



Information Asymmetry in Cotton Markets in India

A Paper on Market Orientation

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Cotton in India


■ India is the *second largest producer* of cotton in the world with 21% of world cotton production. Its yield however, is half of the world average


■ Cotton and its products give substantial income and employment to agriculture and industry in India

■ Good quality of raw cotton, low in trash and contamination, is one pre-requisite in producing high quality textiles.

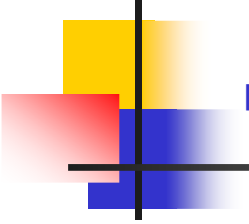
■ Indian cotton is considered superior to mechanically harvested cotton in terms of *sheen of finished fabric, amenability to spinning, tensile strength* etc; its value and acceptance limited due to high levels of contamination and trash.

■ Poor cotton quality has been a major constraint in building a internationally competent textile and garment sector

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- The problem of cotton quality and cotton contamination are issues that encompasses the entire cotton value chain beginning at the farm level up to the final stages of value addition.
 - This problem arises due to poor *transaction practices at the market level, information asymmetry, lack of proper technology and physical infrastructure*. The upstream agents in the supply chain, consisting of farmers and traders/ginners, face a problem of information failure and inadequate institutional support.
 - This limits market performance providing *poor signals for quality through price*, making the benefit from investment in quality is either insignificant or small.

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- With the development of new market opportunities and a liberalized trade regime through the removal of quantitative restrictions on imports as well as export quota on cotton, the textile industry today is faced with challenges as well as opportunities.
 - Poor cotton quality has been the other major constraint and the cotton sector and larger textile enterprises have begun to look at imports for sourcing the quality cotton
 - In 1999-2000, the country imported an estimated 2.2 million bales of cotton, more than 100 per cent increase from the 1.0 million bales that arrived the previous year. In 2001-02 it went up to 2.4 million bales.

Evidence of Markets Failure

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- Indian cotton is considered to be among the most contaminated in the world, according to the International Textile Manufacturers Federation (ITMF).
 - As a result of this Indian cotton is sold at a discount compared to similar international varieties.
 - Due to this, the Indian cotton segment has not developed according to the quality needs of the international markets, thus giving it a disadvantage in textile trade as it cannot convert its inherent advantages of abundant raw material and cheap labour to its benefit.

Worlds Most Contaminated Cotton

Most Contaminated			Contamination (%)	
Rank	Description		Moderate	Serious
<i>2007</i>				
1	<i>Turkey</i>	Cukurova	40	16
2	<i>Turkey</i>	Turkey others	41	10
3	<i>India</i>	MCU5	27	19
4	<i>India</i>	DCH	31	13
5	<i>India</i>	J34	29	11
6	<i>India</i>	Shankar	24	14
7	<i>Paraguay</i>	Paraguay	13	23
8	<i>Nigeria</i>	Nigeria	28	8
9	<i>India</i>	Others	21	12
10	<i>Uzbekistan</i>	Long staples	22	8
<i>2005</i>				
1	<i>Turkey</i>	Cukurova	40	16
2	<i>Turkey</i>	Turkey others	41	10
3	<i>India</i>	MCU5	27	19
4	<i>India</i>	DCH	31	13
5	<i>India</i>	J34	29	11
6	<i>India</i>	Shankar	24	14
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9	<i>India</i>	Others	21	12
10	<i>Uzbekistan</i>	Long staples	22	8
<i>1999</i>				
1	<i>China</i>	Others	63	25
2	<i>India</i>	F-414	53	11
3	<i>Pakistan</i>	Seed Afzal	23	26
4	<i>India</i>	J34	32	16
5	<i>Pakistan</i>	Others	23	25
6	<i>India</i>	Others	27	16
7	<i>India</i>	LRA	28	13
8	<i>India</i>	Shankar 4/6	25	16
9	<i>India</i>	H4	26	15

