Statements*	*Mean*	*SD*
1	Farmers' belief that value addition used to improve farm income	5.25	2.23
2	Farmers want to adopt some post- harvest technologies for value addition	4.31	1.13
3	Respondents are ready to start entrepreneurial activities related to post- harvest technologies if it is facilitated or supported by any organization	2.13	0.97
4	Respondents are ready to accept training about value addition	3.62	1.27
5	I am not want to continue farming if any better opportunities is available	5.26	2.03

Table 4: Farmers' perceived constraints for adoption of post-harvest and value addition technologies

S. No.	*Statements*	*Wilcoxon score*	*Mean ranks*	*Rank*
1	High cost of machineries	690.55	3.98	II
2	Lack of technical guidance	732.83	4.21	I
3	Difficulties in operating machineries	599.85	3.48	VI
4	Lack of initiatives from institutes	608.86	3.57	V
5	High cost of inputs	497.28	3.00	VIII
6	Lack of knowledge	677.22	3.86	III
7	Labor problems	437.18	2.64	IX
8	Lack of credit facilities	550.77	3.26	VII
9	Lack of infrastructure	683.68	3.79	IV
10	Lack of availability of necessary inputs	417.43	2.63	X
11	Lack of manpower	599.85	3.48	VI

titude expressed by the farmers for continuation of farming as profitable business. Most of the farmers perceived that due to risk related to nature and lack of regulated market, farmers are failed to get reasonable price.

Constraints About Adoption of Post-harvest Technologies and Value Addition

The constraints faced by respondents in relation to adoption of post-harvest technology and value addition were listed in Table 4. Here, each of constraints was found to be different from each other with both Wilcoxon scores and mean rank. Lack of technical guidance about post- harvest management and technology was found to be most severe followed by high cost of machineries. Lack of knowledge and skill for taking up post-harvest technologies by farmers was found to be third most important problem. Not availability of necessary infrastructure like irregular electricity supply, lack of good transportation facilities, inadequate number of cold storage and warehouse causes barrier to adopt many post-harvest technology option. Respondents also said that they did not get any technological or financial support from any institution for starting entrepreneurial activities for value addition. They also expressed that if any organization initially facilitated for entrepreneurial activity through post-harvest technology or value addition, they are interested to form groups for income generation. Increasing number of nuclear families causes reduced number of family labor in rural areas too. Additionally, high labor charges also cause barrier in adoption of post-harvest technologies. High price of inputs for post-harvest technologies is perceived as one of the important constrains.

CONCLUSION

The present study indicates positive attitude of farmers towards various aspects like economic, environmental and technological of post-harvest technologies of horticulture and value addition. Farmers' perception and attitude towards post-harvest technology is needed to know before planning of any intervention. Positive response towards various aspects of post- harvest technologies was found among respondents. Although some significant constraints were explained by respondents, which create barriers in adoption of post-harvest technologies like lack of technical guidance found to be most severe followed by high cost of machiner-

ies and others. Hence, minimization of above mentioned constraints is necessary to remove or reduce for more adoption of post-harvest technologies and value addition.

RECOMMENDATIONS

It is recommended that government or non-government institutions should focus on low cost, smallholder suitable and user friendly post-harvest technology development and its demonstration. Not only adoption of technology, but also farmers' innovation, reinvention and documentation of Indigenous Technological Knowledge (ITK) in post-harvest technology aspects should be nurtured. Training, demonstration and farmers' field school is required to conduct for knowledge development and adoption of post-harvest technology in villages.

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