

LONG STAPLE COTTON SCENARIO IN TAMIL NADU AND FUTURE PROSPECTS

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Cotton is an important commercial crop of India. India, the second largest importer of cotton in 2001-02 has become the second largest exporter in 2006. Expected demand for ELS (Extra Long Staple) Cotton during 2011-2012 is 20 lakh bales of 170kg each. Major ELS cotton producing countries are USA (24.3 %), Egypt (35.9 %), China (14.2 %), and India (9.3 %), the other countries being Australia, Israel & Peru (3.9 %), Tajakistan, Uzbekistan & Turkmenistan (5.7 %) and others (0.5 %).

Major areas of Canal irrigated tracts of Karnataka (90% share) and Winter irrigated tracts of Tamil Nadu and limited areas of Coastal districts of Andhra Pradesh, Parts of Gujarat (Anand, Talod), Parts of Maharashtra (Rahuri & Ahmednagar), Parts of Orissa (Bolangir & Kalahandi), Parts of Madhya Pradesh (Ratlam & Badnawar) are the ELS cotton growing regions in India.

Tamil Nadu traditionally grows cotton in an area of about 2.0 lakh hectares and produces about 5 to 5.5 lakh bales of cotton and because of its climate and soil, the state is ideally suited for producing long and extra long staple cottons.

The current production of extra long staple cotton in the country is only around 5 lakh bales. The balance is being met through imports. However, there is a growing apprehension that with the world trade liberalization, removal of quota system and abolition of subsidy on cotton export, the foreign cottons will become costlier and beyond the reach of Indian textile industry. Further, the Cotton Advisory Committee has projected higher level of consumption of cotton than production during 2005 – 06. Similarly, the consumption pattern in India is also expected to increase with the expansion of spinning capacity of Indian Textile Mills. With the international prices also firming up, substantial opportunity exists for the export of Indian Cotton to other countries. All these things call for urgent steps to augment our long and extra long staple cotton production in the country.

The city of Coimbatore is known as the Manchester of South India. Of the two thousand five hundred textile mills available in India, eight hundred textile mills exist in Tamil Nadu of which 300 are in Coimbatore district itself. The spindle capacity of this organized sector is about 12.6 million. Apart from this, there are more than 700 small scale sector units which contribute not less than 2.0 million spindles. These sectors on an average consume around 70 lakh bales of cotton. The long and extra long staple cotton requirement of these mills is around 8 to 10 lakh bales per annum (CICR, 2005).



Cotton Requirement to Spin Yarns of Different Count Groups by the Terminal Year of the 11th Plan Period (2011–12) and Staple wise Cotton Requirements for 2006 – 07 & 2010 - 11 are given below:

11th Plan Period (2011–12)		Staple Group	Requirement (Lakh bales)	
Count groups	Cotton requirement (lakh bales)		2006 – 07	2010 - 11
1- 10s	55.0	Short	21	34
11 – 20s	74.5	Medium	77	121
21 – 30s	105.5	Medium Long	42	65
31 – 40s	131.5	Long	70	110
41 – 60s	67.5	Extra Long	13	20
61 – 80s	18.5	-	-	-
80s and finer	8.5	-	-	-
Total	461.0	Total	223	350

(Source: Sreenivasan, 2006)

Tamil Nadu is a pioneering State in the development and cultivation of long and extra long staple cotton in the country. Release of first extra long staple premium *G.hirsutum* variety MCU 5 in 1969 is a distinct milestone in cotton research. The stability and adaptability of this variety spanning across southern states and four decades is due to its diverse genome involving genotypes from different countries and different species. India is perhaps the only country to harness *G.hirsutum* for spinning good 60s count yarn. The release of a Verticillium wilt tolerant selection MCU 5 VT in 1984 gave a further lease of life to this variety. Further improvements in verticillium wilt resistance; seed cotton yield and quality were done by hybridization with the wild species *G.mexicanum* var. *nervosum* Leningrad strain. This was released as Surabhi in 1997. The varieties MCU 5 , MCU 12, MCU 13 and Surabhi, mainly grown in both winter and summer seasons under irrigation meet the 60s cotton requirement of the country.

