



TREND ANALYSIS: PRICE OF CARDAMOM IN INDIA

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Abstract

In the analysis of Cardamom price by using multiplicative model with average price collected from E-Auction centres in Idukki area namely Bodinayakanur, Santhamparai, Pooparai, Kanjanaparai, and B.L.Ram for the period of twenty years starting from 1996 to 2015, the co-efficient of determination (R^2) was 0.758 which indicated that 75.80 per cent of variation in the price of cardamom was explained by the dependent variable. There has been a significant increase in the price of Cardamom over the years. The indices of cyclical variation in the prices of Cardamom reached the maximum for the period between 2008 and 2012 and it started declining until 2007 from 2002. The price again started increasing from 1999 to 2001. Once in six or seven years the price varied much by irregular factors. The indices of irregular variations ranged from 0.93 to 1.34. The irregular variation in price may be due to sudden changes in demand, influenced by the changes in taste and buying behaviour, the price of substitutes, and change in relative income level. The seasonal indices that lower prices prevailed during May, June, July, August, January, February and March. This is due to heavy arrivals and post harvest glut in the market. The lower prices imply that growers sold their produce after storing them for some time. The highest price index during April, September, October, November and December was due to the seasonal shrinkage of arrivals and the pre-harvest.

Keywords: Cardamom Price, Multiplicative Model, Secular Trend, Cyclical Variation, Irregular Variation, Temporal Variation, Regression and Moving Average.

Introduction

Cardamom is the most important spice produced and traded in India. The product enjoys huge demand in the domestic market. The cardamom cultivators enjoy comparatively better prospects in terms of profit for their investment and efforts and cardamom cultivation has become a beacon of light and a lantern of hope to them. Above all, cardamom has also an enviable overseas market owing to its use in the modern fast food culture which has become indispensable now. It also acts as a good provider of employment opportunities in hilly and rural areas where it is cultivated. It is cultivated in Western Ghats which forming part of three states namely Kerala, Tamil Nadu and Karnataka. India stands second in cardamom production next to Gautamala. In India, Kerala is the leading state in the production with 65 percent of total production. The price of cardamom in India is fixed in Kerala, Karnataka and Tamil Nadu through spices board auction centres. These centres are located in Bodinayakanur, Santhamparai, Pooparai, Kanjanaparai, and B.L.Ram.

Statement of Problem

The Indian cardamom has a place of pride and pre-eminence owing to its pungent taste, oleoresin quality and its alluring green colour. It has its domestic market and earns a sizable foreign exchange to the national exchequer. However, unprecedented factors like erratic rain pattern, failure to fetch remunerative returns, unsecured minimum floor prices for the produces, lack of labourers, migration of labourers, failure to follow integrated farm management practices, failure to introduce modern technologies to augment production pose a serious threat to cardamom cultivation. It is becoming more challenging and involves huge expenses with less return. Moreover, Guatemala has become the largest producer of cardamom and it has become a keen competitor to Indian cardamom. The marketing of cardamom in Indian context needs to be strengthened for sustenance and stability. A study in this direction, it is hoped, will help the policy makers at the helm of affairs to formulate suitable policies for further expansion of cultivation and strengthening of the market structure of the queen of spices, cardamom to motivate and encourage people to take up cardamom cultivation newly or increase the existing area of cultivation.

Review of Literature

Shrivastava (1984) stated that the producer's share is inversely related to consumer price. The retailer's share increases with an increase in the consumer price, whereas the producer's share decreases with an increase in the consumer's price. The benefit derived from all increase in the consumer's price is absorbed by the retailers.

Banumathy (2001) worked out the price behaviour of coconut using time series analysis method. She analysed the seasonal variation from the original composite time series. The time series data is done by assuming multiplicative model of the $Y = T \times C \times S \times I$. Where y = Monthly arrival of price, T = Trend value, C = Cyclical movement, S = Seasonal variation, and I = Irregular fluctuation.



Objectives

The main objective of the study is to analyse the variations in the price of Cardamom of Idukki District of Kerala.

Methodology

Data regarding price of cardamom and other secondary data were collected from various journals, books, Spices statistics published by Spices Board, Cochin and websites for the period of twenty years starting from 2006 to 2015. Cardamom auction is taking place in various places namely Bodinayakanur, Santhamparai, Pooparai, Kanjanaparai, and B.L.Ram. The average price of all above said auction centres have been taken for the analysis.

