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Marketing Efficiency of Green Peas under Different Supply Chains in Punjab

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Abstract

During the year 2007-08, the area under green peas in Punjab was 18.45 thousand hectares with a production of 1.11 lakh tonnes. The total consumption at the farm level being just 2.54 per cent, the marketed surplus was 97.46 per cent. The maximum quantity of green peas was sold by the growers in the wholesale market (about 89%) and the rest was sold at the farm, in the village and in Apni Mandi. The marketing of green peas has been studied by three supply chains, viz. I: Producer → wholesaler (through commission agent) → retailer → consumer; II: Producer → retailer (through commission agent) → consumer; III: Producer → consumer. The net price received by the producer was 67 per cent, 69 per cent and 94 per cent in supply chains I, II and III respectively in the Hoshiarpur market in January, 2009. The producer's share in supply chain III was the maximum because of direct sale by the producer to the consumer. The supply chain III has been found most efficient because its marketing efficiency was 14.83 as compared to 2.70 in supply chain II and 2.38 in supply chain I. The low marketing efficiency in supply chain I was on account of a higher number of market intermediaries in this chain. The functional analysis of the factors affecting the marketing efficiency has revealed that with one per cent increase in marketing margins and costs, the marketing efficiency declined by 0.45 per cent and 0.44 per cent, respectively. The modern market infrastructure may be built up with the public-private partnership to bring efficiency in the marketing of green peas.

Key words: Marketing efficiency, Green peas, Supply chains, Punjab, Price spread

JEL Classification: Q13, Q12

Introduction

The declining farm incomes, almost stagnant foodgrains productivity and growing demand for fruits and vegetables due to increase in per capita income and changes in consumption pattern call for increase in the production of high-value crops such as fruits, vegetables, etc. in the Punjab state. These crops not only enhance income of the cultivators but also generate more employment through diversified farming being labour-intensive crops. These are more beneficial for the marginal and small farmers whose family labour availability per unit of land is high. Due to their small size of operational holdings, it will not be possible to

improve income of these households merely by raising the yield of food and non-food crops. Therefore, the poverty as well as the nutritional insecurity of large number of farm holdings can be reduced with the introduction of high-value crops on these holdings. The vegetable production is one of the potential alternatives due to short cultivation period, small investments (unlike fruits) and their growing demand. Besides, in several cases, the diversification of crops is need of the hour to restore the degraded natural resource base of the state caused by monoculture of cereal crops.

The most important factor determining the pattern, if not the pace, of diversification is the market. There are a number of studies in India and other developing countries, which suggest high elasticity of demand of the high-value crops (HVCs) in response to income

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and prices. The price response however, is one aspect of the impact of the market on the cropping pattern. Equally important is the marketing efficiency. The profitability of the crop/enterprise is the guiding force for resource allocation decisions of the farmers, which apart from production efficiency, depends upon the prices received by the producers in terms of consumer's rupee.

Empirical studies have shown that a large number of the intermediaries are involved in the movement of the horticultural produce from producer to consumer, who appropriate a large proportion of the consumer's price and the share of producer becomes very low. In the case of perishables, the storage of which is difficult, the share of the producer is in the range 30-60 per cent and the market efficiency is low (Government of India, 2001; Anantia, 2008; Jairath, 2008; Dastagiri *et al.*, 2009). However, in recent years, many new supply chains involving large-sized agri retail/ companies, contract farming system, producer groups, etc. are emerging, which are considered to be better marketing models giving higher prices to the producers and better marketing efficiency through vertical integration/ coordination of the market. Therefore, it becomes imperative that such marketing/supply chain models are studied and compared with the prevailing traditional market models in order to measure the efficiency of different supply chains in term of better prices to the producers as well as consumers. Therefore, the present study is focused on these issues and tries to highlight the marketing efficiency of different supply chain systems in the case of green peas in the Punjab state. The specific objectives of the study were to:

- estimate the marketing cost and marketing margin of different functionaries for green peas under different supply chains;
- analyse the price spread, marketing efficiency and farmer's share in consumer's rupee in different supply chains;
- identify the constraints perceived by different stakeholders and study the factors influencing the marketing cost, margins and efficiency; and
- suggest suitable strategies to enhance the marketing efficiency for green peas.

