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Efficiency of the Marketing System for Selected Vegetables in Sri Lanka

by
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Abstract

Vegetables are a very important component in the daily diet of the people in Sri Lanka. Moreover a large proportion of farming population is dependent upon vegetable cultivation. A significant amount of resources are devoted for the purpose of agricultural development. However increased production will not be translated into proportional increase in the level of real income in an economy in which marketing is inefficient and wasteful of resources. Hence the objective of this paper is to examine the efficiency of marketing system for selected vegetables such as carrot and leeks. Marketing efficiency can be measured on the basis of operational efficiency and pricing efficiency. Higher market integration and relatively stable price spreads have shown that vegetable marketing is carried out efficiently

1.0 Introduction

Vegetables are very important components in daily diets of the people in Sri Lanka. An average consumer spends nearly 10 per cent of his food expenditure on vegetables (Household income and expenditure survey 1990/91, Department of Census and Statistics). Similarly the contribution made by it to the cost of living index is 7 percent according to the same source.

Furthermore it occupies a significant place in the domestic food production. Next to paddy, vegetable farming is the most important sub sector in non-plantation sector in Sri Lanka. In the absence of reliable statistics on vegetable farming it is safer to assume that a significant proportion of the farming population is dependent upon vegetable cultivation. It is estimated that the annual production of vegetables in Sri Lanka amounts nearly to about 500,000 mt. and the cultivated extent is about 300,000 ha.

A significant amount of resources and efforts are devoted to research, construction of irrigation facilities and extension in order to promote agricultural production in Sri Lanka. The improvements in crop varieties, irrigation, extension and other factors bring about higher production in agriculture. However the increased production will not be translated into proportionate increase in the level of real income in an economy in which the marketing

system is inefficient and wasteful of resources. Hence the need for an efficient marketing set up is essential. The objective of this paper is to examine the efficiency of the marketing system for selected vegetables such as Carrot and Leeks.

2.0 Methodology

"Efficiency may be defined broadly as the effectiveness or competence with which a marketing structure performs its designed function. In other words, marketing efficiency can be defined as the maximization of consumer's satisfaction with the least costs incurred in providing that satisfaction through the system of marketing "(Jasdanwalla: 1966)[1]. "effective efficient marketing system is one that will induce the production of those products and quantities which, when sold to consumers, will result in maximum returns after the deduction of minimum marketing charges and farm production cost. Generally speaking it may be defined as maximization of input-output ratio. Whereas the outputs of marketing are the consumer satisfaction with the goods and services, the inputs are the various resources of labour, capital and management that marketing firms use in the process "(Kohls: 1967).[2]

But the use of marketing efficiency is limited by the difficulty of measuring the output of consumer satisfaction. To over come this, marketing efficiency is usually subdivided into two different categories: operational (technical) efficiency and pricing (economic) efficiency. The operational (technical) efficiency assumes the essential nature of goods and services to remain unchanged and focuses on reducing the cost of inputs of marketing. It could be measured on the basis of the size of marketing margins and cost in ultimate consumer price. There are various ways by which marketing cost and margins might be estimated. The method of comparing prices of vegetables at different levels of marketing for calculating marketing cost is used in this study. The price spread is a term applied to an aggregate margin, particularly one representing the combined margins of several types of dealers in marketing process. Thus the price spread refers to the difference between the retail price and price received by farmers for an equivalent quantity of farm products. The size of the price spread between farm gate and retail price reflects the level of operational efficiency.

The vegetable markets are efficient if the marketing cost (price spread) is minimum (Sahu and Tripathy:1998)[3]. However the high price spread do not necessarily mean inefficiency, when it involves factors such as processing, storage, high cost transportation and others. However, in most cases, the activities such as processing, grading, and transportation with cooling facilities and storage are not taking place in vegetable marketing in Sri Lanka. In most cases, the vegetables transported to the markets, immediately after the harvest. The price spread for vegetable marketing should be low, since it includes only transport cost, loading/unloading cost, wastage and traders margin.