Source: International Textile Manufacturers Federation survey

The levels of contaminants in Indian cotton & Foreign Cotton

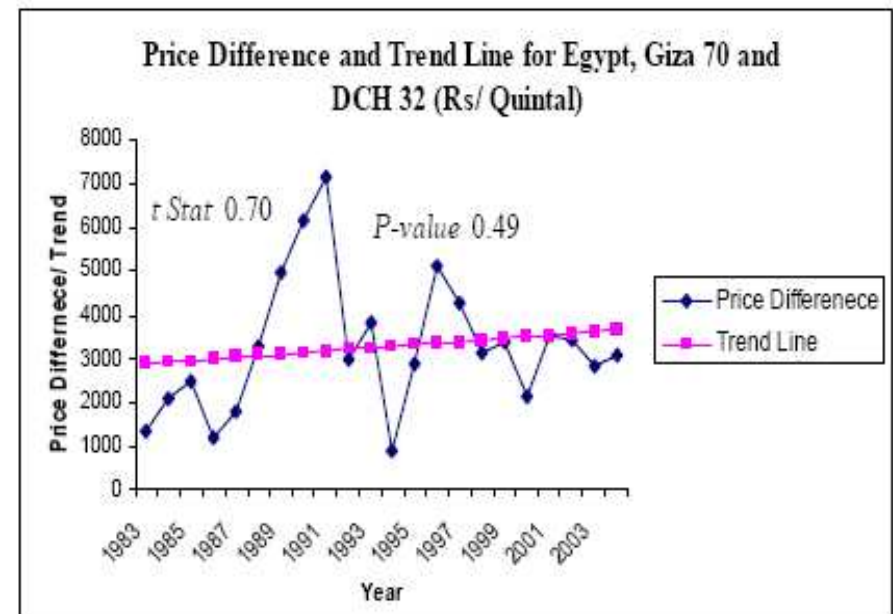
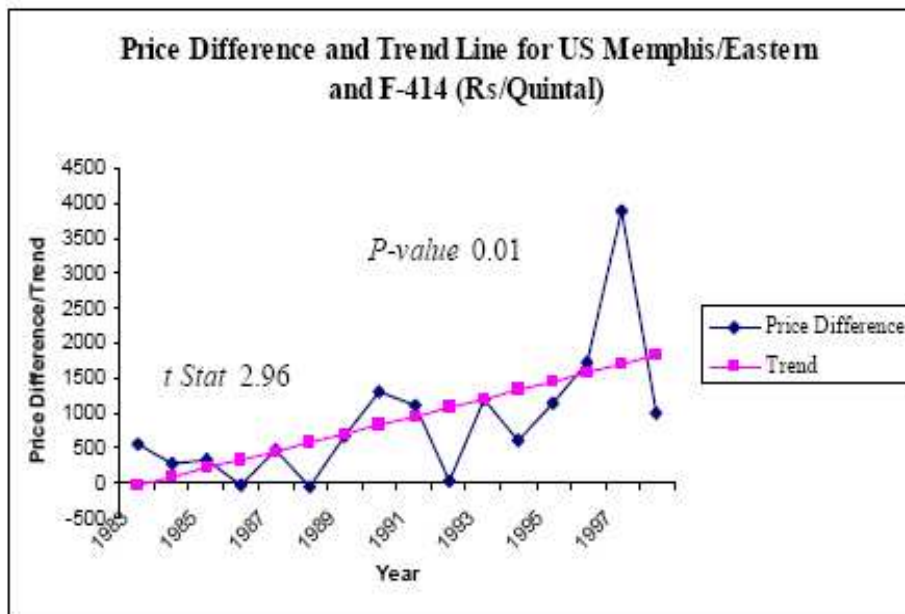
Variety/Hybrid	Trash Content (%)	Range
Indian Cottons :		
RG-8	6.4	5.6-6.9
V-797	13.7	12-18
G.Cot.13	15.5	15.2-15.8
Jayadhar	5.4	3.3-8.6
J-34	5	4-6.5
NHH-44	3.7	2.8-5.2
LRA5166	4.2	1.9-10.6
H-4	3.5	1.9-6.2
H-8	5.8	-
Shankar-6	3.8	1.7-8
DCH-32	4.1	2.8-7.7