The Analytical Framework

Time series analysis was carried out to study the behavior of prices of Cardamom over a period of time. A multiplicative model of the following type has been used.

$$Y = T X C X S X I$$

Where,

Y	=	Actual Price in Rupees per Kilogram
T	=	Secular Trend
C	=	Cyclical Variation
S	=	Seasonal Variation
I	=	Irregular Variation

In the present study, the components were decomposed into three categories namely secular trend, cyclical variation and irregular variation. The seasonal variation was separately analysed with ten years' monthly data.

Secular Trend

The secular trend is the basic tendency of prices to increase or decrease over a period of time. It describes the pattern of behavior which has characteristics of the series in the past. In the present study, the trend of time series of prices worked out, with linear regression equation, since the prices exhibited linear relationship with time. A trend equation fitted for the price of Cardamom is

$$Y = a + bt$$

Where,

Y	=	Price of Cardamom rupees per Kilogram
a	=	Constant
b	=	Regression co-efficient
t	=	Time in Years

Cyclical Variation

A careful study of cyclical variation facilitates to face recession period and to reap the benefits during booms. In the present study, the cyclical variation in annual prices of Cardamom was studied through moving average method. The steps involved are shown below.

Step 1 dividing the actual average yearly price by the trend price.

Step 2 Computation of six yearly centered moving averages for the de-trended data and this formed cyclical variation.

Seasonal Variation

It is a variation which occurs with some degree of regularity within a specific period of one year or shorter. This study is useful to take policy decisions regarding purchase, Production, inventory control and the like. In the present study, the seasonal variation in the monthly average prices was studied for ten years by applying the moving average method. The steps involved are shown below.

Step I Computation of 12 months moving averages for monthly average price series of Cardamom.

Step 2 Obtaining the percentage series of actual prices to moving average prices and arranging them by month.

Step 3 Calculating median for each month and eventually arriving at the seasonal (monthly) indices through adjustment factor.

Irregular Variation

It is the irregular movement of prices over a period of time due to random factors. In the present study, Cyclical-Irregular (CI) components were derived by dividing the actual time series with trend element since seasonal element was absent in the



annual price series. This Cyclical-Irregular (CI) component was again divided by Cyclical component (C) to estimate the irregular variation.

Temporal Variation

A study on temporal variation of prices would be useful in forecasting the price movements in future. This would in turn help the producers and traders in making effective decision in production and marketing.

Results and Discussions

A study on temporal variation of prices would be useful in forecasting the price movements in future. This would in turn help the producer and traders in making effective decision in production and marketing.

The present study analysed the temporal variation of Cardamom prices in Idukki District using yearly average prices of Cardamom. Table 1 shows the trend, cyclical and irregular variations of price.

Table 1 Trend, Cyclical and Irregular Variations of Prices of Cardamom in Idukki District

S.No.	Year	Actual Price	Trend Price	Index of Cyclical Variation	Index of Irregular Variation
1	1996	612,54	635,11	-	-
2	1997	668,12	652,53	-	-
3	1998	682,97	669,96	-	-
4	1999	698,14	687,38	1,01	1,01
5	2000	713,66	704,80	1,00	1,01
6	2001	754,24	722,22	1,00	1,05
7	2002	680,60	739,65	0,99	0,93
8	2003	742,36	757,07	0,99	0,99
9	2004	758,85	774,49	0,98	1,00
10	2005	775,72	791,92	0,98	1,00
11	2006	822,04	809,34	0,98	1,04
12	2007	838,04	826,76	0,97	1,04
13	2008	756,23	844,19	1,00	0,89
14	2009	824,84	861,61	1,04	0,92
15	2010	843,17	879,03	1,03	0,93
16	2011	1239,81	896,46	1,03	1,34
17	2012	913,38	913,88	1,03	0,97
18	2013	931,16	931,30	-	-
19	2014	840,25	948,73	-	-
20	2015	916,49	966,15	-	-

Source: Consolidated report of Spices Board – E-Auction Centers

Secular Trend

Secular Trend is the basic tendency of prices to increase or decrease over a period of time. The concept does not include short – range oscillations in prices but the study movements over a long time. To identify the trend in prices of cardamom for the period from 2006 to 2015, the linear regression equation was fitted and the estimated trend function was,

$$Y = 1979.072 + 0.33X$$

(5.427) (0.007)

$$R^2 = 0.758$$

$$F = 24.365 **$$

Figures in parenthesis denote standard error.