Methodology

The paper is based on the study conducted by the authors (Sidhu *et al.*, 2010). Green peas is an important

vegetable crop in Punjab and its area was 18.45 thousand hectares (11% of total vegetable area) in 2007-08. Hoshiarpur district was selected for the study because about 29 per cent of the green pea area of the state was concentrated in this district during the study period. During the year 2007-08, the green peas production was 1.11 lakh tonnes. The sample consisted of 120 farmers, 30 wholesalers, 30 retailers and 30 farmers from Apni Mandi. All the respondents were from the Hoshiarpur district. The information was collected from them on their socio-economic profile, area and production of green peas crop, consumption of green peas at home and quantity kept for seed purpose, payment in kind to labour, miscellaneous uses and marketed surplus, and costs of marketing of green peas. The price spread was worked out by using the 'mode method'. The marketing efficiency was worked out by using the Acharya's modified method (Acharya and Agarwal, 2010). Cobb-Douglas type production function was applied to study the factors affecting marketing efficiency. Both linear and log-linear production functions were fitted. Best fit function was determined on the basis of the level of significance of the explanatory variables, the value of coefficient of multiple determinations (R^2) and the logical signs of the explanatory variables included in the model.

The secondary data about area, production and yield of different vegetables were taken from the Department of Horticulture, Punjab and *Statistical Abstracts of Punjab*. The primary data from the respondents were collected for the year 2008-09 which was a normal crop year in Punjab.

Results and Discussion

Profile of Green Peas Growers

The majority (54%) of selected farmers were young, in the age group of 30- 50 years. About nine per cent of the farmers were up to 30 years age of age and about 37 per cent were of 50 years and above. Regarding the educational level, the study revealed that only about 13 per cent of the farmers were illiterate, while the majority (62%) had education up to matric or 10+2 level. The number of graduate and post-graduate farmers was small. The average operational holding size of green pea growers was more (16.40 acre) than the state average (10.0 acre). The share of the area owned and leased-in was about 63 per cent and 37 per cent, respectively.

Table 1. Per holding marketed surplus of green peas by selected farmers

Sl. No.	Particulars	Quantity (quintals)
i.	Area (acres)	4.42
ii.	Production	105.96
iii.	Family consumption	0.28 (0.26)
iv.	Quantity kept for seed	0.22 (0.21)
v.	Payment in kind to labour	1.80 (1.70)
vi.	Miscellaneous uses	0.39 (0.37)
vii.	Total consumption (iii to vi)	2.69 (2.54)
viii.	Marketed surplus (ii- vii)	103.27 (97.46)

Note: Figures within the parentheses are percentages of production

Marketed Surplus

The information regarding per holding production, consumption and marketed surplus of green peas is given in Table 1. Per holding production of green peas was about 106 quintals. Its consumption was 2.54 per cent and marketed surplus was 97.46 per cent of total production. The consumption of green peas was low due to its perishable nature.

Marketing Pattern

The maximum quantity of green peas (89%) was sold by the growers in the wholesale market, while sale at the farm was about six per cent. About two per cent green peas were sold to the petty shopkeepers and non-vegetable growing rural households (farm and non-farm) in the village. There was no sale of green peas in the distant markets by the selected farmers. The sale in the Apni Mandi was only 2.19 per cent. The growers had to stay for long hours for sale of green peas in the Apni Mandi. There were some other constraints too. Therefore, the majority of growers preferred to sell green peas in the wholesale market.

Price Spread of Green Peas

The price spread was worked out through three main supply chains of green peas. The supply chain I (Producer → wholesaler (through commission agent) → retailer → consumer) has been discussed in Table

2. A perusal Table 2 reveals that producer's sale price of green peas was ₹ 900/q in Hoshiarpur market, which was 72 per cent of the consumer's purchase price. The expenses borne by the producer were ₹ 67/q which was 5.36 per cent of the consumer's purchase price. The net price received by the producer was ₹ 833/q which was about 67 per cent of the consumer's price. The expenses borne by the wholesaler and retailer were about ₹ 94/q and ₹ 92/q respectively which were 7.52 per cent and 7.36 per cent of the consumer's price (₹ 1250/q). The margin of the wholesaler was lower (4.48%) than of retailer (8.64%). The wholesaler's margin was low due to large volume of business in comparison to the retailer.

