Constraints Perceived by Rural Agro-Processors in Adopting Modern Post-Harvest Technologies

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ABSTRACT

In developing countries, most of the farmers have small landholdings, limited resources and excess family labour. This makes technological up-gradation of agriculture-based enterprises imperative. This study documents the socio-economic attributes and prevailing constraints in adoption of post-harvest technologies, which strictly control the adoption behavior of farmers' (especially farm women, small and marginal farmers). A Likert-type-scale was developed to assess the constraints, which contained five sections viz., namely socio-economic; technological; farming; marketing; and extension. The data were collected from eighty rural agro-processors on three-point continuum namely never; sometimes; and always basis. The study reveals that socio-economic, technological and farming constraints were more prominent than extension and marketing constraints. Most of the rural agro-processors perceived the constraints on "sometimes" basis. This paper also carries measures for removing the constraints as well as suggestions for appropriate policy interventions for boosting-up the rural agro-processing sector.

Key words : *Rural Agro-Processors; Modern Post-Harvest; Technologies; Policy Intervention;*

In the globalized economy, agriculture has become a commercial activity. Thus, technological up-gradation of agriculture based enterprises has become imperative. In most of the developing countries, majority of the rural poor (farmers) have small landholdings, limited resources and excess family labour. In 2006, the estimated population of farmers in developing countries was 1.32 billion (FAOSTAT, 2006). Development and adoption of improved technologies play an important role in improving the productivity and welfare of the limited resource farmers especially in low income-countries (Sall et al. 2000). In India, transition of small farmers from producing staple crops to high value crops is still slow due to various socio-cultural and economic factors. There is a wide gap between agricultural technologies developed at research institutions and its adoption by small-scale farmers and rural households (Kroma, 2003). Lambe et al. (1998) observed that in spite of developing a number of agricultural engineering technologies but proportion of its adoption appear to be meager. Gamon et al. (1994) noticed that adoption of sustainable agriculture is determined by the attributes i.e., relative advantage, compatibility and observability. It is also experienced that often technologies offered for extension do not fit in farmers' contexts, and are perceived as irrelevant. Agro and food processing industries can play a great role in terms of employment and income generation, poverty alleviation, export promotion and foreign exchange earning. Shukla (1993) observed that post-harvest loss prevention, value addition, and entrepreneurship development are essential for higher income and rural employment generation. Grolleaud (2001) reported that implementation of an efficient post-harvest system in any community must provide equitable benefit to all those involved in the system. Agro-industries lead to the creation of forward and backward linkages on large scale by maximizing complementarities of agriculture and industries (Desai, 1986). Various researchers elicited the constraints, which hampered the adoption of post-harvest technologies (see Table 1). These prevailing constraints strictly control the adoption behavior at farmers' level (especially farmwomen, small and marginal farmers). Creating multiple opportunities for small and marginal farmers as well as farmwomen through agribusiness enterprises is a challenging task. Therefore, the study was designed to (a) assess the socio-economic attributes of the rural agro-processors (b) identify the constraints in adoption of modern post-harvest technologies, and (c) suggest the corrective measures.

METHODOLOGY

The study was conducted in Punjab state, which is situated in the North-West of India. The accessible population for this descriptive study was eighty (N=80) small rural agro-processors, who had at least one processing unit. Random sampling technique was applied to draw the samples of 80 agro-processors from four villages of Abohar block (Ferozepur district). Data were solicited by personal interview method with the help of structured schedule during 2006.

A Likert-type-scale was developed to assess the constraints in adoption of modern post-harvest technologies. The scale consisted of 31-items. The Cronbach's alpha coefficient of reliability test was computed as 0.80, which was considered good by George and Mallery (2003). The survey instrument was divided into five sections namely: (i) socio-economic (ii) technological (iii) farming (iv) marketing, and (v) extension. The responses were obtained on three-point continuum viz., never, sometimes, and always basis with the weights of 0, 1, and 2, respectively. The severity of constraints were classified on the basis of mean values as: 0-0.5=Not Severe, 0.5-1.0=Less Severe, 1.0-1.5=Severe, and 1.5-2.0=Most Severe. Data were analyzed using SPSS 11.0.

