



## Effectiveness of Marketing Information Systems (MIS) on vegetable sub-sector in Sri Lanka

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### Abstract

Vegetables are the second most important agriculture sub-sector after rice in Sri Lanka is. Marketing of vegetables is more complex because of the special characteristics like highly perishable nature, seasonality, bulkiness etc. In this situation, it is necessary to implement efficient marketing system for vegetables because producers and consumers are exploited by the intermediaries. Therefore, the line agencies related to the agricultural marketing have introduced MIS by using conventional and Information and Communication Technologies to make the agricultural marketing system as more vibrant and competitive. On this background, this study mainly attempted to analysis effectiveness of Marketing Information System (MIS) on vegetable sub-sector in Sri Lanka. Effectiveness of the MIS was measured by analyzing the price differences of the provinces of Sri Lanka before and after implementation of MIS in Sri Lanka. Secondary data was mainly used for this study. Nominal market price of bean, carrot, cabbage, pumpkin and brinjals were collected. Price fluctuation of selected vegetables before (1999/2000) and after (2007/2008) implementation of MIS was measured by developing Price Index (PI).

Price of the selected vegetables during the period 1999/2000 has highly varied from province to province as compared to the period 2007/2008. The price fluctuation of bean, carrot, cabbage and pumpkin from place to place were relatively low at the second occasion 2007/2008 as compared to 1999/2000. It clearly indicates that MIS has affected while determining the vegetable prices at various places in the country. However, the price behaviour of brinjals has deviated from the normal results. It means that MIS has not positively affected on determination the brinjals prices. However, It can be concluded that MIS has affected positively to determine the vegetable prices in the country and lead to reduce the price variation among the different places of the country. MIS will help safeguard both farmer and consumer while selling and buying vegetables.

**Keywords:** Marketing Information System, price fluctuation, vegetables

### Introduction

The vegetable sub-sector is the second most important sub-sector after rice of agriculture in Sri Lanka. Vegetable are produced on a year round basis and a large number of farmers are involved in the production. A major share of the produced vegetables is consumed locally and the exports amount has recorded less than one percent of domestic production. Vegetable marketing in Sri Lanka is generally in the hands of the private sector, (Vidanapathirana 2008).

Verma *et al.* (2002) indicated that the marketing of vegetables, unlike cereals, is more complex because of its special characteristics like highly perishable nature, seasonality, bulkiness etc. Also it needs special care and immediate dispose. In this situation, it is difficult to recognize the efficiency of marketing vegetables because both parties such as producers and consumers are exploited by the intermediaries. Therefore, building up of new market complex named 'Economic

Center' with all the modern amenities was a adopted strategy to increase market efficiency. It will influence the market structure and the pricing mechanism. These will also benefit the growers to obtain higher prices, increasing the market efficiency and reducing the various losses. Other important policy is implementation of market information and dissemination system. The line agencies related to the agricultural marketing such as DOA, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) and various Economic Centers have introduced MIS by using conventional and latest Information and Communication technologies viz. popular newspapers, television and radio channels, internets and SMS through mobile phones to make the agricultural marketing system more vibrant and competitive.

"A marketing information system is a continuing and interacting structure of people, equipment and procedures to gather, sort, analyse, evaluate, and distribute pertinent, timely and accurate information for use by marketing decision makers to improve their marketing planning, implementation, and control". MIS is a framework for the day to day management and structuring of information gathered regularly from sources both inside and outside an organization. As such an MIS provides continues flow of information about price, adverting expenditures, sales, competitions and distribution, (Pride and Fevrell 2000). Moreover, as Kotler and Kellers (2008) definition says, an MIS is more than a system of data collection or a set of information technologies. Further, MIS consists of people, equipments and procedures to gather, sort, analyze, evaluate and distribute needed, timely and accurate information, to marketing decision makers. However, there was no any study carried out to evaluate the effectiveness of the MIS in Sri Lanka. On this background, this study mainly attempted to analysis effectiveness of MIS on vegetable sub-sector in Sri Lanka. Price fluctuation of selected vegetables before (1999/2000) and after (2007/2008) implementation of MIS was used to achieve the objective.

