

Performance and Growth of Cotton Farming in Karnataka: An Economic Analysis

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Abstract

Cotton is a crop of paramount economic importance to India, holding a significant position in both the agricultural and industrial sectors by supplying the basic raw material to the textile industry. India is a globally recognized cotton producer, ranking 4th in the world. Amidst India's vast agro-ecological diversity that sustains numerous crops crucial for food, nutrition, and economic security, cotton maintains a strategic role in the country's international agriculture. In Karnataka, cotton cultivation is a vital agro-based industry that significantly contributes to allied agricultural activities. This study examines the performance, growth, and development of cotton production in both India and Karnataka. This study adopted a time-series methodology, collecting data from 2008–09 to 2019–20. The analysis specifically focused on examining the relationship between the area under cotton cultivation and total cotton production in Karnataka. The study found a strong positive correlation between the area under cotton cultivation and cotton production in Karnataka. The mean values of area and production were 151.97 and 226.51, respectively, with standard deviations of 36.42 and 87.25. The Pearson correlation coefficient was calculated as 0.867, leading to the rejection of the null hypothesis. This indicates a significant positive relationship between the area cultivated and cotton production in the state.

Keywords: Area; Cotton Cultivation; Cotton Performance; Production; Yield.

1. Introduction

Cotton is one of India's most significant fibers and commercial crops, playing a dominant role in the country's industrial and agricultural economy. India accounts for around 25 percent of the total global cotton production and has emerged as the largest producer in the world, occupying the first position in terms of both total area and production. The worldwide area under cotton was 31.66 million hectares, with total production at 113.11 million bales and productivity at 778 kg/hectare. Among major global exporters, India ranked 3rd with 5.5 million bales, behind the USA (16.25 million bales) and Brazil (10.70 million bales) (USDA, 2023). In India, it plays a major role in sustainability the livelihood of an estimated about 6 million cotton farmers and around 40-50 million people in related activity such as cotton processing and to trade. The Indian Textile Industry consumes a diverse range of fibres and yarns and the ration of use of cotton to non-cotton fibres in India is around 60:40 whereas it is 30:70 in the remaining of the global. Apart from being the provider of a basic essential of life i.e., clothing which is next only to food, cotton is also of the largest contributor to India's net foreign exchange by way of exports in the form of raw

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cotton, intermediate products such as yarn and fabrics to ultimate finished products in the form of garments, made ups and knitwear. Due to its economic importance in India, it is also termed as 'White-Gold'.

2. Research Objectives

The main objectives of the study are as follows:

1. To study the performance and growth in trends of area, production, yield in cotton sector in Karnataka.
2. To analyse the major district-wise trends in growth of cotton production in Karnataka.

3. Hypothesis of the Study

1. There is a correlation relationship between area and production of the cotton sector in Karnataka.

4. Materials and Methods

The present research study is primarily based on secondary data. The data about the area, production, and yield of cotton cultivation were collected from multiple authoritative sources. These sources include the Cotton Corporation of India Ltd., the Department of Agriculture, the Ministry of Textiles, the All India Co-ordinated Cotton Improvement Project, the Directorate of Economics and Statistics in Karnataka, the Economic Survey of India and Karnataka, and World Bank Reports. Additionally, data were sourced from articles published in scholarly journals, specialized articles/journals, and seminal books written by authorities on the cotton cultivation sector. **Statistical Tools Analysis:** Time series data were collected for the period from 2008-09 to 2019-20. The study employed several statistical tools for analysis, including Mean, Annual Growth Rate (AGR), Compound Annual Growth Rate (CAGR), and Correlation. These analyses were conducted using statistical software packages such as Excel, SPSS 21, and Gretl.

5. Performance of Cotton Cultivation in Karnataka

Cotton is a major commercial crop in Karnataka, which currently ranks seventh among the largest cotton-producing states in India. Cotton cultivation is primarily concentrated in the North Karnataka Plateau, where the climate and soil conditions are ideal for its growth. Major cotton-growing districts include Dharwad, Gulbarga (Kalaburagi), Ballari, Belagavi, Raichur, Bagalkot, Vijayapura, Shivamogga, Mysuru, and Karwar (Cotton Corporation of India, 2023). In Karnataka, hybrids and high-yielding varieties are predominantly cultivated under irrigated conditions in districts such as Raichur, Bagalkot, Vijayapura, Ballari, Dharwad, and Belagavi. Rainfed cotton, relying on assured rainfall, is mainly grown in Dharwad, Belagavi, Shivamogga, Mysuru, and Karwar. The North Karnataka Plateau is the primary region for cotton cultivation, particularly in Dharwad, Raichur, Ballari, and Gulbarga, due to ideal growing conditions. Cotton, a key fibre crop, provides raw material for textiles and is also used in carpets, beds, pillows, and cooking oil production from seeds. The main cotton-producing districts in Karnataka include Haveri, Dharwad, Gadag, Mysuru, Ballari, Raichur, Kalaburagi, Belagavi, Davanagere, Chitradurga, Koppal, and Vijayapura, with Haveri ranking first and Dharwad second in production.

