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Influence of Raw Material on Yarn Quality

T BALAMURALIKRISHNA SENIOR GENERAL MANAGER MARKETING & SALES 24-02-2016

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World Scenario





- The world fiber market is dominated by synthetic fibers (a share of about 62.6%)
- Share of Cellulosic fibers which consist of cotton is approximately 29.4%
- Man-made cellulose fibers are a coveted, high quality niche product (approximately 6.7%), with partially better properties than cotton.
- Smallest share is wool with approximately 1.3%.

Cotton Production & Imports - Countrywise

					Jan	Feb
	2011/12_	2012/13_	2013/14_	2014/15_	2015/16_	2015/16_
Production						
Brazil	8,700	6,000	8,000	7,000	6,500	6,700
China	34,000	35,000	32,750	30,000	23,800	23,800
India	29,000	28,500	31,000	29,500	28,000	27,800
Pakistan	10,600	9,300	9,500	10,600	7,200	7,200
Turkey	3,440	2,650	2,300	3,200	2,650	2,650
United States	15,573	17,314	12,909	16,319	12,943	12,943
Uzbekistan	4,000	4,600	4,100	3,900	3,700	3,700
Other	22,107	20,511	19,847	18,632	16,763	16,591
Total	127,420	123,875	120,406	119,151	101,556	101,384
Imports						
Bangladesh	3,400	5,000	5,300	5,400	5,750	5,750
China	24,533	20,327	14,122	8,284	5,500	5,000
India	600	1,187	675	1,226	1,000	900
Indonesia	2,500	3,137	2,989	3,345	3,100	3,100
Korea, South	1,170	1,314	1,286	1,321	1,300	1,300
Mexico	1,000	950	1,040	830	975	975
Pakistan	900	1,800	1,200	835	2,700	2,300
Thailand	1,263	1,511	1,546	1,475	1,475	1,475
Turkey	2,382	3,692	4,246	3,675	3,800	3,800
Vietnam	1,625	2,410	3,200	4,300	5,200	5,200
Other	6,085	6,236	5,675	5,021	5,274	5,284
Total	45,458	47,564	41,279	35,712	36,074	35,084

Source: USDA

In 1000 Bales

LMW®

Cotton Exports & Ending Stock - Countrywise

					Jan	Feb
Exports	2011/12_	2012/13_	2013/14_	2014/15_	2015/16_	2015/16_
Australia	4,640	6,168	4,852	2,393	2,750	2,750
Brazil	4,792	4,307	2,230	3,910	4,300	4,200
Burkina	650	1,200	1,250	1,125	1,300	1,300
Cote d'Ivoire	425	575	725	850	850	800
Greece	1,100	1,100	1,285	1,168	900	900
India	11,080	7,761	9,261	4,199	5,800	5,700
Mali	625	900	800	750	1,200	1,200
Turkmenistan	700	800	1,625	1,500	1,000	1,000
United States	11,714	13,026	10,530	11,246	10,000	9,500
Uzbekistan	2,500	3,200	2,700	2,450	2,300	2,300
Other	7,838	7,493	5,555	5,785	5,652	5,457
Total	46,064	46,530	40,813	35,376	36,052	35,107
Ending Stocks						
Australia	3,807	2,399	1,807	1,779	1,494	1,494
Brazil	7,993	5,801	7,668	7,432	6,382	6,932
China	31,081	50,361	62,707	67,920	64,520	64,520
India	10,619	11,795	11,459	13,486	11,686	11,986
Pakistan	2,835	2,710	2,475	2,835	2,360	2,260
Turkey	1,241	1,315	1,357	1,596	1,396	1,396
United States	3,350	3,800	2,350	3,700	3,100	3,600
Other	13,490	13,560	13,249	13,418	11,919	11,892
Total	74,416	91,741	103,072	112,166	102,857	104,080

Source: USDA

In 1000 Bales

LMW®

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World Balance Sheet						
million 480 lb. bales	2011/12	2012/13	2013/14	2014/15	2015/16 January	2015/16 February
Beginning Stocks	51.3	74.4	91.7	103.1	112.1	112.2
Production	127.4	123.9	120.4	119.2	101.6	101.4
Supply	178.8	198.3	212.1	222.2	213.6	213.6
Mill-Use	104.1	108.4	109.9	110.3	110.9	109.6
Ending Stocks	74.4	91.7	103.1	112.2	102.9	104.1
Stocks/Use Ratio	71.5%	84.6%	93.8%	101.7%	92.7%	95.0%

Production is expected to be 101.4 million bales against 119.2 million bales during 2014-15 which is 15% lower

