

**RESEARCH ARTICLE :**

# An econometric analysis of cotton arrivals, prices and efficiency measures of cotton in non-traditional cotton areas of Karnataka

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**SUMMARY :** The present paper aims to analyse the behaviour of arrivals and prices of cotton in non-traditional areas of Karnataka and also the respondents operating in different channels of marketing and their efficiency measures *i.e.*, Mysore, Davanagere, Shivamogga and Chitradurga districts were selected as non-traditional areas of Karnataka. Seasonal indices computed to study the seasonal variations in market arrivals and prices of cotton. Annual and monthly data relating to arrivals and prices were obtained from the register maintained in each APMC office. The data pertaining to annual arrivals and prices were collected for the period 1997-98 to 2011-12. The other sources consulted for the collection of relevant secondary data were the Additional Director of Agricultural Marketing and Department of Agriculture of the respective selected districts. Results revealed that, higher indices of market arrivals and prices were observed in the peak period (September to December month) and positive correlation between prices and arrivals of cotton in all the four selected markets. Farmers have been forced to sell their produce immediately after the harvest due to greater financial pressure. The marketing efficiency of different channels in marketing cotton has been worked out by Acharya's modified method. In marketing of their cotton produce, majority of the farmers operated through channel III followed by channel II and I. Channel III was the most efficient one because marketing efficiency index was 9.34 in Davanagere market, followed by Shivamogga market with 9.25, Mysore market 8.73 and 8.48 in case of Chamarajanagar market. The low marketing efficiency was observed in case of channel I. The low marketing efficiency in channel I was on account of more number of the market intermediaries in this chain. The marketing efficiency in different channels ranged differently among different market.

**KEY WORDS :**

Arrivals, Prices,  
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## **BACKGROUND AND OBJECTIVES**

Cotton is one of the most important cash crops in India, which plays a significant role in the national economy. It occupies 5 per cent

of the total cultivated area in the country, which is 25 per cent of the world's area under this crop. India is the second largest producer of cotton in the world after China accounting

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for about 18 per cent of the world cotton production. It has the distinction of having the largest area under cotton cultivation in the world ranging between 12 to 12.2 million hectares and constituting about 25 % of the world area under cotton cultivation. The 'white gold' or the "King of fibres" enjoys a predominant position amongst all cash crops in India. India's 2014/15 cotton production is forecast at 36 million 170 kg bales (28 million 480 lb bales/ 6.3 mmt) from 11.8 million hectares, the third highest area on record. Farmers have shown a consistently strong preference for cotton relative to other crops in recent years. The area under cotton cultivation has increased from 76.67 hectare during 2002-03 to 115.53 lakh hectare by 2013-14. The production of cotton has increased to 375 lakh bales by 2013-14. Major cotton producing states in India are Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh. The main cotton growing districts in Karnataka are Dharwad, Haveri, Gadag, Bellary, Belgaum, Raichur and Gulbarga. However, there is spectacular shift in cotton growing areas in Karnataka. From traditional areas it has spread to non-traditional districts like Mysore, Shivamogga, Chamarajanagar, and Davanagere. Hence, the present study has made to analyze the behaviour of arrivals and prices of cotton and to know the different marketing channels that are operated for cotton in the non traditional areas of Karnataka.

## RESOURCES AND METHODS

Karnataka is purposively selected for the study as it is one of the major cotton producing states in the country. The markets have been selected based on the maximum arrivals of the cotton in each district. In four districts four markets were selected for the study which comprised of maximum arrivals in that market. To compute the seasonal indices, the time series data relating to the monthly arrivals and prices of cotton were used. The data pertaining to annual arrivals and prices were collected for the period 1997-98 to 2011-12. Whereas, the data collected on monthly arrivals and prices varied from market to market *i.e.* 15 years in case of Davanagere and Chamarajanagar markets (1997-98 to 2011-12) and in case of Mysore and Shivamogga markets 12 years (2000-2001 to 2011-12). For studying the marketing aspects of cotton one market from each selected district was chosen on the basis of their

dominance in arrivals of cotton. The market functionaries were listed under four heads namely commission agents, wholesale traders, village merchants and ginners. From each market five commission agents, five wholesale traders, five village merchants and five ginners were selected for the study. Thus, a total of 20 commission agents, 20 wholesale traders, 20 village merchants and 20 ginners were interviewed for collecting information on costs incurred, marketing margins and marketing efficiency. The information on quantity handled, price paid, marketing costs and margins, cost incurred in cotton transaction *etc.* was collected from market functionaries.