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1 Jasdanwalla Z.Y. Marketing Efficiency in Indian Agriculture, Allied Publishers, Bombay, 1966. P.34

2 Kohls R.L., Marketing of Agricultural Products. The Macmillan Company, New York. 1967. P.139

3 H.S.Sahu and S.Tripathy, Price Spread and Marketing Channels for Shrimps in Puri District of Orissa published in the Indian Journal of Agricultural Marketing, 12(1&2), 1998,p.146.

In addition, stability of marketing cost is also very important for an efficiently working marketing system. Because sufficient stability of marketing margins and costs prevent undue uncertainty causing waste and misallocation of resources (Hill & Ingersent: 1997)[4]. Furthermore the price mechanism should signal changes in conditions of supply to consumers and consumer demand back to producers. However the practice of price levelling distorts this functioning of the price mechanism. The price levelling occurs when trader cut his margin during the off season, when prices are high and recouping the loss when price falls again later during the peak season. If the price spread remain relatively stable than farm gate, wholesale and retail price, it could be considered that price-levelling practices are not taking place. The stability of variables such as prices and price spreads is measured on the basis of coefficient of variation (C.V). Higher C.V indicates a higher rate of fluctuation of these variables.

The pricing efficiency is concerned with improving the operation of the buying, selling and pricing aspects of the marketing process so that it will remain responsive to consumer satisfaction. The best measure of the satisfaction (output of the marketing process) is what consumers will pay in the market place. But the reliability of this measuring is dependent on at least three basic conditions. First, the consumer must be provided with alternatives from which to choose. Second, the price tags on these choices must adequately reflect the cost of providing the different choices. Third, business firms must be relatively free to enter or leave a particular line of activity in response to the profit or loss that result from these price tags.

Therefore, pricing efficiency is a result of natural competition and balance of economic power that exist within the marketing process. Assuming competitive market structure that gives the best allocation of resources, pricing efficiency of the marketing system could be tested by various methods. The Index of Market Integration method is employed in this study to determine the pricing efficiency.

In competitive market structure or close to perfect competition, prices in the geographically separated markets are expected to move in unison. This would be in response to the stimuli from changing demand, supply and other economic forces. The degree of correlation between prices in various markets is then taken as an index of market integration.

The correlation involves estimating the correlation coefficients between pairs of wholesale prices of homogenous products by time, space and form. Typically, statistically significant and close to unitary coefficient suggest well integrated and efficiently operating markets, while low correlation coefficients indicate non-integrated markets (Mendoza and Rosegrant:1995)[5]. Results of the pair wise correlation estimation between wholesale prices of carrot and leeks in 1998 at different markets considered in this study are presented in the annex.

The Nuwara Eliya district is the main producing area in Sri Lanka for carrot and leeks. A significant portion of carrot and leeks (more than 80 percent of carrot and nearly 90 percent of leeks) is produced in Nuwara Eliya district. Therefore, monthly average farm gate prices for carrot and leeks in Nuwara Eliya district in 1997-1998 were used for analyzing purpose.

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[4] B.E.Hill & K.A.Ingersent, An Economic Analysis of Agriculture,1977,p.147.

[5] M.S.Mendoza and M.W.Rosegrant Research report on "Pricing Behavior in Philippine Corn Markets: Implication for Market Efficiency, International Food Policy Research Institute,1995,p.68.

Monthly average wholesale and retail prices in 1997-1998 at six selected vegetable markets of Sri Lanka namely Colombo, Kandy, Dambulla, Nuwara Eliya, Hambantota and Polonnaruwa were used in calculating the price spread together with correlation coefficients for comparison. These data were collected and compiled by the Marketing and Food Policy Division of Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI). The Kandy market is close to Nuwara Eliya (80 k.m) followed by Dambulla (150 k.m), Hambantota (170 k.m), Colombo (180 k.m) and Polonnaruwa (210 k.m).

The main limitation of this paper is that primary data were not collected for the purpose of this study. Hence all analysis were done with the available secondary data such as monthly farm gate, wholesale and retail prices and marketing cost. Therefore the examination of marketing efficiency was limited to two upcountry vegetables namely carrot and leeks for two years of 1997 and 1998.