The price spread of green peas in supply chain II (Producer → retailer (through commission agent) → consumer) has been presented in Table 3. In the Hoshiarpur market, the producer's sale price of green peas was ₹ 930/q and expenses borne by the producer were ₹ 67/q. These were 74 per cent and 5 per cent, respectively of the consumer's purchase price (₹ 1250/q). The net price received by the producer was ₹ 863/q. It was 69 per cent of the consumer's price and the expenses borne by the retailer were ₹ 176/q. These were 69 per cent and 14 per cent, respectively of the consumer's price. The retailer's margin was ₹ 144/q. The margin of retailer was high in supply chain-II than in supply chain-I because the wholesaler was involved in the latter chain.

The price spread of the green peas in 'Apni Mandi' of Hoshiarpur market in supply chain III (Producer → consumer) is depicted in Table 4. No middleman was involved in the sale of farm produce in the Apni Mandi; this scheme of selling produce directly to customers was introduced in major cities/towns of Punjab in 1987 at the initiative of the then Financial Commissioner (Development) of Punjab. The main objectives of this scheme were to increase producer's share in the consumer's rupee particularly for perishable commodities like vegetables and supplying fresh vegetables to the consumers at a price lower than the prevailing market price.

A perusal of Table 5 reveals that producer's sale price/consumer's purchase price was ₹ 1100/q in Apni Mandi of Hoshiarpur market. The expenses borne by the producer were ₹ 69/q and net price received by the producer was ₹ 1031/q. As compared to supply chains I (66%) and II (69%), the producer's share in

Table 2. Price spread of green peas in Hoshiarpur market, January 2009
(Supply chain I: Producer→wholesaler (through commission agent) → retailer → consumer)

Sl. No.	Particulars	Cost (₹/q)	Share in consumer's price (%)
1.	Producer's sale price/ wholesaler's purchase price	900	72.00
2.	Expenses borne by producer	67	5.36
	i. Grading, filling, stitching etc.	7	0.56
	ii. Cost of packing	22	1.76
	iii. Transportation cost	17	1.36
	iv. Loading, unloading and wastage	21	1.68
3.	Net price received by farmer	833	66.64
4.	Expenses borne by wholesaler	94	7.52
	i. Market fee @ 2 %	18	1.44
	ii. RDF @ 2%	18	1.44
	iii. Commission @ 5 %	45	3.60
	iv. Miscellaneous expenses	13	1.04
5.	Margin of the wholesaler	56	4.48
6.	Wholesaler's sale price/ retailer's purchase price	1050	84.00
7.	Expenses borne by the retailer	92	7.36
	i. Transportation cost	16	1.28
	ii. Labour	2	0.16
	iii. Rent of shop/rehri	1	0.08
	iv. Packing cost	22	1.76
	v. Loss, wastage and spoilage @ 3%	32	2.56
	vi. Miscellaneous cost	19	1.52
8.	Margin of the retailer	108	8.64
9.	Retailer's sale price/ consumer's purchase price	1250	100.00

Table 3. Price spread of green peas in Hoshiarpur market: January 2009
(Supply chain II: Producer → retailer (through commission agent) → consumer)

Sl. No.	Particulars	Cost (₹/q)	Share in consumer's price (%)
1.	Producer's sale price/ retailer's purchase price	930	74.40
2.	Expenses borne by producer	67	5.36
	i. Grading, filling, stitching, etc.	7	0.56
	ii. Cost of packing	22	1.76
	iii. Transportation cost	17	1.36
	iv. Loading, unloading and wastage	21	1.68
3.	Net price received by farmer	863	69.04
4.	Expenses borne by the retailer	176	14.09
	i. Market fee @ 2 %	19	1.52
	ii. RDF @ 2%	19	1.52
	iii. Commission @ 5 %	46	3.68
	iv. Miscellaneous expenses	17	1.36
	v. Transportation cost	16	1.28
	vi. Rent of shop/rehri	1	0.08
	vii. Labour	8	0.64
	viii. Loss, wastage and spoilage @ 3%	28	2.25
ix.	Packing cost	22	1.76
5.	Margin of the retailer	144	11.52
6.	Retailer's sale price/ consumer's purchase price	1250	100.00