Source – Monthly Economic Letter – Cotton Incorporated

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India Scenario





India per capita by 2020 is to increase to 7 kg from present 5 kg

Source: PCI Fibres ,ITMF

India Cotton Balance Sheet

India Balance Sheet

million 480 lb. bales	2011/12	2012/13	2013/14	2014/15	2015/16 January	2015/16 February
Beginning Stocks	11.5	10.6	11.8	11.5	13.5	13.5
Production	29.0	28.5	31.0	29.5	28.0	27.8
Imports	0.6	1.2	0.7	1.2	1.0	0.9
Supply	41.1	40.3	43.5	42.2	42.5	42.2
Mill-Use	19.5	21.8	23.3	24.5	25.0	24.5
Exports	11.1	7.8	9.3	4.2	5.8	5.7
Demand	30.5	29.5	32.5	28.7	30.8	30.2
Ending Stocks	10.6	11.8	11.5	13.5	11.7	12.0
Stocks/Use Ratio	34.8%	40.0%	35.3%	47.0%	37.9%	39.7%

- Cotton consumption in India is expected to grow by 2-3% during 2015-16
- India is the only country where production of cotton is higher than consumption

Source – Monthly Economic Letter – Cotton Incorporated



Cotton Year: October to September

				(In lakh bales of 1	70 kg. Each)
Particulars	2011 12	2042 42	2012 14	2014 45 (D) *	2045 46 (D) *
SUPPLY	2011-12	2012-13	2013-14	2014-15 (F)	2015-10 (F)
Opening Stock	45.77	40.00	40.00	33.00	52.00
Crop	367.00	370.00	398.00	380.00	365.00
Import	7.51	14.59	11.51	14.39	12.00
TOTAL SUPPLY	420.28	424.59	449.51	427.39	429.00
DEMAND					
Mill Consumption	223.59	251.74	268.03	278.55	284.00
S.S.I Consumption	22.12	23.59	25.20	26.28	28.00
Non Textile Consumption	5.00	7.83	6.32	12.84	11.00
Export	129.57	101.43	116.96	57.72	<mark>68.00</mark>
TOTAL DEMAND	380.28	384.59	416.51	375.39	391.00
Closing Stock.	40.00	40.00	33.00	52.00	38.00

P - Provisional

* - As estimated by CAB in its last meeting held on 03.11.2015

2015-16 cotton supply to remain the same and demand is projected to increase by 4.2 % compared YOY

Yarn Production Trend

(In Million Kgs.)

						n nys.)	
Name of the Variety	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2014-2015 (Apr-Oct)	2015-2016 (Apr-Oct)
Cotton Yarn	3490	3126	3583	3928	4055	2328	2436
Growth Rate	13%	-10%	15%	10%	3%		5%
% Share	74%	72%	74%	74%	74%	74%	73%
Blended Yarn	796	789	828	896	920	530	558
Growth Rate	13%	-1%	5%	8%	3%		5%
% Share	17%	18%	17%	17%	17%	17%	17%
100% Non-Cotton Yarn	426	457	456	485	513	300	322
Growth Rate	5%	7%	Nil	6%	6%		7%
% Share	9%	10%	9%	9%	9%	9%	10%
Total	4712	4372	4867	5309	5488	3158	3316
Growth Rate	12%	-7%	11%	9%	3%		5%

Note : Growth Rate is calculated w.r.t. same period of last year. Source : O/o Textile Commissioner, Mumbai

• The Cotton Yarn Production is Stable and a Growth rate of 5% is expected for 2015-16 YOY



(In Million Sq. Mtrs.)

					(/
Name of the Variety	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2014-2015	2015-2016
						(Apr-Oct)	(Apr-Oct)
Cotton Cloth	31718	30570	33870	35513	36959	21065	22165
Growth Rate	10%	-4%	11%	5%	4%		5%
% Share	51%	51%	55%	57%	57%	57%	58%
Blended Cloth	8278	8468	9282	10062	10449	5978	6226
Growth Rate	7%	2%	10%	8%	4%		4%
% Share	13%	14%	15%	16%	16%	16%	16%
100% Non-Cotton Cloth	21765	20567	18797	17049	16924	10211	9595
Growth Rate	-5%	-6%	-9%	-9%	-1%		-6%
% Share	35%	35%	30%	27%	26%	27%	25%
Total	61761	59605	61949	62624	64332	37254	37986
Growth Rate	4%	-3%	4%	1%	3%		7%

Note : Growth Rate is calculated w.r.t. same period of last year. Source : O/o Textile Commissioner, Mumbai

• The Percentage share of Cotton Fabric is Increased to 58% in 2015-16 from 51% in the last Five Years