### **Methodology**

Effectiveness of the MIS was measured by analyzing the price differences of the provinces of Sri Lanka before and after implementation of MIS in Sri Lanka. Following hypothesis was developed to achieve the objective of the study price.

$H_0$  - MIS does not facilitate to minimize the price differences among the different region of the country.

$H_1$  - MIS facilitates to minimize the price differences among the different province of the country.

Secondary data was mainly used for this study. Availability of the data, Nominal Market Prices (NMP) of bean, carrot, cabbage, pumpkin and brinjals were collected from secondary sources such as central bank reports, retail prices reports published by the Department of Census and Statistics and other allied departments (Central Bank, 2009; Department of Census and Statistics, 2009; Department of Agriculture, 2009). Effectiveness of MIS was measured by comparing the price variation of the different part of the country before and after implementation of MIS. MIS was implemented after the 2005. Therefore, the impact of MIS was analyzed by considering the prices fluctuation of selected vegetables before (1999/2000) and after (2007/2008) implementation of MIS.

Price fluctuation of selected vegetables was measured by developing Price Index (PI). PI was developed for each vegetable by considering average price in the year and actual price of the different province of the country. Following formula (i) was applied to calculate the index.

$$PI = \frac{\text{Actual price of the vegetable}}{\text{Average price of the particular vegetable}} \times 100 \dots\dots\dots (i)$$

PI value may be either more or less than hundred. If it is more than 100, it means that the price of the particular vegetable in the area was higher than the average price. If it is less than 100, it indicates that the price of the particular vegetable in the area was lower than the country average price.

When the MIS effective, price fluctuation was low and price should be similar to everywhere in the country. ANOVA was applied to identify whether there is a significantly different of vegetable prices at different provinces in Sri Lanka.

Price stability refers to the minimization of price fluctuation in the province to province in the country. This needs to minimize price risk for the benefit of the farmers as well as traders, (Rupasena, 2003). The level of price stability could be measured by coefficient of variation (CV) which indicates percentage change in the price compared to mean price. CV was measured by using following formula (ii).

$$CV = \frac{\text{Standard deviation of the prices}}{\text{Mean price of the particular vegetable}} \times 100 \dots\dots\dots (ii)$$

The results were depicted by using tables and charts.

**Results and Discussion**

Following Table 1 clearly illustrates that the prices of first occasion were highly fluctuated than second occasion. Table 2 shows the mean separation of the ANOVA. It clearly shows that the highest price at first occasion has recorded in generally Northern and Western province. Vegetable prices of these two provinces were significantly higher than the prices of other province such as Uva, Central, Sabaragamuwa, Eastern, Southern and North Central. Further, lowest prices have recorded in Uva, Central province.

**Table 1: ANOVA table**

Time period		SS	df	MS	F	Sig.
1999/2000	Between Groups	4017.231	8	502.154	8.337	.00
	Within Groups	2168.261	36	60.229		
	Total	6185.492	44			
2007/2008	Between Groups	3737.435	8	467.179	4.420	.01
	Within Groups	3804.651	36	105.685		
	Total	7542.086	44			

Table 2 shows that the highest price at second occasion has recorded in Northern Province only. This may be due to the impact of ware situation in the considered time period. In respect to lowest price, it has recorded at Central, Uva, North Central, Sabaragamuwa, and Eastern. Vegetable prices of Western province were also not significantly higher than these provinces. It means that the vegetable prices were similar all most similar at most places of the country other than Northern Province.

**Table 2: Duncan multiple mean separation**

Province	Before (alpha = .05)			After (alpha = .05)	
	1	2	3	1	2
Uva	88.84			90.41	
Central	92.09			92.52	
Sabaragamuwa	92.66			94.76	
Eastern	96.25	96.25		96.74	
Southern	96.54	96.54		99.76	
North Central	96.90	96.90		101.67	
North Western		105.06		102.88	
Northern			115.65	108.79	
Western			116.01		121.98

Price of the selected vegetables during the time period of 1999 and 2000 has highly varied from province to province (Table 3). The period of 1999/2000, high price has recorded in the North province in respect to up country vegetables such as Bean, Carrot and Cabbage. Further, high prices for low country vegetables such as Pumpkin and Brinjals have recorded at Western province. Lowest prices for Bean, Carrot and Brinjals have recorded at the Uva province while lowest prices for Cabbage and Pumpkin have recorded at the Central and North Central province, respectively.