Table 4. Price spread of green peas in Apni Mandi of Hoshiarpur market: January 2009
(Supply chain III: Producer → consumer)

Sl. No.	Particulars	Cost (₹/q)	Share in consumer's price (%)
1.	Expenses borne by the producer	69	6.27
	i. Grading, filling, stitching etc.	7	0.63
	ii. Cost of packing	5	0.45
	iii. Transportation cost	15	1.36
	iv. Loading and wastage	11	1.00
	v. Packing cost (carry bags)	21	1.91
	vi. Miscellaneous expenses	10	0.91
2.	Net price received by producer	1031	93.73
3.	Consumer's purchase price/producer's sale price	1100	100.00

Table 5. Marketing efficiency of green peas under different channels

Sl. No.	Particulars	Supply chain I	Supply chain II	Supply chain III
1.	Consumer's purchase price	1250	1250	1100
2.	Producer's sale price	900	930	1100
3.	Total marketing costs	185	176	69
4.	Total margins of intermediaries	164	143	-
5.	Net price received by farmer	833	863	1030
	Marketing efficiency	2.38	2.70	14.83

supply chain III (94%) was more on account of direct sale by the producer to the consumer. But this is also a fact that the major share of vegetables can not be sold through Apni Mandi because the traditional wholesalers and retailers have their own role in vegetable marketing. It is a part of the Indian culture that traditional vegetable hawkers supply various vegetables at the doorsteps of the consumers in various localities of cities and towns.

Marketing Efficiency of Green Peas

The marketing efficiency of green peas under different supply chains was worked out by using Acharya's Modified Method and it has been shown in Table 5. The supply chain III was found to be most efficient with marketing efficiency of 14.83 compared to 2.70 in supply chain II and 2.38 in supply chain I. The low marketing efficiency in supply chain I was on account of a higher number of market intermediaries in this chain.

Factors Affecting Marketing Efficiency

The functional analysis of factors affecting marketing efficiency of green peas is shown in Table 6. In the case of green peas, market margins and costs

Table 6. Regression coefficients of Cobb-Douglas type functions for green peas of selected farmers

Particulars	Coefficient
Intercept	-0.9358 (0.1444)
Marketing costs (₹)	-0.4467* (0.0103)
Transportation costs (₹)	-0.0780* (0.0019)
Labour charges (₹)	-0.0325* (0.0059)
Marketing margins (₹)	-0.4554* (0.0236)
Volume of the produce handled (kg)	-0.0005 (0.0027)
Net price received (₹)	0.9947* (0.0062)
Adjusted coefficient of multiple determination (R ²)	0.9965

Notes: Figures within the parentheses are standard errors of regression coefficients

*indicates significance 1 per cent level.

were the major explanatory variables affecting the marketing efficiency significantly. With one per cent increase in these variables, the resultant marketing efficiency declined by 0.45 per cent and 0.44 percent respectively. These coefficients were significant at one per cent level. The coefficients of other explanatory variables such as transportation costs, labour costs and volume of the produce handled were negatively related with dependent variable, but the coefficient of latter was non-significant. On the other hand, the coefficient of net price received was significantly and positively related with marketing efficiency, and with one per cent increase in the net price received, the marketing efficiency increased by 0.99 per cent.

Production and Marketing Constraints Perceived by Farmers

The major constraint as perceived by the selected farmers was high cost of labour in harvesting of green peas which is highly labour-intensive and higher wage rates in the state cause high labour cost (Table 7). The next constraint was high costs on marketing and transportation, malpractices in the market, unremunerative price, exploitation by the commission agents and high fluctuations in the price.

