

Behaviour of market arrivals and prices of tomato in selected markets of north India

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ABSTRACT

India is the second largest producer of vegetables after China. The geographical area and diverse agro climatic niches in the country exert a strong influence on the supply of vegetable crops. The output variations of vegetable crops lead to wide fluctuations in prices exposing the growers to high risk. The paper examines the behaviour of market arrivals and prices of tomato and their nature of relationship in selected markets over the years. It has been found that both market arrivals as well as prices of tomato have shown increasing trends in all the markets during 1991 to 2003. The seasonality in prices of tomato was higher than the seasonality in market arrivals in all the selected markets emphasizing the improvement in the production and protection technologies and imperfection in markets and marketing system of tomato. The selected markets were also not found integrated as shown by the monthly price variations across the markets. The lagged price is an important factor in determining the current price than the market arrivals.

Key words: Market arrivals, tomato, prices, vegetable growers.

India is the second largest producer of vegetables after China and total vegetable production has touched the highest level of 93.84 million tons in 2000-01. The studies have shown that the demand for vegetables is expected to grow at an average rate of 9.2 per cent per annum requiring the doubling of production from the present 90 million tons to 185 million tons by 2011-12 (Singh et al 2004). The huge geographical area and myriad of agro climatic niches in the country exert a strong influence on the

supply of the most of the agricultural commodities. This is particularly true for vegetable crops because of their shorter growth periods and wide ecological amplitude. The output variations of vegetable crops lead to wide fluctuations in their prices exposing the vegetable growers to more risk as compared to the growers of other crops. Moreover, due to their perishable nature, vegetable crops require immediate marketing to ensure quality produce to the consumers and remunerative

prices to the growers. Inadequate market infrastructure and prevalence of too many intermediaries between producer and consumer result in higher marketing costs thus lowering the share of producer in the consumer's rupee. The lack of market intelligence about the potential markets and the pattern of arrivals and prices further add to the woes of the vegetable growers. The need for proper marketing intelligence has been felt and raised from time to time (Kalloo and Pandey 2002, Rai and Pandey 2004). Therefore, market intelligence on aspects such as potential markets, the quantum of market arrivals and prices in different markets in different months of a year is essential in helping the vegetable growers to adjust their cropping pattern.

The present study is an attempt to analyze the behaviour of market arrivals and prices of tomato both over years as well as across the selected markets. The specific objectives of the study were to analyze the behaviour of market arrivals and prices and the nature of their relationship.

METHODOLOGY

The data on market arrivals and prices of tomato have been collected for the period of 1991 to 2003 from different issues of data bases of National Horticultural Board in respect of Delhi, Chandigarh, Jalandhar and Shimla markets.

To study the trends in arrivals and prices linear regression equations were estimated. The pattern of market arrivals and prices of tomato were analyzed in terms of minimum, maximum and average values and coefficient of variations. The seasonal indices were worked out by using ratio to moving average decomposition method. Seasonality in prices and market arrivals was estimated as follows (Ali 2000):

$$S_i = [(I_h - I_l) / I_l] * 100$$

Where I_h = highest value of seasonal index, I_l = lowest value of seasonal index

In order to examine the nature of relationship between market arrivals and prices the following model was used in linear form :

$$P_t = f(P_{t-1}, Y_t)$$

Where P_t = current price, P_{t-1} = lagged price and Y_t = current arrivals of tomato in selected markets

RESULTS AND DISCUSSION

Trends in arrivals and prices of tomato

The market arrivals and prices of tomato in four markets were selected for trend analysis and the trend values are

Market arrivals and prices behaviour of tomato

presented in Table 1. The results showed that both market arrivals as well as prices in all the four markets except market arrivals in Jalandhar increased. The highest increase in market arrival of 19.70 metric tons per month was found in Delhi market followed by Chandigarh (3.35 MT), and Shimla (0.85 MT). However, highest increase in prices was found in Jalandhar market (Rs 3.03/month) followed by Delhi (Rs 1.99/month) and Chandigarh (Rs 1.57/month). The highest increase of 10.08 per cent per annum in market arrival was found in Shimla market, whereas, lowest (2.04%/annum) in Delhi market. In case of prices, an increase of 5.64 per cent per annum was

observed in Jalandhar and lowest (2.16%/annum) in Shimla markets.

The market arrivals and price behaviour of tomato during 1991 to 2003 in the selected markets was examined using descriptive statistics like minimum, maximum and average values and coefficient of variations (Table 2). The marketwise analysis of tomato showed that on an average, the mean prices of tomato varied between Rs 600 and Rs 694 per quintal in the selected markets, whereas, minimum and maximum price per quintal varied between Rs 130 to Rs 268 and Rs 2414 to Rs 1779, respectively. The

Table 1. Trends in arrivals and prices of tomato in selected markets

Name of market	Trend for	Constant	Coefficient	R ²	Linear Growth Rate
Delhi	Arrivals	10309.59* (606.75)	19.70* (6.71)	0.05	2.04
	Prices	528.20* (50.36)	1.99* (0.56)	0.07	3.48
Chandigarh	Arrivals	568.59* (35.03)	3.35* (0.39)	0.57	4.80
	Prices	477.15* (38.13)	1.57* (0.42)	0.08	3.12
Jalandhar	Arrivals	1018.90* (95.48)	-1.90 (1.06)	0.02	-2.64
	Prices	414.04* (48.02)	3.03* (0.53)	0.18	5.64
Shimla	Arrivals	32.22* (9.23)	0.85* (0.10)	0.31	10.08
	Prices	592.52* (40.72)	1.26* (0.45)	0.05	2.16