3.0 Pricing Efficiency

Generally, correlation coefficients of wholesale prices between different markets for carrot and leeks in 1997 and 1998 are positive and high ranging from 0.89 to 0.99 and statistically significant at 1- percent level. This finding suggests that in regard to wholesale markets in Nuwaraeliya and Dambulla, Colombo and Kandy are closely integrated. The correlation coefficient was 0.97 to 0.98 (between Colombo and Kandy), 0.98 (Colombo and Dambulla), 0.97-0.99 (Colombo and Nuwara eliya), 0.94-0.99 (between Colombo and Hambantota), 0.96-0.98 (between Kandy and Dambulla), and 0.94-0.98 (between Dambulla and Nuwara eliya). Contrary to this, a little lower correlation coefficients were observed in following markets; 0.89-0.96 (between Hambantota and Dambulla), 0.92-0.97 (between Hambantota and Kandy), and 0.91-0.97 (between Hambantota and Nuwara eliya), indicating lower levels of integration than other markets. (See tables No: 1 to 4).

However overall correlation coefficients show that there is a high degree of integration among these markets. This indicates that high pricing efficiency exists in these markets. The pricing efficiency is a result of the nature of competition and balance of economic power that exist within the marketing process. The formal and informal price information systems partly contributed to this Market integration. HARTI disseminate daily information of prevailing prices in the important vegetable markets of the country through electronic mass media. Moreover, the private traders use latest communication facilities such as phone, fax etc to exchange price information among them. In addition, relatively better transport and communication facilities contributes to speedy and timely regional distribution of vegetables.

4.0 Operational Efficiency

The annual average price spread for carrot and leeks has stayed above 40 percent of the retail prices in the different markets. That means, farmers receive less than cents 60/ kg, if the retail prices of carrot and leeks are Rs.1.00/kg. The highest price spread of 50-60 percent is observed in Colombo markets. The annual average of price spread for carrot and leeks was above 50 percent in Hambantota markets. It was ranged between 40 to 50 percent in other markets. The lowest price spread was observed in Nuwaraeliya market, nearly 32-35 percent for Carrot. This is mainly due to Nuwaraeliya is the major producing area. (see table Nos: 5 and 6).

The annual average retail price and price spread for carrot was Rs.52.45/Kg and Rs.28.63/Kg respectively in 1998 in Colombo Markets. It was Rs.45.00/Kg and Rs.21.18/

Kg in Dambulla in the same year. According to research conducted by HARTI, transport cost, loading/unloading, and market levy accounted for below 5 percent in the retail price of Carrot. The wastage was around 7 – 8 percent. The wholesaler's margin accounted for 10 – 15 percent and retailer's margin accounted for 20 – 25 percent, (Rupasena, et. Al:1999)[6]. The main reason for higher retailer margin was small scale of business operation. There are a large number of small-scale retailers operating in the markets. Normally they maintain higher margins because they sell small quantities of vegetables. Although, transportation and distribution is speedy, poor packing and handling methods result in considerable wastage of vegetables.

5.0 Trends in Price Spread for Carrot and Leeks

The percentages of price spread in retail prices for carrot and leeks have revealed some seasonality pattern and relationship to the price levels (see figures 1-6 in the annex). The calculated percentage share of price spread in retail price is narrow during the lean periods and it is high during the peak supply period for carrot and leeks. This means that when farm gate and retail prices increase during the off-season, the percentage share of price spread in retail price declines. When farm gate and retail prices decline due to high supply during the peak months the percentage of price spread in the retail prices increases (see tables No: 5 and 6).

Contrary to this, the farmers share in the retail prices moves up and down jointly with the rise and fall in retail prices of carrot and leeks. When the retail prices record highest level, farmer shares in retail prices are also high. The farmers share record low points during the period retail prices are low.