A time series is a complex mixture of four components *viz.*, trend (T), seasonal (S), cyclical (C) and irregular (I) movements.

These four kinds of movements are frequently found either separately or in combination in a time series. The relationship among these components is assumed to be either additive or multiplicative. A composite economic time series data is expressed in multiplicative model as,

$$O_t = T \times C \times S \times I \quad (1)$$

where,  $O_t$  = Original observation at time 't', T = Trend element, C = Cyclical element

S = Seasonal variation, I = Irregular fluctuations.

In the present study, only the trend and seasonal indices were computed to study the behaviour of arrivals and prices of cotton.

To compute the seasonal indices, the time series data relating to the monthly arrivals and prices of cotton were subjected to the simple averages method.

Simple regression analysis was carried out to ascertain the response of price to a given change in arrivals. The equation fitted for the purpose was specified as follows.

$$Y_i = a + b X_i \quad (2)$$

where,  $Y_i$  = Prices,  $X_i$  = Market arrivals, a = Intercept parameter, b = Regression co-efficient or slope parameter

$i = 1, 2, \dots, n$

The prices ( $Y_i$ ) were assumed to be the dependent variable and market arrivals ( $X_i$ ) were taken as independent variables.

In order to study the nature and magnitude of association between arrivals and prices of cotton crop, the correlation analysis was adopted. Further the correlation co-efficients were tested for their statistical significance. To find out the extent of fluctuations in

market arrivals and prices of cotton crop and to know the extent of integration in the non-traditional cotton growing areas selected as the study markets, the coefficient of variation analysis was used. The tabular presentation technique used to work out the marketing costs, marketing margins, producers share in consumer's rupee. The data were summarized with the aid of averages, percentages etc. to obtain the meaningful results.

## OBSERVATIONS AND ANALYSIS

The data on monthly market arrivals of cotton and prices of cotton were considered for each of the selected markets separately. It could be seen from the Table 1 that higher indices of market arrivals and prices were observed in the peak period (September to December month) in all the four markets. Singh (1996) in their study on seasonal indices of arrivals and prices of pigeonpea in Uttar Pradesh also observed that immediate months after the harvest of the crop as peak arrival months. The arrivals in the market immediately after the harvesting period caused the decline in prices and converse was also true.

The arrivals in the market immediately after the harvesting period caused the decline in prices and converse was also true. In case of Shivamogga market the higher indices were observed during January (158.46), however, the indices were lowest in the months of May and June. While in the months of July, August and

September no arrivals of cotton were seen during this period. The price indices were also high during February (121.31), March (118.85) and January (109.14). Price indices in general were more than that of indices of arrivals. Lean periods were the months of April, May, June and July August. The seasonal pattern of market arrivals was the result of in-adequacy of warehousing facilities and inability of farmers to withhold stocks and incur additional costs on storage and also to take on themselves. The consequence of price fluctuations, the financial pressure to pay off the costs of cultivation obligations were also instrumental in augmenting market arrivals immediately after the harvest so, there is an urgent need to develop credit facilities and make them available to farmers to relieve them from financial difficulties. The situation clearly indicated that some of the large farmers who withhold their past seasons produce in anticipation of higher prices sold their produce during the months of crop growth period and to some extent this situation might be due to entry of produce from the outside market also. This situation was seen in case of Davanagere market. In Davanagere market this was shared by large farmers, with their strong with holding capacity. In rest of the markets Chamarajanagar and Mysore market it was mostly the small and marginal farmers who marketed their produce immediately after harvest due to their immediate cash needs.

