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TRENDS IN AREA, PRODUCTION AND PRODUCTIVITY OF COTTON ACROSS THE MAJOR STATES IN INDIA

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ABSTRACT

Cotton is the most important fiber crop of the world and also one of the most widely grown commercial crops in India. Cotton is grown in the nine major states in three different zones in the country. Data on area, production and productivity of cotton was collected from 1980 onwards for the nine major cotton growing states. The results revealed that the average production of cotton in the country was 90.05 lakh bales during period I which increased to 166.40 lakh bales in the period II showing a change of 84.78 per cent between the two periods. And the productivity of cotton for the country as a whole increased from 210 kg/ha in period I to 318 kg/ha in the period II with a change of 55.64 per cent. The Garrett's ranking technique was used to rank the constraints with importance to quality. The poor awareness among the farmers especially with respect to the packing material they use was identified as the major problem.

KEYWORDS: Cotton, Production, Growth, Quality

INTRODUCTION

Cotton is an important cash crop to many developing countries supporting the livelihoods of millions of poor households. Among the countries in which cotton is an important contributor to rural livelihoods are China, India and Pakistan where millions of rural households are engaged in cotton production and more than two- thirds of the world's cotton is produced in the developing countries. The area under cotton across the world has been stagnant for the last five decades however production has been increasing due do rise in yield. The world cotton area ranged between 32.7 m.ha to 33.6 m.ha while the production in cotton has increased from 577.58 lakh bales to 1523.53 lakh bales from 1960-61 to 2007-08. Among the cotton growing countries, India has the largest area under cotton production followed by China, United States and Pakistan. China is the largest producer of cotton followed by India and United states. Though China has just more than half of India's area, it produces twice the cotton compared to India. Australia has the highest yield in cotton (1991 kg/ha) followed by Brazil, Syria and China. While India (523 kg/ha) has one of the lowest yields in the world. The production of cotton has been increasing in China and India while it has been decreasing in the United States and by 2007 India over took the US and became the second largest producer.

India is the only country in the world growing all the four cultivated species of cotton, G.hirustum, G.arboretum, G.herbaceaum and G. barbadense are cultivated on commercial scale besides hybrids. The maximum area is covered by the hybrids. Cotton is grown in the nine major states in three different zones. Punjab, Haryana and Rajasthan in north zone; Maharashtra, Gujarat and Madhya Pradesh in central zone and Andhra Pradesh, Karnataka and Tamil Nadu in the south zone are the major cotton growing states. Central zone accounts for about 60 per cent of all cotton, and where only 16 per cent is irrigated. Cotton is also grown in other parts of the country and about four million farmers grow the crop in 13 states. India is unique among the major cotton growing countries because of the broad range of agro-climatic and soil conditions which permit cultivation of all varieties and staple lengths of cotton.

The north zone tends to produce mostly short and medium staple varieties, the south zone mostly long and extra long staple and the central zone a range of medium and long staple varieties. The cotton sector during the decade of 1990-2000 passed a negative growth rate both in production and productivity with significant variation. The introduction of Bt cotton from the year 2002 has brought about a significant change in the productivity levels of cotton in some states. Quality is the catchword everywhere. It must be realized that competition will dominate not only the global market but also the domestic market because WTO regulations will permit near unrestricted entry of foreign goods into India. It is also necessary to recognize the dual nature of this competition in price and competition in quality. The cost and quality of raw material become particularly important in textiles because the raw material cost constitutes a significant position of the product cost. Multiplicity of cotton varieties\hybrids leading to rampant mixing is another major problem.

OBJECTIVES OF THE STUDY

- Analyse the area, production and productivity of cotton in India.
- To study the state wise growth in the production of cotton.
- To examine the constraints in the export of Indian cotton with special reference to quality parameters.

METHODOLOGY AND DATA

In order to study the growth of cotton in India secondary data on the area, production and productivity of cotton from the year 1981-82 to 2008-09 for the nine major cotton growing states was obtained from Center for Monitoring Indian Economy Pvt. Ltd. (CMIE). Based on the availability of data the study period was divided into period I (1981 to 1994) and period II (1995 to 2008-09).

The Primary data was collected from exporters and officials of the Cotton Corporation of India selected cotton markets from Hubli, Dharwad, lakshmeswar, Gadag and Bijapur in Karnataka state in order to analyze the constraints in exports of Indian cotton with special reference to quality parameters.

GROWTH RATE

To study the growth rate in area, production and productivity of cotton in India the Compound Growth Rate (CGR) was worked out.

An exponential form of the growth function was used as shown below.