6. Growth in Area, Production and Yield of Cotton in Karnataka

Cotton cultivation is one of the most important aspects of Karnataka's economy. Karnataka's topography, like its soil and climate, lends itself well to cotton cultivation activities. Cotton production employs most of the people of Karnataka, especially in rural areas. In Karnataka, cotton occupies an area of 205.79 lakh hectares with a production of 382.43 lakh bales and with a yield of 186.37 kg/ha (2019-20). The Predominant Bt cotton growing major districts are Yadgir, Kalaburgi, Bidar, Raichur, Bellary, Koppal, Bagalkot, Davanagere and Mysore. The area, production and yield under cotton in the year-wise growth trends are presented in Table-1. But in this very wide fluctuated for all the years in the State.

Table –1 : Growth Status of Cotton Cultivation in Karnataka

Year	Area (In Lakh Hectare)	Production (In Bales)	Yield (Kg/Hectare)
2008-09	100.03	135.48	131.92
2009-10	115.06	115.78	100.86
2010-11	137.78	188.85	137.49
2011-12	143.51	197.47	138.13
2012-13	125.19	184.92	148.00
2013-14	166.68	278.27	167.36
2014-15	220.82	373.17	169.56
2015-16	161.68	182.02	112.92
2016-17	128.43	158.94	124.24
2017-18	137.77	290.87	211.95
2018-19	180.86	229.89	127.53
2019-20	205.79	382.43	186.37
Mean	151.97	226.51	146.36
CAGR	4.37	6.91	2.66

Source: 1) Annual Report of Committee on Cotton Production and Consumption (COCPC), India – 2008 to 2019.

2) Directorate of Economic and Statistic, Karnataka – 2009 to 2019.

The trend analysis of cotton cultivation in Karnataka between 2008-09 and 2019-20 shows significant volatility in both area and production (as shown in above table). The area under cotton cultivation initially grew, rising from 100.03 lakh hectares in 2009-10 to a peak of 220.82 lakh hectares in 2014-15. Following this peak, the area experienced a sharp decline, dropping to 128.43 lakh hectares in 2016-17. The area subsequently recovered, showing a significant increase to 205.79 lakh hectares by the end of the study period (2019-20). Cotton production mirrored the area trends, starting at 135.48 bales in 2008-09. Production significantly increased to a high of 373.17 bales in 2014-15. A subsequent sharp decrease was observed, with production falling to 158.94 bales in 2016-17. Finally, production recovered and predominantly increased to reach a new high of 382.43 bales in 2019-20.

The analysis of cotton yield in Karnataka between 2008-09 and 2019-20 reveals considerable year-to-year fluctuation, indicating volatility in productivity. Yield began at 131.92 kg/ha in 2008-09 but saw a significant decrease in the following year, dropping to 100.86 kg/ha in 2009-10. The yield then significantly increased, reaching a high of 169.56 kg/ha in 2014-15. Following the peak, the yield sharply decreased (data for the lowest point is missing in the original text) and continued a declining trend, settling at 127.53 kg/ha in 2018-19. The yield concluded the study period on a high note, showing a significant increase to 186.37 kg/ha in 2019-20. The analysis of cotton cultivation in Karnataka demonstrates a positive growth trend across all key metrics during the study period (2008-09 to 2019-20). The Compound Annual Growth Rate (CAGR) figures are as follows: area under cultivation (4.37%), production (6.91 %) and yield (2.66%).

Table –2: Top District of Cotton Production in Karnataka (2018 to 2019)

(In Bales)

S. No	District	2018-19	%	2019-20	%	Growth Rate between 2018 and 2019
1	Belagavi	167339	11.95	93332	4.01	55.77

2	Vijayapura	59160	4.22	104870	4.5	177.27
3	Kalburgi	203077	14.5	379566	16.29	186.91
4	Raichur	218909	15.63	363643	15.61	166.12
5	Koppal	12711	0.91	14716	0.63	115.77
6	Gadag	32893	2.35	84785	3.64	257.76
7	Dharwad	76592	5.47	166041	7.13	216.79
8	Haveri	154751	11.05	75596	3.25	48.85
9	Ballari	119990	8.57	172586	7.41	143.83
10	Chitradurga	16556	1.18	31073	1.33	187.68
11	Mysuru	54633	3.9	45536	1.95	83.35
12	Chamarajanagara	8527	0.61	12767	0.55	149.72
13	Yadgiri	256612	18.32	757598	32.52	295.23
14	Others	18722	1.34	27441	1.18	146.57
	Total of State	1400472	100.00	2329550	100.00	166.34

Source: Government of Karnataka (2021), Karnataka at a Glance – Statistical Report – 2021