* Significant at 1% level of significance

Table 2. Measures of variation in prices and arrivals of tomato in selected markets

Name of Market	Measures of variation							
	Prices of tomato (Rs/qt)				Arrivals of tomato (000, MT)			
	Minimum	Max	Average	CV	Minimum	Max	Average	CV
Delhi	144.00	2414.00	676.62	47.81	4547.00	22423.00	11855.95	32.58
Chandigarh	180.00	1779.00	600.74	41.07	348.00	1573.00	831.64	31.82
Jalandhar	130.00	1917.00	650.84	50.48	188.00	3645.00	869.80	69.06
Shimla	268.00	1877.00	694.83	37.57	14.00	711.00	100.60	69.24

coefficient of variation of prices revealed low variations in Shimla and high in Jalandhar markets. Similarly, the market arrivals of tomato showed higher variations (>60%) in Shimla and Jalandhar markets as compared to Delhi and Chandigarh (30%).

Seasonality in market arrivals and prices of tomato

Seasonal indices of price and market arrivals were estimated using ratio to moving average method and results are presented in Table 3. Seasonal fluctuations were observed both in market arrivals as well as prices of tomato across the selected markets. It can further be observed that variations in market arrivals and prices of tomato are in general inversely related in all the markets highlighting the perishability and varied short duration production period of tomato in different regions. The overall seasonality in selected markets has been estimated both for the market arrivals as

well as prices taking into the lowest and highest monthly index value. It was found that price seasonality of tomato varied between 22–97 per cent, whereas, in case of market arrivals it varied between 25–48 per cent. This shows that seasonality in price was higher as compared to market arrivals in all the selected markets. Low seasonality in market arrivals in all the selected markets as compared to price is because of the standardization of production and protection technologies of tomato crop. However, higher price variability is because of the imperfection in the markets and marketing system of tomato.

Market integration and seasonality

The selected markets seem not to be well integrated as reflected by monthly price variations. The prices of tomato in Delhi and Jalandhar markets were highest in September while in low range in Shimla and Chandigarh markets. A similar situation

Table 3. Seasonal indices of market arrivals and prices of tomato in selected markets

Months	Markets							
	Chandigarh		Delhi		Jalandhar		Shimla	
	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices
Jan	0.97	1.01	1.13	0.94	0.84	1.00	0.92	1.13
Feb	1.01	0.90	1.12	0.83	0.85	0.88	0.94	1.09
Mar	1.08	0.81	0.99	0.75	1.06	0.74	0.98	1.01
Apr	1.09	0.80	0.88	0.77	1.20	0.67	1.02	1.00
May	1.10	0.86	0.81	0.90	1.23	0.81	1.03	0.98
Jun	1.06	0.96	0.78	0.99	1.21	0.90	1.07	1.00
Jul	1.04	1.01	0.85	1.05	1.21	0.99	1.11	0.98
Aug	0.95	1.10	0.99	1.19	0.99	1.14	1.08	0.93
Sep	0.88	1.22	1.05	1.30	0.83	1.32	0.99	0.92
Oct	0.89	1.19	1.12	1.18	0.84	1.28	0.96	0.94
Nov	0.93	1.09	1.14	1.07	0.88	1.20	0.95	1.01
Dec	1.00	1.05	1.12	1.02	0.85	1.08	0.95	1.02
Seasonality (%)	25.00	52.50	46.00	73.33	48.00	97.01	20.00	22.82

prevails in case of arrival of tomato also. Therefore integrating markets by providing information on market arrivals and prices can help to reduce seasonality in tomato markets. Similar findings were reported by Arora (1998) who found that the markets in hilly regions of Uttar Pradesh are well integrated, however, this situation is not found nationwide. Indian markets across states seemed relatively less integrated.

Relationship between prices and market arrivals of tomato

To study the nature of relationship

between prices and market arrivals linear regression equations were estimated and results are presented in Table 4. The regression analysis indicated that the lagged price of tomato had a positive and significant correlation with current prices and negative and significant with market arrivals. It was observed that the lagged price of tomato gave high response and explained higher variation indicating that the lagged price of tomato is an important factor in determining the current price than the market arrivals. Similar findings were reported by Alemayehu and Atteri (2000).

Table 4. Relationship between prices and arrivals of tomato in selected markets

Name of market	Constant	Coefficient		R ²
		Lag price	Arrivals	
Delhi	447.47*(74.33)	0.60*(0.07)	-0.015(0.01)	0.34
Chandigarh	454.16*(69.68)	0.52*(0.07)	-0.20*(0.06)	0.33
Jalandhar	504.68*(67.87)	0.46*(0.06)	-0.17*(0.04)	0.43
Shimla	466.22*(56.28)	0.43*(0.08)	-0.71**(0.29)	0.27

* Significant at 1% level of significance

** Significant at 5% level of significance

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Received : 17.6.2010

Accepted :27.10.2010