$Y = AB^t V_t$

Where,

Y_t = dependent variable for which growth rate is estimated

A = intercept indicating Y in the base period (t = 0)

B = regression co-efficient { (1+g) and g =CGR}

T_i = time period (i = 1 to 10)

V_t = random error

The growth equation was converted into the logarithmic form in order to facilitate the use of Ordinary Least Squares for estimation of parameters

ANALYSIS OF CONSTRAINTS USING GARETT RANKING

The respondents were asked to rank the constraints on scale 1 to 10.The rank 1 meant most important factor and rank 8 meant least important factor. In the next stage the ranks assigned to each factor by each individual are converted into percent position using the following formula,

Percent position = (Rij-0.5)*100/Nj

Where Rij stands for the rank given for the i^{th} factor (i=1,2,…..10) by the j^{th} individual. One the per cent positions were found, scores were determined for each per cent position referring Garrett's table. The ranks are given in descending order.

RESULTS AND DISCUSSIONS

The nine major cotton growing states in India namely, Punjab, Haryana, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu were considered for the study. These states put together cover 99 per cent of the area and production in the country

Area, Production and Productivity

The state wise area of cotton is given in Table 1. It is evident that during the period I, the area under cotton was the highest in Maharashtra (35.50 %) followed by Gujarat (16.32 %), Karnataka (9.20 %), Andhra Pradesh (8.17%), Punjab (8.51 %), Madhya Pradesh (7.21 %), Haryana (5.91 %), Rajasthan (5.45 %), Tamil Nadu (3.16 %). The cotton area in India was 74.89 lakh hectares during period I. During the period II the average area of cotton increased to 88.16 lakh hectares. Thus there was an increase of 17.73 per cent in area under cotton. In the states of Maharashtra, Gujarat, Andhra Pradesh, Haryana, Rajasthan and Madhya Pradesh the average area of cotton has increased but in percentage share of cotton area showed an increase only for Gujarat (20.51 %), Andhra Pradesh (11.94 %) and Haryana (5.68%). The percentage change of cotton area in the period II over the period I was highest for Andhra Pradesh (71.96%) followed by Gujarat (47.95 %), Haryana (28.20%), Rajasthan (17.40 %), Maharashtra (14.37%), Madhya Pradesh (3.24%). The area under cotton in the states Karnataka, Punjab and Tamil Nadu has declined during period II compared to period I.

During the period I, the average production was highest in Punjab (17.03 lakh bales) with a highest share of 18.91 per cent followed by Maharashtra (18.42%), Gujarat (17.56%), Haryana (10.69%), Andhra Pradesh (10.32%), Karnataka (8.03%), Rajasthan (7.5%) and Tamil Nadu (4.44%). During the period II, Gujarat was the largest producer of cotton with average production of 43.49 lakh bales sharing 26.13 per cent followed by Maharashtra (20.40%), Andhra Pradesh (12.75%), Punjab (9.74%), Haryana (8.28%), Rajasthan (4.93%), Karnataka (4.23%), Madhya Pradesh (3.75%) and Tamil Nadu (1.70%). The percentage change in cotton production during period II over period I was the highest for Gujarat (174.97%) followed by Andhra Pradesh (128.41%), Maharashtra (104.56%), Madhya Pradesh (96.47%), Haryana (43.12%) and Rajasthan (21.19%) where as Karnataka (-2.68%), Punjab (-4.82%) and Tamil Nadu (-29.47%) witnessed decline in production. The average production of cotton in the country was 90.05 lakh bales during period I which increased to 166.40 lakh bales in the period II showing a change of 84.78 per cent between the two periods.

The state wise performance of productivity of cotton in India is given in Table 1. During the period I, the productivity was highest in Punjab with 451 kg/ha followed by Haryana with productivity of 365 kg/ha. The productivity of cotton in Andhra Pradesh, Gujarat, Rajasthan, Tamil Nadu was between 200 kg/ha and 300 kg/ha where as the productivity was below 200 kg/ha for Karnataka, Madhya Pradesh and Maharashtra. The lowest productivity was observed

in Madhya Pradesh (101 kg/ha). During the period II, the productivity of cotton was better in all the major cotton growing states. Punjab and Haryana retained their position in India ith productivity of 485 kg/ha and 420 kg/ha respectively. The analysis of percentage change in productivity of cotton revealed that the productivity of cotton in all the states increased between the two periods. The highest percentage change was noticed in Madhya Pradesh (81.94%), Maharashtra (77.61%) and Gujarat (76%) while the least change was were observed in Tamil Nadu (6.85%). The productivity of cotton for the country as a whole increased from 210 kg/ha in period I to 318 kg/ha in the period II with a change of 55.64 per cent.