Table 1 Constraints Perceived by Rural Agro-Processors in Adoption of Modern Post-Harvest Technologies

Author (s)	Constraints
Sumathi, (1990);	(i) Farming constraints (lack of concrete or good floor, lack of space for storage, and Anuradha, (1992) & insufficient space for threshing and drying) (ii) social /cultural constraints (spreading dust Parvathil et al. (1999) during threshing and winnowing, lack of skill, inadequate labour, lack of time, complexity of practice and scared use of chemicals) (iii) scientific / technological constraints (lack of conviction about advantage of post-harvest technology, lack of scientific knowledge about improved practices, non-availability of improved machineries, lack of technical guidance and training, non-availability of information regarding scientific storage methods and non-availability of chemicals in time and with ease), and (iv) economic constraints (lack of purchasing power, high cost of post-harvest machineries, loss of produce by using public transport and tractor for threshing, lower socio-economic condition and high cost involved in constructing concrete threshing floor)
Sawant et al. (2000)	(i) Delay in availability of fruits (ii) lack of complete and correct knowledge about post-harvest technology (iii) lack of training (iv) seasonal enterprise (v) damage of the fruits by monkeys (vi) change in climate (vii) lack of time for post-harvest enterprise (viii) simultaneous ripening of all the minor fruits (ix) distant location of market (x) complexity in processing of some products, and (xi) non-availability of processing equipment.
Suman (2004)	(i) Social (lack of risk bearing attitude, motivation, cooperation and fragmentation of land) (ii) economic (lack of finance, high cost, repair and maintenance and inadequate loan / subsidy) (iii) media and communication (inadequate contact with information source, inadequate cooperation from machinery dealers and lack of information about improved implements), and (iv) personal (lack of initiative, education, enthusiasm, unable to take risk, lack of advise

RESULTS AND DISCUSSION

Demographic attributes and constraints perceived by rural agro-processors have been discussed and presented in Table 2 and Table 3, respectively.

Demographic Attributes of the Rural Agro-Processors: Male counterparts owned the agro-processing units and they had rural background (Table 2). Majority of them (63.75 %) ranged between 28-43 years of age. Most of them (78.75 %) had 2 to 8 years of experience in processing sector. Most of the processors (97.50 %) had single processing unit. Only 25 % respondents had senior secondary or higher level of education. Most of the agro-processors (66.25 %) had 6 to 8 members in the joint family system (98.75 %). More than half of the respondents (55 %) were cultivating less than one hectare of land and had 2 to 3 animals in the herd. Respondents opted non-institutional agencies (76.25 %) for their credit related needs. Processing, as a main occupation was adopted by 93.75 % respondents. Only one-third respondents (31.25%) opted agriculture as complementary occupation. All the respondents preferred learning by doing instructional method for training purpose, followed by field visits (98.75 %) and video-tape (97.50 %). Of the total, 90 % respondents were used to watching television, followed by listening radio (68.75 %) and discussing in groups (42.50 %) to seek the information related to agricultural technologies. Less than half of the respondents (45 %) were members of co-operative societies followed by religious committees (36.25 %). Less than half of the respondents had undergone short-term training (1-3 days) in food processing (43 %) and agriculture production area (32.50 %).

Constraints Perceived by Rural Agro-Processors: The mean and standard deviation of the constraints perceived by rural agro-processors have been listed in Table 3. It was noticed that constraints related to socio-economic

Table 2 Demographic Attributes of Rural Agro-Processors (N = 80)