The above table-2 reveals the major district-wise cotton production in Karnataka from 2018-19 to 2019-20. Out of 14 major districts in Karnataka, Yadgiri district has the highest production of cotton was 757598 lakh bales in 2019-20 as compared to 256612 lakh bales in 2018-19; this district has a 295.23 percent of highest growth rate increase in the research period. Kalburgi district has the second highest position in the production of cotton was 379566 lakh bales in 2019-20, compared to 203077 lakh bales in 2018-19; this district has a 186.91 percent of highest growth rate increase in the research period. Raichur district has the third highest production of cotton was 363643 lakh bales in 2019-20 as compared to 218909 lakh bales in 2018-19. The fourth-highest cotton production was recorded in the Ballari district in 2019-20, with 172586 bales produced, compared to 119990 lakh bales in 2018-19; this district's growth rate during the research period was 143.83 percent. Dharwad district has the fifth highest production of cotton has increased by 166041 lakh bales in 2019-20 as compared to 76592 lakh bales in 2018-19. Vijayapura district has the sixth position in cotton production has increased by 104870 lakh bales in 2019-2 as compared to 59160 lakh bales in 2018-19; it has a growth rate of increase was 177.27% in the study period.

Belagavi district has the seventh highest production of cotton has increased by 363643 lakh bales in 2019-20 as compared to 218909 lakh bales in 2018-19; it has a growth rate of increase was 55.77% in the study period. Gadag district has the eighth position in cotton production has increased by 84785 lakh bales in 2019-20 as compared to 32893 lakh bales in 2018-19; with a growth rate of increase was 257.76% in the study period. Haveri district has the ninth place in cotton production has decreased by 75596 in 2019-20 as compared to 154751 lakh bales in 2018-19, because of a scarcity of rain and lack of irrigation. Mysuru district has the tenth position in cotton production was 45536 lakh bales in 2019-20 as compared to 54633 lakh bales in 2018-19; it has a growth rate of increase by 83.35%. Chitradurga district has the eleventh position in cotton production has increased by 31073 lakh bales in 2019-20 as compared to 16556 lakh bales in 2018-19. It has a 187.68% growth rate had increased in the study period.

The remaining 17 districts have a twelfth position in the production of cotton has increased by 27441 lakh bales in 2019-20 as compared to 18722 lakh bales in 2018-19; that means 146.57% of growth rate increased in the study period. With a growth rate of 115.77% over the research period, Koppal district ranks thirteenth in terms of cotton production, with 14716 lakh bales produced in 2019-20 compared to 12711 lakh bales in 2018-19. In regards

to cotton production, Chamarajanagar district came in last, producing 12767 lakh bales in 2019–20 as compared to 8527 lakh bales in 2018–19; this district's growth rate during the research period was 149.72%.

7. Testing Hypothesis

H0: There is no correlation relationship between area and production of the cotton sector in Karnataka.

H1: There is a correlation relationship between area and production of the cotton sector in Karnataka.

Table-3 Descriptive Statistics for Cotton Cultivation in Karnataka

Descriptive Statistics			
	Mean	Std. Deviation	N
Area under Cotton	147.0736	33.80515	11
Production	212.3327	75.64055	11

Table – 4: Correlation between Area and Production of Cotton Cultivation in Karnataka

Correlations			
		Area	Production
Area under Cotton	Pearson Correlation	1	.827**
	Sig. (2-tailed)		.002
	N	11	11
Production	Pearson Correlation	.827**	1
	Sig. (2-tailed)	.002	
	N	11	11
**. Correlation is significant at the 0.01 level (2-tailed).			

The correlation analysis between the area under cotton cultivation and cotton production in Karnataka shows a strong positive relationship. The Pearson correlation coefficient is 0.827, indicating a high degree of association between the two variables. The p-value (Sig. 2-tailed) is 0.002, which is less than 0.01, confirming that the correlation is statistically significant at the 1% level. With N = 11 observations, the results suggest that increases in the area under cultivation are strongly associated with increases in cotton production. However, we have rejected the null hypothesis. Hence, there is a positive correlation between area and production of cotton cultivation in Karnataka.

8. Conclusion

The study concludes that cotton is cultivated across twelve districts in Karnataka, contributing significantly to the state's fabric and clothing sector. Owing to its surplus cotton production, Karnataka has achieved a degree of self-sufficiency in textile manufacturing. Davanagere has emerged as the most prominent hub for cotton textile industries and is often referred to as the "Manchester of Karnataka" due to its substantial cotton output. To meet the growing demands of the textile industry and enhance cotton exports, the cotton sector—supported by various programmes and schemes—is working to increase both production and quality. The study further indicates that the Government of Karnataka has introduced several policy initiatives and reforms, including special packages and additional incentives under the Agriculture Development and Textile Industry schemes, to promote cotton cultivation and strengthen the overall cotton economy in the state.

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