Source: International Textile Manufacturers Federation survey (2005)

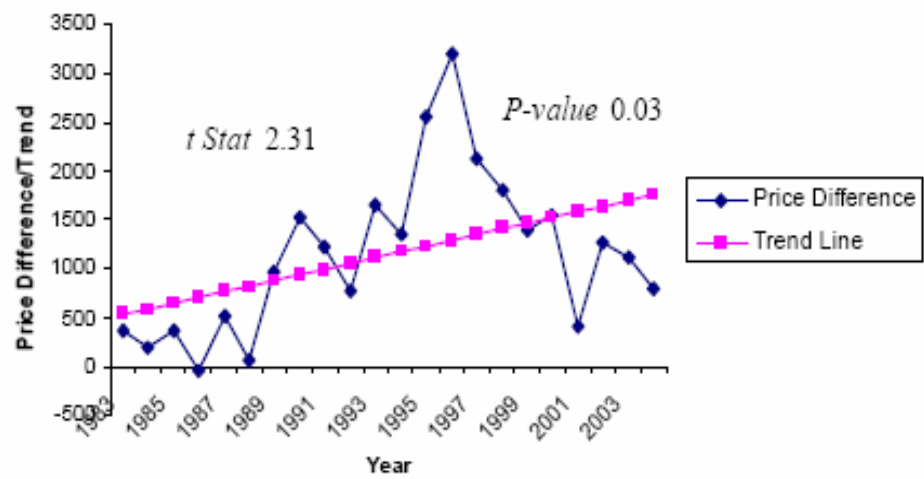
Foreign Cottons :		
Australian Cotton(strict middling)	3.1	3.1-3.3
Liba cotton	4.1	3.4-5.6
CIS cotton	4	-
Chinese cotton (superior quality)	1.4	-

Source: International Textile Manufacturers Federation survey (2005)

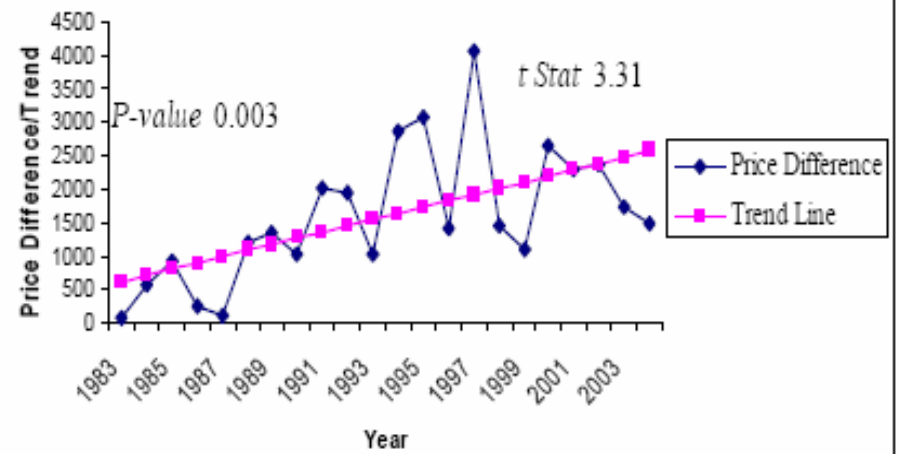
Raw Cotton Price Divergence: Comparison of Indian Cotton Varieties and International Cotton Varieties



**Price Difference and Trend Line for US Orleans Jayadhar
(Rs/Quintal)**



**Price Difference and Trend Line for Sudan Barakat and
Shakar 4 (Rs/Quintal)**





Average Price Difference for different varieties of Indian and International cotton