** Significant at one per cent level.

It could be observed from the above function that the co – efficient of determination (R^2) was 0.758 which indicated that 75.80 per cent of variation in the price of cardamom was explained by the dependent variable.



The results also show that there has been a significant increase in the price of Cardamom over the years. The annual average price of Cardamom per kilogram has increased at the rate of ₹ 984.23 per annum. The actual price series with the estimated trend value is presented in Table 1.

Cyclical Variation

Cyclical variation in price of Cardamom refers to recurrent up and down movements around secular trend levels which have duration anywhere from 2 to 12 years. These cycles may or may not be periodic. This study is useful in framing suitable policies for stabilizing the price level. The cyclical variation in prices of Cardamom is analysed by moving average method. It could also be seen that the indices of cyclical variation in the prices of Cardamom reached the maximum for the period between 2008 and 2012 and it started declining until 2007 from 2002. The price of Cardamom again started increasing from 1999 to 2001.

Irregular Variation

Irregular variation refers to such variations in price of Cardamom which do not repeat themselves in a definite pattern. Irregular variation in price includes all types of variation other than the trend and cyclical movements. Irregular variation in price is caused by certain special isolated occurrences such as sudden change in demand or rapid technological progress. By their nature these movements are irregular and unpredictable. An analysis of irregular variation in price of Cardamom in Idukki District was carried out.

It could be observed that once in six or seven years the price of Cardamom varied much by irregular factors. The indices of irregular variations for the price of Cardamom ranged from 0.93 to 1.34. The co-efficient of variation of irregular variation is 37.68 per cent. Thus it is inferred from the table that irregular variation in the price of Cardamom was seen which was confirmed by the co-efficient of variation of the irregular indices. The irregular variation in price of Cardamom may be due to sudden changes in demand, influenced by the changes in taste and buying behaviour, the price of substitutes, change in relative income level and the like.

Seasonal Variation

Seasonal variation in prices of Cardamom was observed during the survey period. Cardamom is consumed almost daily in a small quantity. There is a regular demand throughout the year. But the supply varied with the production season. Only small quantities are stored by the growers. This is the cause for the post harvest glut and pre-harvest scarcity. Hence an analysis of the seasonal variation in the price of Cardamom is pertinent.

In the present study, the seasonal variations in the monthly average prices of Cardamom for ten years from 2006-2015 by applying 12 months average.

Table 2 Seasonal Variation

Month	Seasonal Index
April	103,77
May	95,17
June	90,12
July	93,12
August	96,40
September	105,01
October	108,28
November	106,41
December	108,24
January	97,64
February	95,88
March	99,96

Source: Spices Board – E-Auction Centers

Table 2 reveals that much variation in the price of Cardamom exists in the market in the different months of a year. It could be observed from the seasonal indices that lower prices prevailed during May, June, July, August, January, February and March. This is due to heavy arrivals and post harvest glut in the market. The lower prices imply that growers sold their produce after storing them for some time. The highest price index during April, September, October, November and December was due to the seasonal shrinkage of arrivals and the pre-harvest.



Conclusion

The result of Price of Cardamom analysis shows that the co-efficient of determination (R^2) was 0.758 which indicated that 75.80 per cent of variation in the price of cardamom was explained by the dependent variable. There has been a significant increase in the price of Cardamom over the years. The annual average price of Cardamom per kilogram has increased at the rate of ₹ 984.23 per annum. The indices of cyclical variation in the prices of Cardamom reached the maximum for the period between 2008 and 2012 and it started declining until 2007 from 2002. The price of Cardamom again started increasing from 1999 to 2001. Once in six or seven years the price of Cardamom varied much by irregular factors. The indices of irregular variations for the price of Cardamom ranged from 0.93 to 1.34. The co-efficient of variation of irregular variation is 37.68 per cent. Thus it is inferred from the table that irregular variation in the price of Cardamom was seen which was confirmed by the co-efficient of variation of the irregular indices. The irregular variation in price of Cardamom may be due to sudden changes in demand, influenced by the changes in taste and buying behaviour, the price of substitutes, change in relative income level and the like. The seasonal indices that lower prices prevailed during May, June, July, August, January, February and March. This is due to heavy arrivals and post harvest glut in the market. The lower prices imply that growers sold their produce after storing them for some time. The highest price index during April, September, October, November and December was due to the seasonal shrinkage of arrivals and the pre-harvest.

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