During the period I the country as a whole witnessed an annual decrement in area under cotton. The production and productivity of Punjab, Haryana, Rajasthan, Madhya Pradesh, Karnataka and country as a whole showed significant positive growth. During the period II only Gujarat and Madhya Pradesh showed significant growth in area while the other major states showed negative growth. The production and productivity scenario in the period II revealed that the states like Gujarat, Maharashtra and Madhya Pradesh which did not show significant growth in the previous period showed a significant positive growth. While the southern states (TamilNadu and Karnataka) showed no significant growths. Due to adoption of Bt cotton and accelerated transfer of technology and coordinated development efforts made by government, the country had received positive results in the increase of cotton productivity.

Growth of Cotton

Area growth in India was negative while the production and productivity showed positive growth (Table 2). The state wise analysis of growth in area of cotton showed that during the period I Haryana and Andhra Pradesh showed significant annual increment per unit of 4.49 and 4.7 per cent respectively while Karnataka, Tamil Nadu, Gujarat and Madhya Pradesh and for country as a whole witnesses annual decrement in area. In the case of production and productivity Punjab, Haryana, Rajasthan, Madhya Pradesh, Karnataka and country as a whole showed significant positive growth. During the period II only Gujarat and Madhya Pradesh showed significant growth in area while states like Punjab, Haryana, Rajasthan, Karnataka and Tamil Nadu recorded negative growth. The production and productivity scenario in the period II revealed that the states like Gujarat, Maharashtra and Madhya Pradesh which did not show significant growth in period I showed a significant positive growth. While the southern states of Tamil nadu and Karnataka showed no significant growth.

Table 2: Compound Growth Rates of Area, Production and Productivity of Cotton in India

S.No	Particulars	Period I			Period II		
		Area	Production	Productivity	Area	Production	Productivity
1	Andhra Pradesh	4.7***	6.66***	1.80	1.18	4.27***	3.06**
2	Gujarat	-3.96	-2.90	1.10	4.41***	9.38***	4.77*
3	Haryana	4.49***	6.22***	1.66*	-0.97	2.81*	3.82**
4	Karnataka	-4.9	1.42	6.84***	-3.95	-3.8	1.2
5	Madhya Pradesh	-1.40	1.60	3.03**	2.03*	5.00***	3.55**
6	Maharashtra	0.22	1.51	1.27	0.39	4.65**	4.26**
7	Punjab	0.61	6.16***	5.50**	-1.49	3.55	5.13
8	Rajasthan	1.08	5.08**	3.99**	-3.59	-3.33	0.27
9	Tamil Nadu	-0.007	1.59	1.60	-7.4	-6.9	0.57
India		**-0.67**	**2.66*** **	**3.36*** **	**0.53**	**4.47****	**3.91****

Note: *** denotes significance at 1 per cent ** denotes significance at 5 per cent * denotes significance at 10 per cent

Quality Parameters and Constraints in the Export of Cotton

India has the distinction of producing a number of cotton varieties comprising of short staple, medium, long and extra- long staple length varieties of cotton to meet the specific quality requirements of the domestic textile industry.

Though India has the advantage in abundant raw materials and cheap labour to its benefit, the poor quality of Indian cotton is real disadvantage in trade. Poor cotton quality has been the major constraint and the cotton sector and larger textile enterprises have begun to look at imports for sourcing the quality cotton. Indian cotton is regarded to be among the world's most contaminated with high percentages of trash and micro dust (Sreenivasan, 2007). Bale-to-bale and lot-to-lot variability in quality attributes is greater in Indian cotton. These issues need to be addressed to enable India achieve desired levels of cotton productivity, quality and competitiveness in the world textile and apparel market. The major quality parameters in cotton include fibre length, fineness, maturity, strength, colour and impurity content which is a combination of physical and microbiological attributes. The quality standards are given by the International Cotton Association and The United States Cotton Standards.

Colour: The colour of cotton ranges from white to yellowish and it is grouped as white, light spotted, spotted tinged and yellow stained in descending order of quality.

Leaf Grade and extraneous matter: it describes the leaf or trash content in the cotton.

Fibre Length: It is the average length of the longer one-half of the fibres

Uniformity: It is the ratio between the mean length and the upper half mean length of the cotton fibres within the sample. It is measured by the length uniformity index.