The first *G.barbadense* variety Sujata was released by the Central Institute for Cotton Research, Regional Station, Coimbatore in 1969. However, this variety was capable of spinning only up to 100s count and also suffered from tall plant habit which made plant protection very difficult. By hybridization with the variety St Vincent from West Indies, the second *barbadense* cotton ‘Suvin’ capable of spinning up to 120s count was released for cultivation in 1976. Large scale cultivation of Suvin, which at one time touched 30,000 hectares in the Southern states helped the country to attain self sufficiency in extra long staple production. However, due to increased cost of cultivation, competition from other high yielding hybrids and price fluctuations at the time of harvest, the area under Suvin has been drastically reduced. Nevertheless, under contract farming and through improved management practices, the area under Suvin did not completely lost.

The first extra long staple intra *hirsutum* hybrid Savita capable of spinning 60’s count yarn was released in 1987 from Central Institute for Cotton Research, Regional Station, Coimbatore. Later, Private sector hybrids like RCH 2, Bunny and



Mallika were released. These hybrids meet the long staple requirement of the Tamil Nadu textile mills.

The long staple variety Supriya with big bolls, earliness and high ginning out turn is popularly grown in Theni and Madurai districts. Similarly, the variety MCU 13 released from Tamil Nadu Agricultural University, Coimbatore can be grown in the winter irrigated tracts. These varieties are also capable of spinning up to 50's count yarn.

The first interspecific (*G.hirsutum x G.barbadense*) hybrid, Varalaxmi was released from UAS, Dharwad. This was followed by DCH 32 in 1974. Even after three decades, these interspecific hybrids are popular in south zone states of Tamil Nadu and Karnataka apart from certain pockets in Uttar Pradesh. The interspecific hybrids are capable of spinning up to 80's count yarn. Due to poor adaptability of these two hybrids in Tamil Nadu, a newhybrid TCHB 213 was released from Tamil Nadu Agricultural University in 1991 and this has replaced DCH 32 in most parts of the state. These hybrids meet the textile industry's need for spinning 80's count yarn.

Long Staple Varieties and Hybrids with area of adaptation

Available Extra long staple cotton varieties and hybrids are listed below with their area of adaptation:

Variety / Hybrid	Area of Adaptation
MCU5 / MCU12/ MCU13/ Surabhi	Winter irrigated and Summer irrigated tracts of Tamil Nadu
Varalaxmi / DCH-32	Dharwad, Belgaum, Bailhongal, Haveri, Chamrajnagar, Mysore and Shimoga tract of Karnataka, Erode, Salem and Dindigal districts of TamilNadu, Western Maharashtra and Ratlam tract of MP.
TCHB-213	Coimbatore, Salem and Erode districts of TamilNadu and in some parts of Andhra Pradesh and Karnataka
SARA-2	Coimbatore in TamilNadu and Dharwad, Hubli tract of Karnataka
SIMA HB-3	Coimbatore, Salem districts of TamilNadu and Burhanpur in MP
AACH 1065	Karnataka, TamilNadu
MRC-6918 Bt	TamilNadu, Karnataka
Rasi 708 Bt	TamilNadu, Karnataka
Supriya	Theni and Madurai districts of Tamil Nadu

The detailed agronomic and fibre quality attributes of the ELS / long staple varieties are furnished in Table 1.

Reason for inconsistent ELS cotton production

- Excess production leads to steep decline in price
- Low yield in ELS cotton varieties
- Severe damage of bollworm, especially pink bollworm
- Long duration
- High cost of production
- Bad boll opening



There is however short fall in availability of ELS cotton to the tune of 6-7 lakh. Gap between demand and supply of ELS cotton is being bridged by importing PIMA from USA and Giza Cotton from Egypt. Mills may not like to depend on import of ELS cotton due to uncertainty in their availability and escalation in price. Increase in domestic production is therefore the answer.