Demographic Attributes			Frequency	%
Age (in years)	Young	(<28)	14	17.50
	Middle	(28-43)	51	63.75
	Old	(>43)	15	18.75
Gender	Male		80	100
Marital Status	Single		1	1.25
	Married		79	98.75
Background	Rural		80	100
Experience in	Low	(<2)	7	8.75
Processing	Medium	(2-8)	63	78.75
(years)	High	(>8)	10	12.50
Operation Unit	Single		78	97.50
	Double		2	2.50
Education	Illiterate		3	3.75
	Up to Primary		20	25.00
	Up to Middle		37	46.25
	Up to Senior Secondary		17	21.25
	Sr. Secondary to Graduate		3	3.75
Family Size	Small	(< 6)	18	22.50
	Medium	(6-8)	53	66.25
	Large	(> 8)	9	11.25
Family Type	Nuclear		1	1.25
	Joint		79	98.75
Land Holding	Small	(<1)	44	55.00
(Acre)	Medium	(1-2)	34	42.50
	Large	(> 2)	5	6.25
Herd Size	Small	(< 2)	27	33.75
	Medium	(2-3)	48	60.00
	Large	(>3)	5	6.26
Credit	Institutional		6	7.50
	Non-Institutional		71	76.25
Occupation	Main Agriculture		5	6.25
	Processing	75	93.75	
Complementary	Agriculture	25	31.25	
	Dairying		16	20.00
	Labour		21	26.25
	Processing	5	6.25	
Preference to	Video Tape	78	97.50	
Instructional	Lecture		68	85.00
Method	Slide Presentation		71	88.75
	Photograph	70	87.50	
	Field Visit	79	98.75	
	Learning by Doing		80	100
Mass Media	Television	72	90.00	
Exposure	Radio		55	68.75
	Newspaper	9	11.25	
	Pamphlet / Leaflet		2	2.5
	Kisan Mela	14	17.50	
	Exhibition	10	12.50	
	Farmers Day		3	3.75
	Demonstrations		7	8.75
	Group Discussion		34	42.50
Social	Gram Panchayat		14	17.50
Participation	Co-operative Society		36	45.00
	Milk Co-operative Society		25	31.25
	Panchayat Samittee		22	27.50
	Rural Youth Club		21	26.25
	Religious Committee		29	36.25
	Any Groups		14	17.50
Training Attended	Production		26	32.50
(1-3 days)	Processing		29	3.00

($\overline{X}$ = 0.93, s = 0.61), technological ($\overline{X}$ = 0.84, s = 0.53) and farming ($\overline{X}$ = 0.81, s = 0.60) were prominent than marketing ($\overline{X}$ = 0.74, s = 0.57) and extension constraints ($\overline{X}$ = 0.67, s = 0.55). These constraints slowed down the adoption of modern post-harvest technologies in the locale of study. Constraints were further analysed according to severity of constraints based on their mean values as: 0-0.5=Not Severe, 0.6-1.0=Less Severe, 1.1-1.5=Severe, and 1.6-2.0=Most Severe. Data were analyzed using SPSS 11.0. Out of 31 constraints, 26 were considered as "less severe", 4 were considered "severe" and 1 was considered as "not severe". Overall the constraints were perceived as "less severe" ($\overline{X}$ =0.79, s = 0.57). Out of 31 constraints, 4 were measured as severe. It is evident that social taboos are deep rooted in the Indian social system, which obstruct to opt the processing occupation. It is considered as lower caste / peoples' occupation. Elders are dominant in making the family decisions. Whatever decisions are taken by elders, others have to obey. Thus youth don't have much freedom to opt the processing occupation. Complexity in the technology and negative attitude towards post-harvest aspects also hinders to go for the post-harvest technologies.

While considering these facts, the training need of the agro-processors to upgrade their knowledge and skills in modern post-harvest technology is strongly recommended. It was felt that provision of credit facilities could change the perceived constraints into enabling factors for adoption of modern post-harvest technology enterprises, which are also reported by Parvathil et al. (1999) & Suman (2004). Odhiambo, (1998) noticed a number of notable factors like socio-economic, contact with extension workers, provision of infrastructure and other institutional factors, which influenced the adoption. Other factors also reported by authors' like personal factors including society membership (Sajise & Ganapin, 1991), education (Obinne, 1991; Lapar & Pandey, 1999 and Weir and Knight, 2000) and household income (Lapar & Simeon, 2004), education levels (Pitt & Sumodiningrat, 1991; Dorfman, 1996; Irungu et al. 1998; Staal et al. 2002; Lapar & Simeon, 2004) that contribute in adoption of new agricultural technologies. Chamber et al. (1989) noticed that adoption of technologies has been enhanced by farmer-to-farmer extension network, on-farm demonstrations, and on-farm visits. Farmers through Self-Help Groups (SHGs) enabled the adoption of technologies and diffusion enhancement (Mavedzenge et al. 1999). SHGs have found to be reliable and efficient mode of technology transfer but require positive attitude of group members (Meena et al. 2003). Thus, it is need of the

