Behaviour of Market Arrivals and Price of Groundnut in Tamil Nadu : An Economic Analysis

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Abstract

India ranked 2nd in the world groundnut production after China, with an annual groundnut seed production of 5.9 million tonnes and annual groundnut oil production of 1.5 million tonnes in 2015. In India, Tamil Nadu is one among the leading groundnut cultivating states. Groundnut cultivation covers 5.9% of the area and 4.3% of production. Among different districts in Tamil Nadu, Thiruvannamalai District is the most important producer of groundnut. The present study measured the monthly time-series data on indices of seasonal indices of arrivals and prices of groundnut for the year 2015. I found that the price was the only factor which determined the quantity of market arrivals in the short run. It was also found that the trend in arrivals and prices were found to be positive over a period of time. The growth rates were estimated to be 3.81% for the arrivals and 12.07% for the prices of groundnut. This indicated that the percentage increase in prices of groundnut was found to be higher than that of arrivals.

Keywords: market arrivals, groundnut, cyclical variations, regression co-efficient

JEL Classification : B41, C13, J43, M3

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India has been producing groundnut since its introduction in Asia in the 16th century. The weather in the Indian subcontinent suits well to the crop. The country ranked 2nd in the world groundnut production after China, with an annual groundnut seed production of 5.9 million tonnes and annual groundnut oil production of 1.5 million tonnes in 2015. Furthermore, India has the maximum area under groundnut cultivation. The major groundnut producing states in India are: Gujarat (2.5 Mt), Tamil Nadu (1 Mt), Andhra Pradesh (1 Mt), Karnataka (0.5 Mt), Maharashtra (0.5 Mt), Madhya Pradesh, Orissa, and Rajasthan. The Indian groundnut production and coverage are largely concentrated in these states. Today, groundnut has a share of approximately 25% in the total Indian oilseed production. But this share is constantly reducing since India became independent ; it was around 70% in the 1950s. Karnataka was one of the major oilseeds producing states in the country, accounting for 9.72% of the total area under oilseeds and 7.03% of the national production in the year 2014-15 (Department of Agriculture and Cooperation, Directorate of Economics and Statistics, 2015).

In India, Tamil Nadu is one among the leading groundnut cultivating states. Groundnut cultivation covers 5.9% of area and 4.3% of production. Among different districts in Tamil Nadu, Thiruvannamalai District is the most important producer of groundnut. The multiplier groundnut is grown widely in Thiruvannamalai District. This is the main reason for selecting Thiruvannamalai as the study area.

Statement of the Problem

Groundnut is an important oil crop and it has greater economic importance among the vegetables since it is one of

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the leading commodities in agricultural exports. The agricultural commodity prices affect the level of living of both consumers and farmers. It is often desirable to increase the returns to farmers and lower costs for consumers in order to help raise the standard of living of both (Basu & Singh, 2005).

Production is one end of the food problem in India, the other being distribution. Agricultural marketing systems have an important role to play in predominantly agrarian economies. Inadequate market infrastructure and unpredictable prices are considered to hamper accelerated agricultural development. Markets for farm products are proverbially imperfect with a few well organized traders and a large number of unorganized producers dumping their produce under the seasonal pattern of production and harvesting. While market imperfections and the consequent loss in marketing efficiency are the common problems in all farm products, they are more pronounced in markets for perishable products. Among the perishables, vegetables have all the problems discussed and the performance of market for vegetables leaves much scope for improvement. Groundnut has a place of pride not only for its diverse uses but also for its special preference by consumers, rich and poor, while it also is subjected to production and marketing problems as stated above.

Thiruvannamalai District in Tamil Nadu is an important centre for groundnut production and marketing. The producers and consumers of this area often complain of wide price fluctuations. The groundnut prices are reported often to be manipulated in the wholesale centre and retail points against the interests of the producers - farmers and consumers. Therefore, marketing of groundnut in Thiruvannamalai district deserves attention not only to understand the problems in marketing, but also to identify specific strategies to improve the performance of the groundnut market. The present study attempts to analyze the pattern of market arrivals and prices of groundnut in Thiruvannamalai District of Tamil Nadu.

The nature of agricultural production itself leads to price fluctuations. Prices are at the lowest when arrivals are at the peak, and they improve with the decline of arrivals till the end of the crop season. The pattern of arrivals and prices of groundnut are examined in order to minimize price fluctuations. This research is devoted to an analysis of the temporal variations in market arrivals and prices of groundnut (Godara & Bhonde, 2006).