The highest farm gate prices for carrot and leeks observed during January and February months and lowest prices during the period of August to October in 1998. The same pattern of movement could be observed in regard to wholesale and Retail Price. The calculated percentage share of farm gate price in the retail price for leeks in the same year have increased in the months of January and February; 51 percent in Colombo market, 52-54 percent in Hambantota, 66-69 percent in Nuwaraeliya, Dambulla and Kandy. It was low during August to October; 30-40 percent in all selected markets. Contrary to this, the calculated percentage share of price spread in retail price was low during January to February while high during August to October. This is mainly because of that the price spread remains relatively stable than farm gate prices.

The fluctuation of monthly farm gate prices for carrot and leeks was considerably high. The coefficient of variation (C.V) of monthly farm gate prices was above 40 during the period of 1997-1998. Meanwhile the C.V of retail prices in all selected markets are recorded below 30. The C.V of price spread stayed below 5-10 points lower compared to that of retail prices. This implies that fluctuation of the farm gate prices higher than that of price spread. In other words the price spreads remain more stable than farm gate prices, wholesale prices and retail prices. The relative stability of marketing margins in comparison with the variation of retail prices is a matter of great importance in determining the

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[6] L.P. Rupasena, I.R. Perera, J.K.M.D. Chandrasiri & B. Ratnayake, Vegetable Production and Marketing in the N'Eliya District. 1999. p.76. 82.

influence of the food-marketing-margin structure upon prices and income received by farmers. This means that practice of levelling is not taking place in vegetable marketing in Sri Lanka. The practice of price levelling distorts the functioning of the price mechanism in signalling changes in the condition of supply to consumers and consumer demand back to producers (see table No: 7 and 8).

6.0 Conclusion and Remarks

A higher level of pricing efficiency is observed in these markets. The correlation co-efficient of wholesale prices for carrot and leeks in selected markets are close to unity suggesting well-integrated markets and thereby efficiently operating markets. This indicates that high pricing efficiency exists in these markets. The pricing efficiency is a result of the nature of competition and balance of economic power that exist within the marketing process. The formal and informal price information system is partly contributed to this market integration. HARTI disseminate daily information of prevailing prices in the important vegetable markets of country through electronic mass media. Moreover, the private traders use latest communication facilities such as phone, fax and etc to exchange price information among them. In addition, relatively better transport and communication facilities contribute to speedy and timely regional distribution of vegetables.

The high price spread do not necessarily mean inefficiency, when it involves factors such as processing, storage and others. However the vegetables immediately after the harvest are transported to markets in Sri Lanka. In most cases the activities such as processing, grading, sophisticated packing and transportation with cooling facilities are not taking place in vegetable marketing in Sri Lanka. Therefore the share of the price spread should be low.

However price spread ranged between 40-60 percent of retail prices in most of the selected markets. This indicates that, still a significant portion of the expenditure of ultimate consumer falls within marketing cost and margins. The retailers margin and higher wastage have contributed the major part of the price spread. The retailers keep a wide margin to increase net return because of their small scale of business operation. Furthermore the use of primitive methods in packing and handling result in wastage. These areas should be improved to increase the operational efficiency of the vegetable marketing system.

Furthermore, the price spread remains stable than farm gate, wholesale and retail prices. The sufficient stability of marketing margins prevents undue uncertainty causing waste and misallocation of resources. The relative stability of price spread indicates that price levelling practice, which distort the functioning of the price mechanism in signalling changes in the condition of supply to consumers and changes in consumer demand back to farmers, not taking place.

In view of the finding of this study, there should be some measures taken to reduce the wastage and retailers margin. Apart from this, it is possible to conclude that vegetable marketing system in Sri Lanka is functioning more or less efficiently.

Table - 1 : Correlation of Wholesale Prices of Carrot Between Different Markets (1997)

Areas	Colombo	Kandy	Hambantota	Dambulla	Nuwaraeliya
Colombo	1	-	-	-	-
Kandy	0.98	1	-	-	-
Hambantota	0.94	0.94	1	-	-
Dambulla	0.98	0.98	0.90	1	-
Nuwaraeliya	0.97	0.96	0.92	0.96	1

Table - 2 : Correlation of Wholesale Prices of Leeks Between Different Markets (1997)