Marketing Constraints Perceived by Farmers in Apni Mandi

The major constraints as perceived by the selected farmers in the Apni Mandi were non-availability of drinking water (Rank I). The other constraints were unhygienic conditions in the market (Rank II), inadequate market infrastructure (Rank III), frequent changes in site for the farmers (Rank IV), dominance of traditional retailers (Rank V) and market not Apni

Table 7. Production and marketing constraints of green peas as perceived by the selected farmers

Constraints	Ranking according to Garrett's technique
High cost of labour	1
High marketing cost	2
High transportation cost	3
Malpractices in the market	4
Unremunerative price	5
Exploitation by commission agents	6
Fluctuations in price	7

Mandi in the real sense (Rank VI). It has been observed that a large number of vendors come to the Apni Mandi for the sale of grocery items, plastic goods, ready-made garments, cosmetics, eatables particularly snacks, cold drinks, ice-cream, etc. Such a congested scenario in Apni Mandi creates several traffic problems for the general public and loss of business for the farmers.

Constraints Perceived by Selected Wholesalers in the Market

The wholesalers in the wholesale vegetable markets highlighted the non-availability of drinking water as the number one constraint, followed by unhygienic conditions in the market (Rank II), inadequate market infrastructure (Rank III), and non-availability of cold storage facilities (Rank IV).

Summary and Conclusions

The study has revealed that the production of green peas in Punjab was 1.11 lakh tonnes in 2007-08 with per holding production of green peas as 106 quintals. The consumption of green peas being low (2.54%) due to its perishable nature, the marketed surplus was high (97.46%). The sale pattern of green peas has revealed that its maximum quantity is sold by the growers in the wholesale market (about 89%) and rest is sold at the farm, in the village and in Apni Mandi.

The price spread of green peas in supply chain I (Producer → Wholesaler (through commission agent) → retailer → consumer) in the Hoshiarpur market has revealed that the net price received by the producer was about 67 per cent, expenses borne by the wholesaler were 7.52 per cent and by retailer were 7.36 per cent of the consumer's price (₹ 1250/q). In this supply chain, the margin of the wholesaler (4.48%) was less than of retailer (8.64%) on account of high volume of business by wholesalers as compared to that of retailer. The price spread of green peas in supply chain II (Producer → retailer (through commission agent) → consumer) in the Hoshiarpur market has revealed that the net price received by the producer was 69 per cent, expenses borne by the retailer were 14 per cent and margin of retailer was 12 per cent of the consumer's purchase price. The margin of the retailer was high in supply chain II as compared to supply chain I because the wholesaler was not involved. In supply chain III (Producer → consumer) followed in the Apni Mandi, there is direct sale of the produce

by producer to the consumer. The study has indicated that producer's sale price/consumer's purchase price was ₹ 1100/q in Apni Mandi. The expenses borne by the producer being about 6 per cent, the net price received by the producer was 94 per cent of consumer's price. As compared to the supply chains I and II, producer's share in supply chain III was more on account of direct sale by the producer to the consumer. The supply chain III has been found most efficient with marketing efficiency of 14.83 compared to 2.70 in supply chain II and 2.38 in supply chain I. The low marketing efficiency in supply chain I has been because of higher number of market intermediaries in this chain.

The functional analysis of the factors affecting the marketing efficiency has revealed that market margins and costs were the major explanatory variables affecting the marketing efficiency significantly. With one per cent increase in marketing margins and costs, the marketing efficiency has been found to decline by 0.45 per cent and 0.44 per cent respectively. The impact of cost in reducing marketing efficiency has been found smaller than that of margins. It has been inferred that marketing efficiency increases by 0.99 per cent with one per cent increase in the net price received.

According to Garret's ranking technique, high cost of labour has been reported as most important constraint in harvesting of green peas, followed by high costs on marketing and transportation, malpractices in market, un-remunerative price, exploitation by the commission agents and fluctuations in the price of green peas.

The major constraint as perceived by the selected farmers has been identified as non-availability of drinking water in Apni Mandi., unhygienic conditions in the market, inadequate market infrastructure, frequent changes in the site of farmers, dominance of the traditional retailers and market not Apni Mandi in the real sense. The wholesalers highlighted non-availability of drinking water as the number one constraint in the wholesale vegetable markets, followed by unhygienic conditions in the market, and inadequate market infrastructure. The unhygienic conditions in the market become more severe in the rainy seasons.

In the era of liberalization, privatization and globalization (LPG), the existing market infrastructure is not up to the mark. Since the State Government and Punjab Mandi Board alone can not build modern market infrastructure of international standard, it may be built with the public-private partnership to bring efficiency in the marketing of green peas.

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