Market arrival is the most dominant factor in the determination of prices of groundnut. In the present study, the market arrival of groundnut is considered from the villages to Thiruvannamalai market during the main crop season. The price of groundnut is the general price level of multiplier groundnut that is registered by the National Horticulture Research and Development Foundation, Thiruvannamalai and Association of Commission Agents. In order to measure the variability due to trend, cyclical, seasonal, and irregular fluctuations, the coefficient of variations were worked out separately for arrivals and prices of groundnut.

Methodology

The primary data were collected during the months between January - December 2015 for the agricultural years from 2006-2016. This present study is based on monthly time series data on the market arrivals and prices of groundnut in Thiruvannamalai market.

The change in behaviour of prices and market arrivals of groundnut were analyzed by computing a multiplicative model (Grewal, 1987) of the following type:

$$Y_t (A/P) = T.S.C.I \quad \text{------------- (1)}$$

where,
$Y_t (A/P)$ denotes the time series data on arrivals/prices,
T = denotes the trend components,
S = denotes the seasonal variations,
C = denotes the cyclical movements, and

$I =$ denotes the irregular variations.

Irregular variations are the movements in the prices due to random factors and these variations are computed with the help of the given formula :

$$I = SI / S, \qquad \text{------------- (2)}$$

where,
S = seasonal variations and ,
I = Irregular variations.

Cyclical variations are computed by using the given formula :

$$C = TC / T, \qquad \text{------------- (3)}$$

where ,
C = Cyclical variations and,
T = trend components.

✥ **Secular Trend and Growth Rate :** Trends, in general, indicate the tendency of prices of groundnut to increase or decrease over a long period. In order to understand the secular trend, growth rate is calculated with the help of the equations given below :

$$Y = ab^t \qquad \text{--------------------- (4)}$$

where,
Y indicates the arrivals/prices,
t indicates the time (years).

Computed Growth Rate $=$ (Antilog $b - 1) \times 100$

Results and Discussion

(1) Seasonal Variations in Arrivals and Prices : Seasonal variation is a periodic movement of the variable studied which occurs within a year and it repeats itself year after year due to regular and periodic changes in the underlying factors influencing the variables. In the present study, seasonal variations in the monthly average prices are studied for 10 years by using the given formula and this variation could be attributed to seasonality in market arrivals of groundnut. The Table 1 shows the monthly time series data on seasonal indices of arrivals and prices of groundnut for the year 2015, which were collected from Thiruvannamalai Market, Thiruvannamalai District, Tamil Nadu.

   It is inferred from the Table 1 that the period from July to December existed as a lean period of arrivals of groundnut in the market. The peak season for arrivals in the market appears to be March to June. The seasonal indices of prices are observed in the range of 112.63% in November to 69.11% in May. During the lean period of arrivals from July to December, the variations in the seasonal indices of prices range from 74.15% in July to 112.63% in November. Similarly, during the peak period of arrivals, the prices vary from 69.11% in May to 73.12% in June. It reveals that seasonal variability in arrivals is found to be less than that of prices, indicating that the price is the only factor which determines the quantity of market arrivals. The results are also depicted graphically in the Figure 1.

Table 1. Seasonal Indices of Arrivals and Prices of Groundnut in Thiruvannamalai District for the Year 2015

Month	Seasonal Indices of	
	Arrivals	Prices
January	93.38	76.21
February	97.72	75.39
March	100.01	72.04
April	107.36	71.63
May	114.12	69.11
June	103.21	73.12
July	99.35	74.15
August	95.16	83.12
September	88.41	94.73
October	81.69	101.43
November	78.17	112.63
December	89.11	89.64

Figure 1. Seasonal Indices of Arrivals and Price of Groundnut
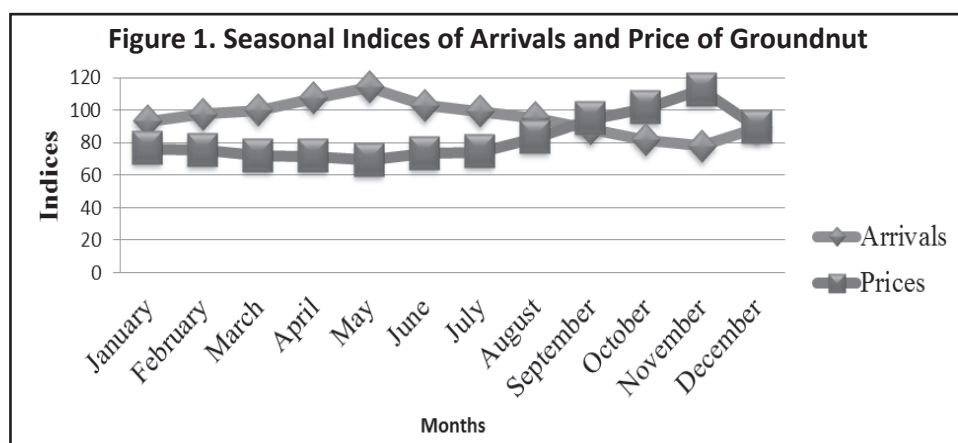
(2) Irregular Variations in Arrivals and Prices : Irregular variations are the movements in the prices due to random factors and these variations are computed. The irregular indices of arrivals and prices of groundnut in Thiruvannamalai district are presented in the Table 2.