Recommendations on researchable issues for enhanced ELS cotton production

- Developing barbadense genotypes with improved productivity, earliness and high ginning outturn. Quality improvement especially micronaire and strength to international standards
- Development of intra barbadense hybrids to enhance productivity with ELS quality
- Development of potential interspecific hybrids (HXB) meeting the CIRCOT quality norms (35-36 mm; 3.6 micronaire; 31 g/tex) with improved yield and ginning outturn
- Population improvement and development of heterotic pools to develop superior parents and high yielding hybrids with improved fibre quality
- Improvement in physiological, biochemical and crop canopy traits of ELS cottons
- Thrust on Best Crop Management Practices (BCMP) and protection methodologies to enhance productivity and quality of ELS cotton
- Identification and precision mapping of ELS cotton growing tracts through detailed soil survey and plant – soil – water - climate relationships for enhanced productivity
- **Biotechnological approaches**
 - a) Development of Bt versions of MCU 5, Suvin and interspecific hybrids
 - b) Development and utilization of molecular markers, for fibre quality improvement trait and
 - c) Other novel traits

Advantage of Bt technology in ELS cotton hybrids

- Highly resistant to bollworms
- Reduced duration of crop to 160 – 170 days
- Better boll opening in interspecific hybrids
- Higher yield than the existing ELS varieties and hybrids

Govt. approved ELS Bt cotton hybrids

Hybrids	Yield (Qtls/ha)	Ginning Outturn (%)	2.5% Staple Length (mm)	Fibre strength (g/tex)	Micronaire
RCHB 708 Bt	23.8	30.6	36.6	27.1	3.4
MRC 6918 Bt	19.9	30.3	35.9	27.4	3.5



(Area under ELS Cotton during 2006-07 is 65000 ac under MRC 6918 Bt and 10000 ac under RCH B 708 Bt)

Scope and limitation in cultivation of ELS cotton in Tamil Nadu

Scope

- Irrigated area offers good scope for production
- Ideally suited for long and extra long staple cottons
- Rainfed areas are also important

Limitations

- Crop failure
- Spurious seeds, poor quality inputs
- Extended wet spells and pest problems
- Monocropping

Table 1 . The detailed agronomic and fibre quality attributes of the ELS / long staple varieties

Variety	MCU 5 VT	Surabhi	DCH 32	TCHB 213
Kind	<i>G.hirsutum</i>	<i>G.hirsutum</i>	Intra specific hybrid	Intra specific hybrid
Yield (q/ha)	25 to 30	25 to 30	30 to 40	30 to 40
Ginning out turn (%)	32	33	34	30
Duration (days)	175	170	185	200
Boll weight (g)	4.0	4.0	4.3	3.0
Lint index (g)	5.5	5.0	5.7	5.0
Seed index (g)	10.5	8.5	10.3	11.4
2.5% Span Length (mm)	32.1	33.0	33.9	34.8
Uniformity Ratio (%)	44	47	45	47
Fibre Fineness (Micronaire)	3.4	3.6	3.0	3.3
Maturity Coefficient	66	70	73	75
Bundle Strength (g/tex)	24.1	23.9	23.9	24.3
Area of adaptation	TN, KAR, AP	TN, KAR, AP	KAR, TN	TN
Special feature	Verticillium Wilt tolerant	Verticillium Wilt resistance	-	-
Released by	CICR, Coimbatore	CICR, Coimbatore	UAS, Dharwad	TNAU, Coimbatore



Table 1 Contd.

Variety	Suvin	MCU 12	MCU 13	Supriya
Kind	<i>G.barbadense</i>	<i>G.hirsutum</i>	<i>G.hirsutum</i>	<i>G.hirsutum</i>
Yield (q/ha)	20 to 30	20 to 30	20 to 30	20 to 25
Ginning out turn (%)	28	34.8	34	38
Duration (days)	190	150	165	155
Boll weight (g)	3.0	4.0	4.0	5.5
Lint index (g)	4.0	5.4	5.6	6.0
Seed index (g)	9.5	9.7	10.5	10.0
2.5% Span Length (mm)	40.0	30.0	30.3	30.6
Uniformity Ratio (%)	42	44	44	46
Fibre Fineness (Micronaire)	3.5	3.3	4.5	4.0
Maturity Coefficient	80	77	77	73
Bundle Strength (g/tex)	32.3	23.0	23.5	23.3
Area of adaptation	TN,KAR, AP	TN	TN	TN
Special feature	-	-	-	-
Released by	TNAU, Coimbatore	TNAU, Coimbatore	TNAU, Coimbatore	CICR, Coimbatore