Thus, the pattern of disposal of cotton in the different markets by small and large farmers indicated a shift away

**Table 1: Seasonal indices of arrivals and prices of cotton in the study markets**

Month	Davanagere market <sup>1</sup>		Mysore market <sup>2</sup>		Chamarajanagar market <sup>1</sup>		Shivamogga market <sup>3</sup>	
	Arrivals	Price	Arrivals	Price	Arrivals	Price	Arrivals	Price
April	56.62	57.47	0.13	0.58	0.78	0.36	19.59	101.80
May	25.28	19.52	0.03	0.08	0.00	0.00	4.62	82.01
June	17.48	15.06	0.02	0.06	0.37	0.29	4.23	84.84
July	6.01	5.26	0.06	0.27	47.28	34.09	0.00	0.00
August	17.91	17.62	2.33	16.54	126.54	115.33	0.00	0.00
September	74.88	80.48	30.93	206.65	505.71	628.41	0.00	0.00
October	224.37	233.22	89.28	492.31	207.00	200.91	19.79	90.68
November	248.59	264.89	72.60	356.14	141.47	94.33	145.01	94.56
December	190.85	177.50	19.75	106.66	105.38	78.62	451.96	96.81
January	164.25	142.01	2.42	12.33	40.17	26.53	158.46	109.14
February	92.72	94.76	1.41	6.94	15.78	13.50	53.19	121.31
March	81.03	92.21	0.40	1.44	9.52	7.63	43.15	118.85

Note: 1. Values computed for 16 years (1997-2012)

2. Values computed for 12 years (2000-2012)

3. Values computed for 7 years (2007-2013)

from the peak period with an increase in the size of holding. The large farmers were selling a relatively higher proportion of their marketed surplus during the subsequent off-season months. The withholding capacity of the producer-sellers was also a contributory factor influencing the arrivals at the later stages after the post harvest period.

The availability of storage facilities, the costs involved in holding back the produce were also the possible causes underlying the fluctuations in market arrivals. Another reason for holding the produce by the large farmers was the expectation of higher prices during off-season and they were financially sound. By contrast, small and medium farmers sell their produce immediately after the harvest due to the urgent need of hard cash, small quantity of produce, prior indebtedness, *etc.*

To study the relationship between the arrivals and prices of cotton crop in selected markets, the regression co-efficients were estimated (Table 2). The selected four markets revealed the positive relationship between arrivals and prices of cotton. There was no negative impact observed of cotton arrivals on prices as indicated by the increase in price by Rs. 1140 per quintal of cotton for an increase in 1000 quintals of arrivals in Chamarajanagar market. The greater positive response impact of arrivals on prices was observed in Chamarajanagar market. The lowest impact was seen in case of Mysore market. Increase in market arrivals of 1000 quintals increased the price by Rs. 90 per quintal. In Davanagere and Shivamogga markets an increase of 1000 quintals of market arrivals led to an increase in tax price by Rs. 1100 and 1030 per quintal, respectively. In this relationship, price as a leading factor in determining the arrivals made it clear that cotton is a commercial crop grown mainly with profit motive, though they are considered as a non-traditional cotton growing areas of Karnataka. The impact of fluctuations in market arrivals of cotton was found to be greater in Chamarajanagar

market as reflected by its higher regression co-efficient compared to other three markets.

A positive correlation between prices and arrivals of cotton was observed in all the four selected markets. The extent of positive association was high in Chamarajanagar market (0.92) and it was significant at 1 per cent level. The lowest association was observed in case of Mysore market with 0.12 and it was non-significant. The Chamarajanagar and Davanagere farmers might have had a better command over the sources of credit and as a consequence, their withholding capacity was higher and regulated their disposals in the light of the prevailing prices. The higher the prices, the higher the arrivals. A positive correlation co-efficient in the selected markets between arrivals and prices observed in cotton in all the four markets was partly due to an increase in demand for cotton by the textile mills and partly due to the general inflationary conditions prevailing in the Indian economy.

Co-efficient of variation was computed to study the variations in market arrivals and prices of cotton and are presented in Table 2. The co-efficient of variation in prices of cotton ranged from 65.12 per cent in Mysore market to 120.30 per cent in Chamarajanagar market. And in case of arrivals, highest variation was noticed on Mysore market (301.80 %). Variation in prices was more than the variation in arrivals in all the four selected markets. It could be concluded that, the co-efficient of variation in prices were found to be higher than that of arrivals in all the four markets. Highest variation in arrivals was observed in Mysore market and highest variation in prices in case of Chamarajanagar market.