It is seen from the Table 2 that the irregular indices of arrivals of groundnut vary from 79.65 % in October to 119.27% in May. The irregular indices of prices range from 69.13% in February to 130.46 % in October. It can be observed from the analysis that the irregular fluctuations in prices were much greater than those of arrivals over a period of time. The computed data on irregular indices of arrivals and prices are presented in the Figure 2.

(3) Cyclical Variations in Arrivals and Prices : Cyclical variations are the movements with periods longer than a year and all cycles are not of the same length. Cyclical variations are computed and the results are provided in the Table 3. From the Table 3, it is observed that the cyclical indices of arrivals of groundnut range from 80.45% in 2012-13 to 143.51% in 2015-16. The cyclical variations range from 184.36% in 2006-07 to 79.89% in 2008 - 2009. It is also found that the cyclical indices of prices were much greater than those of arrivals over a period of time. The cyclical variations of arrivals and prices are shown in the Figure 3.

**Table 2. Irregular Indices of Arrivals and Prices of
Groundnut in Thiruvannamalai District for the Year 2015**

Month	Irregular indices of	
	Arrivals	**Prices**
January	92.16	74.13
February	94.34	69.13
March	103.16	70.66
April	99.47	70.09
May	119.27	73.21
June	101.44	70.15
July	87.33	96.43
August	91.49	88.34
September	86.41	122.63
October	79.65	130.46
November	100.53	121.89
December	112.92	119.47

Figure 2. Irregular Indices of Arrivals and Price of Groundnut
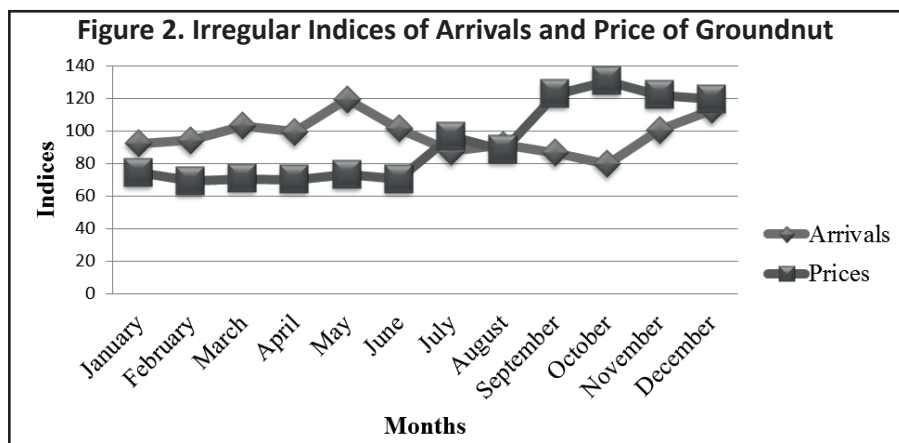
The prices and arrivals reach their maximum after some time. A completed cycle includes one peak and one trough. The peak periods of arrival of groundnut as observed from the Table 3 are 2007-08, 2010-11, 2014-15, and 2015-16. In the case of prices of groundnut, the highest price was found during the periods from 2006-07, 2009-10, 2011-12, 2012-13, and 2013-14.

(4) Secular Trend and Growth Rate : Trends in general show the tendency of prices of groundnut to increase or decrease over a long period. In order to understand the secular trend, growth rate is calculated with the help of equations.

The estimated values of secular trend and growth rate of arrivals and prices are shown in the Table 4. The Table 4 shows that the trend coefficients of both arrivals and prices are positive and statistically significant at the 5% level. The growth rates are 3.81% and 12.07% for arrivals and prices of groundnut, respectively. It reveals that the groundnut prices had increased to the tune of 12.07 % per annum compared to the arrivals of groundnut, which is 3.81 % per annum. The adjusted R^2 values constitute 0.47% and 0.59% for arrivals and prices of groundnut, respectively.