Strength: The fibre strength is measured in grams per tex (a tex unit is equal to the weight in grams of 1000 meters of fibre). The High Volume Instrument (HVI) is capable of providing measurement of the following parameters,

- Length and uniformity index (UI).
- Micronaire.
- Strength (g/tex) and elongation.
- Colour (reflectance Rd, yellowness +b) and colour grade.
- Trash (% area, trash count) and trash grade.
- Short fibre content and maturity index.

CONSTRAINTS IN THE EXPORT OF RAW COTTON FROM INDIA

The survey was conducted to study the constraints experienced in the exports of raw cotton from India and the results are presented in Table 3. The Garrett's ranking technique was used to rank the constraints. The scores of the individual respondents are added together and divided by the total number of the respondents for whom scores are added. The mean scores for all the factors are ranked by arranging in descending order. The results showed that the poor awareness among the farmers especially with respect to the packing material they use was identified as the major problem. The second and third major constraints identified are also of equal importance and they are the presence of high trash/contamination and the difficulty in maintaining the consistency in quality. The other constraints in order are the regulation of cotton exports and the demand from the local mills. The lack of proper quality testing facility in near by places was a problem for the exporters, market information and getting the fibre test report. The phytosanitary measures followed by the importing countries and lack of demand from the importing countries were identified as minor constraints in the export of cotton.

Table 3: Constraints in the Export of Raw Cotton from India

S.No	Constraints	Garrett's Mean Score	Rank
1	Lack of demand from importing countries	28.5	IX
2	Lack of proper quality testing facility (HVI testing)	48.5	VI
3	Presence of high trash content /contamination in Indian cotton	70.2	II
4	Problem in maintaining consistency in quality	65	III
5	Stringent phytosanitary measures followed by the importing countries	28.3	X
6	Lack of international market information.	40.5	VII
7	Government regulation of exports	61.3	IV
8	Higher demand from local mills	54.1	V
9	Poor awareness among the primary producers and absence of uniform packing material.	72.1	I
10	Difficult in getting the phytosanitary certificate/fiber test report.	32.5	VIII

CONCLUSIONS

India is a major producer and exporter of cotton in the world. The study revealed that the productivity of cotton for the country as a whole increased. The production and productivity of Punjab, Haryana, Rajasthan, Madhya Pradesh, Karnataka and country as a whole showed significant positive growth. The area under cotton in the states Karnataka, Punjab and Tamil Nadu has declined**.** Being 100 per cent handpicked, the Indian cotton has the potential to deliver clean to the mills, but the Indian bales have high levels of trash and contamination. The poor awareness among the farmers especially with respect to the packing material they use was identified as the major problem.

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APPENDICES

Table 4: State Wise Area, Production and Productivity under Cotton

S. No	States	Area (Lakh Hectares)			Production (Lakh Bales)			Productivity (Kg/ha)		
		Period I	Period II	% Change	Period I	Period II	% Change	Period I	Period II	% Change
1	Andhra Pradesh	6.12 (8.17)	10.52 (11.94)	71.96	9.29 (10.32)	21.22 (12.75)	128.41	257	336	30.52
2	Gujarat	12.22 (16.32)	18.09 (20.51)	47.95	15.82 (17.56)	43.49 (26.13)	174.96	218	383	75.99
3	Haryana	4.43 (5.91)	5.68 (6.44)	28.26	9.63 (10.69)	13.78 (8.28)	43.12	365	420	14.88
4	Karnataka	6.89 (9.20)	4.91 (5.56)	-28.79	7.23 (8.03)	7.04 (4.23)	-2.68	187	245	31.32
5	Madhya Pradesh	5.40 (7.21)	557 (6.32)	3.24	3.17 (3.52)	6.23 (3.75)	96.47	101	184	81.94
6	Maharashtra	26.63 (35.56)	30.45 (34.54)	14.37	16.59 (18.42)	33.94 (20.40)	104.56	106	189	77.61
7	Punjab	6.43 (8.59)	5.74 (6.52)	-10.66	17.03 (18.91)	16.21 (9.74)	-4.82	451	485	7.57
8	Rajasthan	4.08 (5.45)	4.79 (5.43)	17.40	6.76 (7.51)	8.20 (4.93)	21.19	277	306	10.24
9	Tamil Nadu	2.37 (3.16)	1.63 (1.85)	-31.28	4.00 (4.44)	2.82 (1.70)	-29.47	284	303	6.85
	India	74.89 (100.00)	88.16 (100.00)	17.73	90.05 (100.00)	166.40 (100.00)	84.78	204	318	55.64

Note: Figure in parenthesis as percentages to total (India)