Areas	Colombo	Kandy	Hambantota	Dambulla	Nuwaraeliya
Colombo	1	-	-	-	-
Kandy	0.97	1	-	-	-
Hambantota	0.99	0.94	1	-	-
Dambulla	0.98	0.98	0.89	1	-
Nuwaraeliya	0.97	0.95	0.91	0.94	1

Table - 3 : Correlation of Wholesale Prices of Carrot Between Different Markets (1998)

Areas	Colombo	Kandy	Hambantota	Dambulla	Nuwaraeliya
Colombo	1	-	-	-	-
Kandy	0.97	1	-	-	-
Hambantota	0.96	0.92	1	-	-
Dambulla	0.98	0.96	0.96	1	-
Nuwaraeliya	0.98	0.97	0.97	0.98	1

Table - 4 : Correlation of Wholesale Prices of Leeks Between Different Markets (1998)

Areas	Colombo	Kandy	Hambantota	Dambulla	Nuwaraeliya
Colombo	1	-	-	-	-
Kandy	0.98	1	-	-	-
Hambantota	0.99	0.97	1	-	-
Dambulla	0.98	0.98	0.96	1	-
Nuwaraeliya	0.99	0.98	0.96	0.98	1

Table - 5 : Share of price spread in Retail Price of Carrot in selected Markets (1997 - 1998)

Months	Colombo		Hambantota		N'Eliya		Dambulla		P'naruwa		Kandy	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
Jan	51.9	50.1	54.0	51.8	47.6	30.1	38.6	36.7	46.3	40.5	43.8	40.8
Feb	47.5	48.6	45.8	47.1	40.5	21.8	39.6	30.8	43.2	33.5	23.3	31.3
Mar	48.1	52.6	49.2	52.1	35.1	35.5	35.9	50.1	43.3	43.1	26.4	34.1
Apr	52.4	53.4	31.4	49.4	30.2	36.2	36.7	46.1	42.9	48.1	32.6	41.5
May	46.1	62.4	41.3	62.3	30.0	42.7	30.7	55.7	40.5	56.7	25.4	52.1
Jun	44.8	52.3	42.8	41.4	14.8	27.0	33.1	44.1	31.4	44.7	34.6	44.4
Jul	56.7	42.7	54.3	45.6	36.9	26.8	47.3	36.9	50.2	36.9	43.1	36.5
Aug	59.5	60.0	64.9	57.1	48.9	36.4	56.0	58.1	58.9	58.3	40.7	49.1
Sep	62.4	68.1	64.5	61.2	48.1	56.6	58.2	65.0	57.3	67.0	40.3	59.8
Oct	61.0	61.6	62.1	54.2	36.4	51.3	56.2	57.7	53.2	59.5	48.8	52.1
Nov	41.7	61.6	31.7	63.5	26.2	47.1	45.3	59.1	43.3	59.7	50.1	50.5
Dec	44.5	59.8	43.3	57.3	13.2	46.8	22.6	48.7	32.9	53.5	30.1	45.5
Annual Avg	51.4	56.1	48.3	52.5	32.1	35.8	40.4	47.1	43.8	48.1	36.7	43.2

Table - 6 : Share of Price Spread in Retail Price of Leeks in Selected Markets (1997 - 1998)

Months	Colombo		Hambantota		N'Eliya		Dambulla		P'naruwa		Kandy	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
Jan	69.5	48.1	67.7	48.3	63.9	30.1	63.8	36.0	66.2	34.3	63.9	39.7
Feb	61.9	48.6	61.1	45.6	58.2	33.2	59.3	38.1	59.7	36.9	46.8	31.5
Mar	64.3	50.1	61.3	52.9	56.4	39.6	55.4	47.9	65.1	46.1	46.2	43.8
Apr	71.1	51.5	67.4	49.6	62.0	30.9	56.8	45.1	71.9	47.2	50.0	44.1
May	64.9	59.8	65.2	60.8	52.8	43.4	53.7	52.2	74.6	52.5	45.6	54.1
Jun	55.3	51.1	54.5	47.8	43.9	33.8	44.9	46.9	66.3	48.1	38.7	40.1
Jul	58.1	61.4	57.2	58.4	46.3	46.8	51.2	54.1	64.5	52.6	38.5	56.2
Aug	63.4	67.1	63.2	65.1	55.5	58.8	56.2	60.0	64.6	63.7	47.4	51.9
Sep	66.3	69.7	67.1	64.7	57.5	59.4	60.1	68.6	63.4	68.3	51.0	61.5
Oct	65.6	65.1	65.5	61.3	42.7	56.7	59.9	61.5	59.9	61.5	53.6	55.5
Nov	39.5	52.5	28.7	52.7	20.4	32.0	33.2	50.4	35.0	49.6	27.4	33.7
Dec	42.4	49.8	41.7	46.3	18.2	37.7	22.4	47.4	32.9	45.8	24.2	27.2
Annual Avg	60.2	56.2	56.7	53.3	46.3	40.2	49.2	48.8	59.3	48.7	42.4	44.4