hour that agro-processors must be motivated to form the SHGs at cluster level. These groups should be linked with institutional credit system and markets. Transfer of technology through groups has found to be the effective means that requires minimum investment. Groups must be made aware of marketing strategies to get wider opportunities for their new products. Need based and skill oriented training should be organized to develop the skills among the group members. Lal et al. (2000) noticed that training on farm implements and post-harvest technologies through demonstrations give better results. Availability of post-harvest processing equipment at competitive rates, popularization of improved methods / technologies and up-gradation of skills of the agro-processors will help in ameliorating the constraints and will promote adoption. This can be achieved by various approaches but formation of groups seems to be most appropriate in Indian context. Provision of extension of technologies by university coupled with other factors have had significant positive influence on decision to adopt and introduce cultural practices with improvement on the well being of participating farmers (Oloruntoba & Adegbite, 2006).

Table 3 Constraints Perceived by Rural Agro-Processors in Adoption of Modern Post-HarvestTechnologies (N = 80)

Constraints		Response (s)	
		Mean ($\overline{X}$)	SD (S)
Socio-economic	Social taboos	1.20	0.62
	Decision makers are elders	1.00	0.50
	Complexity in technology / practice	1.00	0.52
	Lack of purchasing power	0.81	0.67
	Expensive machineries	0.72	0.67
	High cost involved in constructing floor / infrastructure	0.97	0.69
	Lack of time due to busy in domestic work	0.98	0.66
	Pollution due to dust during processing	0.93	0.62
	Lower socio-economic condition	0.78	0.65
	Negative attitude towards post-harvest aspects	1.00	0.52
		0.93	**0.61**
Technological	Lack of training / technical guidance	0.87	0.43
	Insufficient information about scientific methods	0.92	0.41
	Non availability of improved machineries	0.80	0.56
	Less skilled labour	0.77	0.72
		0.84	**0.53**
Farming	Lack of space for storage /g threshing / dryin	0.72	0.63
	Lack of good floor for processing	0.80	0.58
	Small size of land holding	0.92	0.61
		0.81	**0.60**
Marketing	Lack of transportation	0.75	0.60
	Lack of time for marketing	0.62	0.51
	Unavailability of cheap labour	0.73	0.47
	Distant place from city / town	0.65	0.63
	Less knowledge about marketing strategies	0.80	0.60
	Low risk taking behavior	0.86	0.72
	Lack of knowledge about marketing aspects	0.63	0.60
	Lack of appropriate marketing channel	0.75	0.49
	Inability to find market for value added product	0.90	0.58
		0.74	**0.57**
Extension	Lack of motivation	0.76	0.50
	Lack of feedback	0.75	0.49
	Insufficient liaison with processors / farmers	0.76	0.55
	Insufficient coverage of success stories in media	0.61	0.70
	Lack of group meeting or discussion	0.48	0.55
		0.67	**0.55**
		Overall 0.79	**0.57**

The extension agencies can play an important role to educate the farmers in adoption of improved production technologies for their benefits and reversing their negative attitude. Increased knowledge and awareness level are generally considered prerequisites for adoption of new practices and technologies (Rogers, 1995). Frequent visit of extension worker increased the efficiency / productivity of the farmers (Birkhaeuser et al. 1991; Bindlish &

Evenson, 1997). The orientation of the groups' members must be changed from traditional business to the diversification of the agro-products. For wider publicity of the post-harvest technologies, agricultural programmes on modern post-harvest technologies and available government schemes should be prepared in local language and be broadcasted countryside.

CONCLUSION

The study revealed that most of the agro-processors perceived the constraints on "sometimes" basis on socio-economic, technological, farming, marketing, and extension aspects. These constraints can be adequately addressed through extension agencies by formation of SHGs and by adopting bottom-up approach. The efforts to improve the agro-processing in rural catchments can provide employment opportunities to the rural people and economic benefits as a result of value addition. Based on the results of study, following elements as a part of national policy / strategy would help in eradication of rural poverty by adopting the post-harvest technologies: (i) formation of SHGs / social capital at cluster level and transfer of technology through these SHGs (ii) conduction of need-based and skill oriented training (iii) long-term institutional credit support (iii) market-driven and decentralized extension system (iv) orientation towards high-value enterprises by providing the technology based entrepreneurship development programmes (v) use of appropriate media mix at rural level, and (vi) awareness creation about post-harvest technologies and government schemes through mass media.

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