**Table 3. Cyclical Variations in Arrivals and Prices of
Groundnut in Thiruvannamalai District During 2006 - 2015**

Year	Cyclical Indices of	
	Arrivals	Prices
2006-07	91.84	184.36
2007-08	136.49	81.69
2008-09	112.64	79.89
2009-10	89.65	104.47
2010-11	94.76	109.89
2011-12	107.69	119.76
2012-13	80.45	116.84
2013-14	84.37	120.42
2014-15	109.76	96.21
2015-16	143.51	103.27

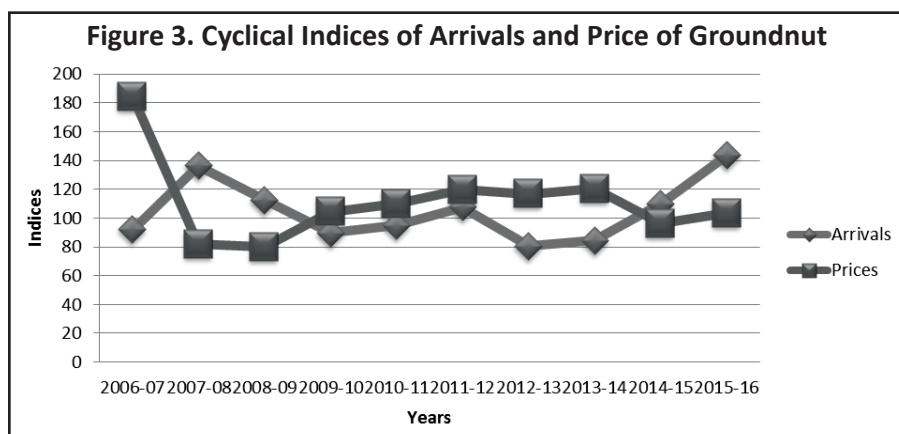Figure 3. Cyclical Indices of Arrivals and Price of Groundnut

Table 4. Secular Trend and Growth Rate of Arrivals and Prices of Groundnut in Thiruvannamalai District

	Regression Coefficient			Growth Rate in Percentage
	a	b	R^2	
Arrivals	32.74	8.32* (3.47)	0.47	3.81
Prices	5.72	1.14* (5.32)	0.59	12.07

Note : Figures in brackets are the *t* - values.

* indicates that the coefficient is statistically significant at the 5% level.

(5) Coefficients of Variation of Arrivals and Prices : The coefficients of variation are due to trend, cyclical, seasonal, and irregular fluctuations, which are furnished in the Table 5. It is revealed from the Table 5 that the total coefficients of variation for arrivals and prices are 57.28% and 75.64%, respectively. It indicates that less variation is found in prices of groundnut compared to the arrivals. The variations due to seasonal component rank first for arrival, followed by the irregular component, trend component, and cyclical component. In the cases of prices, the variations due to trend component rank first, followed by the irregular component, cyclical component, and seasonal component.

Table 5. Coefficients of Variation of Arrivals and Prices of Groundnut

Component	Coefficient of Variation	
	Arrival	Price
Trend	12.62	23.18
Cyclical	12.03	16.36
Seasonal	18.32	14.32
Irregular	14.31	21.78
Total	57.28	75.64

Conclusion

The behavior of market arrivals and prices are studied by analyzing the variations due to seasonal, cyclical, irregular, and trend components. The results reveal that the seasonal variability in arrivals is found to be less than that of prices, indicating that the price is the only factor which determines the quantity of market arrivals in the short run. The irregular fluctuations in prices are much greater than those of arrivals over a period of time. It is also found that the cyclical indices of prices are much greater than those of arrivals over a period of time. The trend in arrivals and prices is found to be positive over a period of time. The growth rates are estimated to be 3.81% for the arrivals and 12.07% for the prices of groundnut. This indicates that the percentage increase in prices of groundnut is found to be higher than that of arrivals. The variations due to seasonal component rank first for arrivals, followed by the irregular component, trend component, and cyclical components. In the case of prices, the variations due to trend component rank first, followed by the irregular component, cyclical component, and seasonal component.

Policy Implications

The seasonal price indices for groundnut are found to be high during July to December in the study area. The groundnut farmers could be advised to sell their produce during the aforesaid months in the market. There are wide fluctuations in groundnut prices due to irregular and excess arrivals during the peak period. Hence, the farmers are not able to get a reasonable price for groundnut during this period. It is suggested that government should take steps to create storage facilities and establish godowns in the study area. With the effective implementation of these suggestions, the groundnut cultivators may get a better remuneration for their produce. This would help to improve their economic conditions.

Limitations of the Study and Scope for Further Research

The following are the important limitations of the study. This study used disaggregate data for the market arrivals for groundnut of Thiruvannamalai District. The main limitation of the study is that most of the commission agents were not willing to share their transaction/purchase and sale related information. The data collected from the farmers and market intermediaries is based on their memories and thus also has some limitations. Due to time constraints, regression was performed on one factor only, that is, affecting the market arrivals of groundnut. Other major factors like demand, festival seasons also influence the market arrivals of groundnut, which can be examined in future studies.

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