**Table 3: Price index of selected vegetables period of 1999/2000**

Province	Bean	Carrot	Cabbage	Pumpkin	Brinjals
Western	106.21	105.22	114.48	123.02	131.11
Central	90.04	88.11	83.37	100.22	98.73
Southern	97.54	96.18	96.97	98.09	93.95
North	116.28	137.87	114.57	114.47	95.08
Eastern	106.38	94.11	100.19	89.13	91.45
North Western	103.42	99.15	107.70	105.04	109.99
North Central	100.47	102.26	101.66	84.48	95.60
Uva	87.17	85.45	87.00	94.17	90.41
Sabaragamuwa	92.45	91.72	94.06	91.33	93.77
<b>Mean</b>	99.99	100.01	100.00	99.99	100.01
<b>Maximum</b>	116.28	137.87	114.57	123.02	131.11
<b>Minimum</b>	87.17	85.45	83.37	84.48	90.41
<b>Range</b>	29.11	52.42	31.20	38.53	40.70
<b>SD</b>	9.24	15.57	11.04	12.43	13.01
<b>CV</b>	9%	16%	11%	12%	13%

Table 4 clearly illustrates price variation of the selected vegetables among the province during the time period of 2007/2008. The high price has recorded in the Northern Province in respect to up country vegetables. Further, high price for Pumpkin has recorded in the Western province at the considered time period. In respect to the lowest price of Bean, Brinjals and Pumpkin, it has recorded at Uva, North Central and Sabaragamuwa Provinces, respectively. Further, lowest price for Carrot and Cabbage have recorded at the Central province.

Lowest and highest prices of Bean at two occasions 1999/2000 and 2007/2008 were recorded in Uva and Northern provinces, respectively (Tables 3 and 4). Important point was price fluctuation of province to province was relatively low at second period. It means that MIS has positively affected while determining the Bean prices at various places in the country.

Highest and lowest prices of Carrot in years 1999/2000 were recorded at North and Uva provinces, respectively (Tables 3 and 4). However, the second occasion price was almost equal at all provinces. It means that the price fluctuation among provinces was very low at second occasion 2007/2008. Therefore, it can be recognized that MIS has appeared in the game for reducing price variation at various places in the country.

In Cabbage, highest price of two occasions has recorded at Western and North province, respectively. Also lowest price at both times has recorded at central province. There was high price fluctuation for the period of 1999/2000. Further, there was low price fluctuation at second occasion. Therefore, it can be indicated that MIS has shown positive impact when determining the Cabbage prices at various places in the country.

**Table 4: Price index of selected vegetables period of 2007/2008**

Province	Bean	Carrot	Cabbage	Pumpkin	Brinjals
Western	109.09	101.18	106.41	105.00	122.31
Central	97.10	88.12	84.28	98.45	84.12
Southern	108.11	103.74	107.23	103.29	92.04
North	117.82	106.40	120.69	102.77	162.22
Eastern	106.25	101.50	102.38	95.21	93.44
North Western	110.08	102.44	100.26	103.11	92.43
North Central	101.25	101.28	92.57	99.84	78.85
Uva	97.06	93.52	86.08	99.76	86.19
Sabaragamuwa	100.77	101.86	100.07	92.56	88.41
<b>Mean</b>	105.28	100.00	100.00	100.00	100.00
<b>Maximum</b>	117.82	106.40	120.69	105.00	162.22
<b>Minimum</b>	97.06	88.12	84.28	92.56	78.85
<b>Range</b>	20.76	18.28	36.41	12.44	83.37
<b>SD</b>	6.84	5.62	11.31	4.09	26.35
<b>CV</b>	7%	6%	11%	4%	26%

Pumpkin prices were highly varied from place to place of years 1999/2000. The relevant time highest and lowest prices have recorded at Western and North Central province, respectively. On this background second occasion, price fluctuation after ten years was minimal. Therefore, it can be identified that MIS has positively effected to minimize Pumpkin prices variation at various places of the country.

Though the Brinjals is also low country vegetable there was no positive effect of MIS on determination the prices in various places of the country because second occasion price fluctuation was very high as compared to the first occasion. At 1999/2000 period, highest price has recorded at Western province. However, the second time period, highest price has recorded at North province.