The selection of marketing channel becomes imperative for the farmers since the real benefit accrued for them is mainly dependent upon the choice of the agency or the channel for disposal of their produce. The channel selected by them must account for minimum marketing cost and ensure higher share of consumer

**Table 2: Regression, correlation co-efficients and variation between annual arrivals and average prices of cotton in selected markets**

Market	Regression				Correlation co-efficients	Variation	
	a	b	R <sup>2</sup>	p value		Arrival	Price
Mysore market	18.27	0.09 <sup>NS</sup>	0.08	0.38	0.12 <sup>NS</sup>	301.8	65.12
Chamarajanagar market	6.21	1.14 <sup>NS</sup>	0.94	8.36	0.92*	92.21	120.3
Shivamogga market	7.78	1.03*	0.08	0.002	0.57**	42.05	74.53
Davanagere market	6.67	1.1 <sup>NS</sup>	0.96	3.74	0.90*	99.43	116.35

Note : NS=Non-significant

\* and \*\* indicate significance of values at P=0.01 and 0.05, respectively

**Table 3 : Preference of sample respondents to different channels of marketing of cotton in selected markets**

Farmers	Mysore district			Chamarajanagar district			Davangere district			Shivamogga district		
	Channel-I	Channel-II	Channel-III	Channel-I	Channel-II	Channel-III	Channel-I	Channel-II	Channel-III	Channel-I	Channel-II	Channel-III
Small farm	5 (62.5)	6 (50)	9 (45)	0	6 (60.00)	14 (46.67)	8 (53.33)	10 (55.56)	2 (28.57)	3 (25.00)	12 (75.00)	5 (41.67)
Large farm	3 (37.5)	6 (50)	11 (55)	0	4 (40.00)	16 (53.33)	7 (46.67)	8 (44.44)	5 (71.43)	9 (75.00)	4 (25.00)	7 (58.33)
Total	8 (100)	12 (100)	20 (100)	0	10 (100.00)	30 (100.00)	15 (100)	18 (100.00)	7 (100.00)	12 (100.00)	16 (100.00)	12 (100.00)

Figures in parentheses indicate percentages

**Table 4: Marketing efficiency index of cotton operating in different channels in selected markets**

District	Channel-I	Channel-II	Channel-III
Mysore district	4.09	5.44	8.73
Chamrajanagar district	3.90	4.14	8.48
Shivamogga district	4.36	3.70	9.25
Davanagere district	4.59	3.34	9.34

rupee. The selection of marketing channel depends upon quantity of cotton they produce, with holding capacity of the farmer, price structure, availability of infrastructural facilities *etc.* In the study area, three marketing channels have been identified in marketing of cotton by the cotton producers. They are

Channel I: Producer → Commission agent → Wholesale trader → Miller

Channel II: Producer → Village trader → Miller

Channel III: Producer → Miller

In marketing of their cotton produce, majority of the farmers operated through channel III followed by channel II and I (Table 3).

The marketing efficiency of different channels of marketing cotton has been worked out by Acharya's modified method and it is shown in Table 4. A perusal of the table reveals that channel III was the most efficient one because marketing efficiency index was 9.34 in Davanagere market, followed by Shivamogga market with 9.25, Mysore market 8.73 and 8.48 in case of Chamarajanagar market. The low marketing efficiency was observed in case of Channel I, whereas in Chamarajanagar market the efficiency index was 3.89 followed by Mysore market (4.09), Shivamogga market (4.36) and Davanagere market (4.59). The low marketing efficiency in channel I and channel II was on account of more number of the market intermediaries in this chain similar result was seen in case of Brinjal by Sindhu *et al.* (2012) and Verma *et al.* (2004). The marketing channel-III was found to be efficient one among the other channels. Because marketing efficiency was highest in

this channel.

### Summary and Conclusion:

As the crop is mainly grown during *Kharif* season higher indices were noticed for arrivals soon after the harvest *i.e.* during September to February. Higher seasonal indices have been observed for market arrivals of cotton during peak period *i.e.*, during the months immediately after the harvest. Farmers have been forced to sell their produce immediately after the harvest due to greater financial pressure. Increased warehousing facilities coupled with credit linked to marketing would overcome this difficulty and pave the way for a more regular flow of marketable surplus to ensure better prices for the producers. Farmers need to be educated about the facility of marketing credit by Agricultural Extension Agencies and in markets with wide area of operations, the transportation cost was found to be the major component of the total marketing cost, especially in the case of farmers coming from distant places with small lots of the produce.

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