Overview of Indian Manufacturing Value Chain LMW®



Value Chain Outlook by Segment 2015-16

Value Chain	Domestic	Export
Spinners (Cotton Yarn)	Stable	Negative
Spinners (Synthetic yarn)	Negative to Stable	Negative to Stable
Fabric Player (Cotton)	Stable	Stable
Fabric Player (Synthetic)	Negative to Stable	Negative
Apparel / Made-ups Manufacturing (Cotton)	Stable with Positive Bias	Stable with Positive Bias
Apparel / Made-ups Manufacturing (Synthetic)	Stable	Stable



- The cotton industry is likely to revive moderately in CY17 as exports to Vietnam, Pakistan, and Bangladesh grow.
- Vietnam is likely to increase its spindles capacity by 30% in FY17.
- The local cotton production in Pakistan and Bangladesh is unable to keep pace with the increasing demand for apparels from these locations, providing opportunities to Indian exporters.
- However, in view of China reducing imports significantly and moderating demand from the Indian spinning mills industry, the demand for cotton will increase at a marginal rate in CY17 and the prices are likely to remain firm at the current levels.



Cotton fibres are a



Yarn Manufacturing Cost Contribution

5 – 65%
5 – 8%
.2 – 17%
5 - 7%
8 - 10%

LMW



Raw Material Characteristic



Raw Material Characteristics





- The Profit of the Spinning mill depends on the raw material used
- Cotton being a natural fibre, it has built in variations. Hence Selection and control are of paramount importance

Raw Material Influences

- * Spinability
- * Productivity
- *Yarn Realization
- ***** Quality of its end product (yarn)
- * Running performance of the machines





- Length, Uniformity and Short fibre content
- Strength & Elongation
- Fineness
- Trash
- Maturity
- Colour
- Contaminations
- Neps
- Honey dew content
- Moisture content

Fibre Length

- Length is the major deciding parameter for fixing the price of the cotton
- Length is normally expressed as staple length (2.5% span length) in mm
- Other associated measures are
 - Length uniformity
 - Short fibre content
- Based on the length, varieties of cotton are classified as
 - Extra long staple
 - Long staple
 - Medium long staple
 - Medium staple
 - Short staple



- Spinning limit (Count Processed)
- Yarn strength
- Yarn evenness
- Yarn hairiness
- Handle of the product
- Luster of the product
- Productivity



- Higher short fibre content results in
 - Increased waste % during process
 - Lower Yarn realization
 - Poor yarn quality with respect to unevenness and imperfection
- Fibres of above 15 mm only produce the positive characteristics of yarn
- Fibres of 12-15 mm do not contribute to strength but only to fullness of yarn
- Fibres of under 4-5 mm are lost in processing as fly

Fibre Strength and Elongation

- Fibre Strength is expressed in two units.
 - Grams / tex
 - Pound per square inch
- Fibre strength can be measured in two ways
 - Single fibre strength (in academics and research)
 - Bundle fibre strength (in industry)

Influence of Fibre Strength

- Higher the fibre strength, higher will be the yarn strength
- Stronger fibres withstand the Stress and Strain of the process like rolling, revolving, beating, stretching and twisting. And therefore resist nep formation and fibre rupture
- Higher fibre strength improves spinning performance with respect to end breaks



- Finer the fibres, higher is the spinning limit as the number of fibres increase in cross section
- Finer fibres result in
 - Lesser irregularity
 - Higher productivity with Reduced Twist
 - Higher Strength and elongation of the yarn



Higher trash and dust results in

- Higher waste %
- Lower Yarn realization
- Requires more beating points and results in fibre rupture
- Creates process problems in blow room & cards
- Affects appearance and the imperfections in the yarn.
- Higher dust causes wear of machinery and chocking of drive gears, chains, filters etc.
- Potential health hazard for skin and respiratory system



- Immature fibre creates
 - Neps during process
 - Affect the dyeing uptake
 - Affects the cleaning efficiency and waste extracted during process.
- Better evenness, lower imperfections, higher strength and elongation will be achieved with good matured cotton



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Spinning process	Mic	Maturity	Length	SFC	Strength	Colour	Trash	Neps
Cleaning efficiency	٧	V	V	V	V		V	٧
Waste	V	V	V				V	
Ends Down		V	V	V				





Modern Spinning Machinery are configured to meet the requirements of,

- Higher Productivity
- Consistent quality
- Varying fibre characteristics



Machinery Configuration is versatile to handle the variable characteristics of different fibres such as,

- Staple length
- Micronaire
- Trash %
- Fineness
- Strength / Elongation







To arrive at the best process / configuration suitable for customer requirement to achieve best quality output at highest productivity



- Individual class rooms for all machinery for demonstration and explanation
- Experienced engineers using scientific methods and tools
- Programs to train mill personnel at all levels in the operation and maintenance of the plant and machineries of a textile mill
- Includes process control, quality control and electrical/electronics training
- Special training program for New Entrepreneurs

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