The close look at the Table 5 also revealed that the price similarity of the different provinces in Sri Lanka at two period 1999/2000 and 2007/2008. Range shows the gap between highest and lowest value of the price indexes and CV shows the price stability. Range and coefficient of variance of Bean, Carrot and Pumpkin was smaller on 2007/2008 than 1999/2000. It means that the price variation of provinces was low at the years 2007/2008 as compared to years 1999/2000. Contradictory, range and coefficient of variance of Brinjal has increased at second occasion than first occasion. It indicates that the price variation of Brinjal was very high years 2007/2008 as compared to years 1999/2000 of the country. This may be the negative impact of the war situation in the Northern Province in the second occasion.

In respect to the time period of 1999/2000, highest to lowest price variation have recorded Carrot (Range = 52.42 CV = 16%), Brinjals (Range = 40.7 CV = 13%), Pumpkin (Range = 38.53 CV = 12%), Cabbage (Range = 31.2 CV = 11%) and Bean (Range = 9.24 CV = 9%), respectively, (Table 5).

Highest variation has recorded for Brinjals (Range = 83.37 CV = 26%). Second, third and fourth places have gone to Cabbage (Range = 36.41 CV = 11%), Bean (Range = 20.76 CV = 7%) and Carrot (Range = 18.28 CV = 6%), respectively. Lowest price variation from place to place has reported to pumpkin (Range = 12.44 CV = 4%).

**Table 5: Price variation of two periods 1999/2000 and 2007/2008**

	Time	Range	SD	CV
<b>Bean</b>	1999/2000	29.11	9.24	9%
	2007/2008	20.76	6.84	7%
<b>Carrot</b>	1999/2000	52.42	15.57	16%
	2007/2008	18.28	5.62	6%
<b>Cabbage</b>	1999/2000	31.20	11.04	11%
	2007/2008	36.41	11.31	11%
<b>Pumpkin</b>	1999/2000	38.53	12.43	12%
	2007/2008	12.44	4.09	4%
<b>Brinjals</b>	1999/2000	40.70	13.01	13%
	2007/2008	83.37	26.35	26%

### Conclusion

Price of the selected vegetables during the time period of 1999 and 2000 has highly varied from province to province in the country. The period of 1999/2000, high price has recorded in the Northern province in respect to up country vegetables. Further, high prices for low country vegetables viz. Pumpkin and Brinjals have recorded at Western province. Lowest prices for Bean, Carrot and Brinjals have recorded at the Uva province while lowest prices for Cabbage and Pumpkin were recorded at the Central and North Central province, respectively.

When considering the time period of 2007/2008, highest price has recorded in the North province for Bean, Carrot, Cabbage and Brinjals. Further, high price for Pumpkin has recorded at Western province at the considered time period. In respect to the lowest prices of Bean, Brinjals and Pumpkin, it has recorded at Uva, North Central and Sabaragamuwa provinces, respectively. Further, lower price for Carrot and Cabbage have recorded at the Central province.

Bean price fluctuation among provinces was relatively low at second occasion-2007/2008 as compared to the time period 1999/2000. It clearly indicates that MIS has effected while determining the Bean prices at various places in the country. The second occasion, Carrot price was almost equal at all provinces. It means that the price fluctuation was very low at second occasion 2007/2008. Therefore, it can be concluded that MIS has positively affected when determining the Carrot prices at various places in the country. MIS has shown positively effect when determining the Cabbage prices at various places in the country because price variation from place to place of Cabbage price was very low at the time period 2007/2008 as compared to time period 1999/2000.

Price fluctuation after ten years for Pumpkin was minimal as compared to years 1999/2000. Therefore, it can be concluded that MIS has positively affected to reduce the Pumpkin prices variation at various places of the country. However, the Brinjals price behaviour has deviated from the normal results. It was no positive effect of MIS on determination the prices in various places of the country because second occasion price fluctuation was very high as compared to the first occasion. It needs to be further analyzed. However, it can be concluded that MIS has effected positively to determine the vegetable prices in the country and lead to reduce the price variation among the provinces. It will therefore, help to maintain the safeguard both farmer and consumer while selling and buying vegetables.

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