Table - 7 : Coefficient of Variation of Prices and Price Spread of Carrot in Selected Markets (1997-1998)

Markets	Year	Coefficient of Variation			
		a) Farm gate Price	b) Wholesale Prices	c) Retail Price	Price spread [c]-[a]
Colombo	1997		39.19	28.41	21.77
	1998		40.98	31.71	23.85
Hambantota	1997		34.21	29.70	19.82
	1998		42.56	37.13	31.44
Nuwaraeliya	1997	40.80	32.62	21.98	16.84
	1998	43.97	42.09	29.90	16.54
Dambulla	1997		35.34	25.62	19.96
	1998		36.56	27.84	17.20
Kandy	1997		37.73	36.26	28.64
	1998		35.66	34.50	27.97
Polonnaruwa	1997			21.84	12.72
	1998			26.67	16.36

Table - 8 : Coefficient of Variation of Prices and Price Spread of Leeks in Selected Markets (1997-1998)

Markets	Year	Coefficient of Variation			
		a) Farm gate Price	b) Wholesale Price	c) Retail Price	Price spread [c]-[a]
Colombo	1997		42.99	22.89	10.20
	1998		41.74	30.44	23.36
Hambantota	1997		34.21	24.27	16.24
	1998		42.56	34.46	27.56
Nuwaraeliya	1997	49.98	36.46	27.48	18.46
	1998	42.70	45.48	29.91	22.06
Dambulla	1997		37.23	22.48	15.75
	1998		41.87	27.61	14.37
Kandy	1997		39.87	29.21	21.72
	1998		44.43	35.62	23.80
Polonnaruwa	1997			26.17	17.62
	1998			25.41	14.57

References

Gunawardena, P.J. and Athula Chandrasiri. (1980). *Factors Influencing Vegetable Prices: A study of the vegetable economy in Sri Lanka*. ARTI, Colombo.

Hill, B.E. and Ingersent, K.A. (1977). *An Economic analysis of Agriculture*. London, p.147.

Jain, S.C. (1971). *Principles and practice of agricultural marketing and prices*. U.P Agricultural University, Pantnagar. p.221-252.

Jasdanwalla, Z.Y. (1966). *Marketing Efficiency in Indian Agriculture*. Allied Publishers, Bombay.

Kohl, R.L. (1967). *Marketing of Agricultural Products*. the Macmillan Company, New York.

Mendoza, M.S. and Rosegrant, M.W. (1995). *Research Report on Pricing Behavior in Philippine Corn markets: Implication for Market Efficiency*. International Food Policy Research Institute, p.68.

Rupasena, L.P., Perera, I.R., Chanrasiri, J.K.M.D., and Ratnayake, B.(1999). *Vegetable production and marketing in the Nuwaraeliya District*. HARTI, Colombo. p76 - 82.

Sahu, H.S. and Tripathy, S. (1998). Price spread and marketing channels for shrimps in Puri district of Orissa. *Indian Journal of Agricultural Marketing*. 12(1&2), p.146.

Shakunthala Gupta. (1996). *Marketing of Agricultural Products*. New Delhi, p.93-110, 139-163.

Shepherd, G.S. (1965). *Marketing of Farm Products – economic analysis*. Iowa State University, USA. p 250-265.