Varieties	Average Price Difference 1985-99	Average Price Difference 1990-94	Average Price Difference 1995-99	Average Price Difference 2000-04
<i>US Memphis/Eastern and F-414</i>	269.52	777.20	1658.44 (1995-98)	.NA
<i>US Orleans/Texas and Jayadhar</i>	285.25	1145.53	2198.86	1147.26
<i>Egypt, Giza 70 and DCH32</i>	2227.46	4703.50	3476.45	3070.11
<i>Sudan Barakat and Shankar4</i>	584.47	1591.73	2434.99	2047.63

Quality Constraints in the Final Market Segment

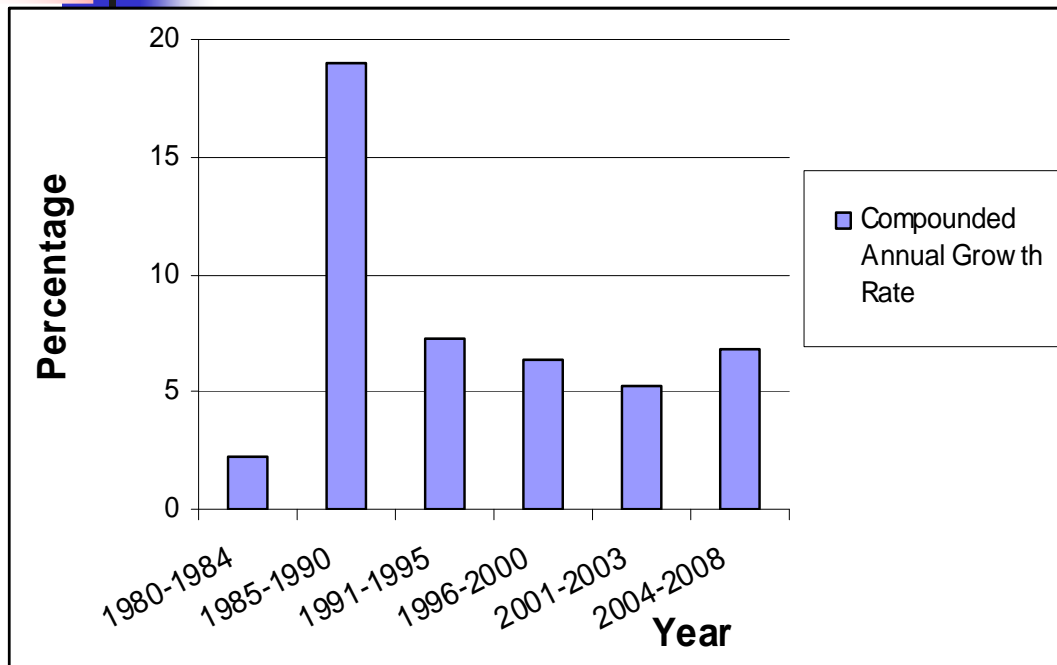
- The Indian cotton textile and garment industry has historically been of prime importance to the country's economy.
- It accounts for 14% of its industrial production, 4.3% of its GDP and 16% of the total merchandise export.
- The industry also accounts for 90% of the Indian textile exports and 57% of the domestic fiber consumption.
- It has been the second largest employment generator after agriculture, providing direct employment to over 35 million people (ICRA Sector Analysis, 2006).
- The textiles and clothing market in India in 2004 was estimated to be 4.25 trillion rupees with 61% of it being domestic, 9% technical textiles and the remaining 30% being exports (ibid).



Policy restrictions and growth

- Despite its large size, the industry has not been able to consistently compete at the international level for a long time
 - This is due to existence of labour restrictions, high excise tariffs, cloth sale obligations as well as plant size regulations
 - In the mid-1960s, India was the eighth largest exporter of textiles in the world (UN Statistics 2005), however, restrictive internal regulations over the next decade led to a decline in the share of textile exports.
 - Policy reforms in the 80's and the 90's in the textile sector saw the exports recovering at a steady pace.

Compounded Annual Growth Rate of Apparel Exports (1980-2008)

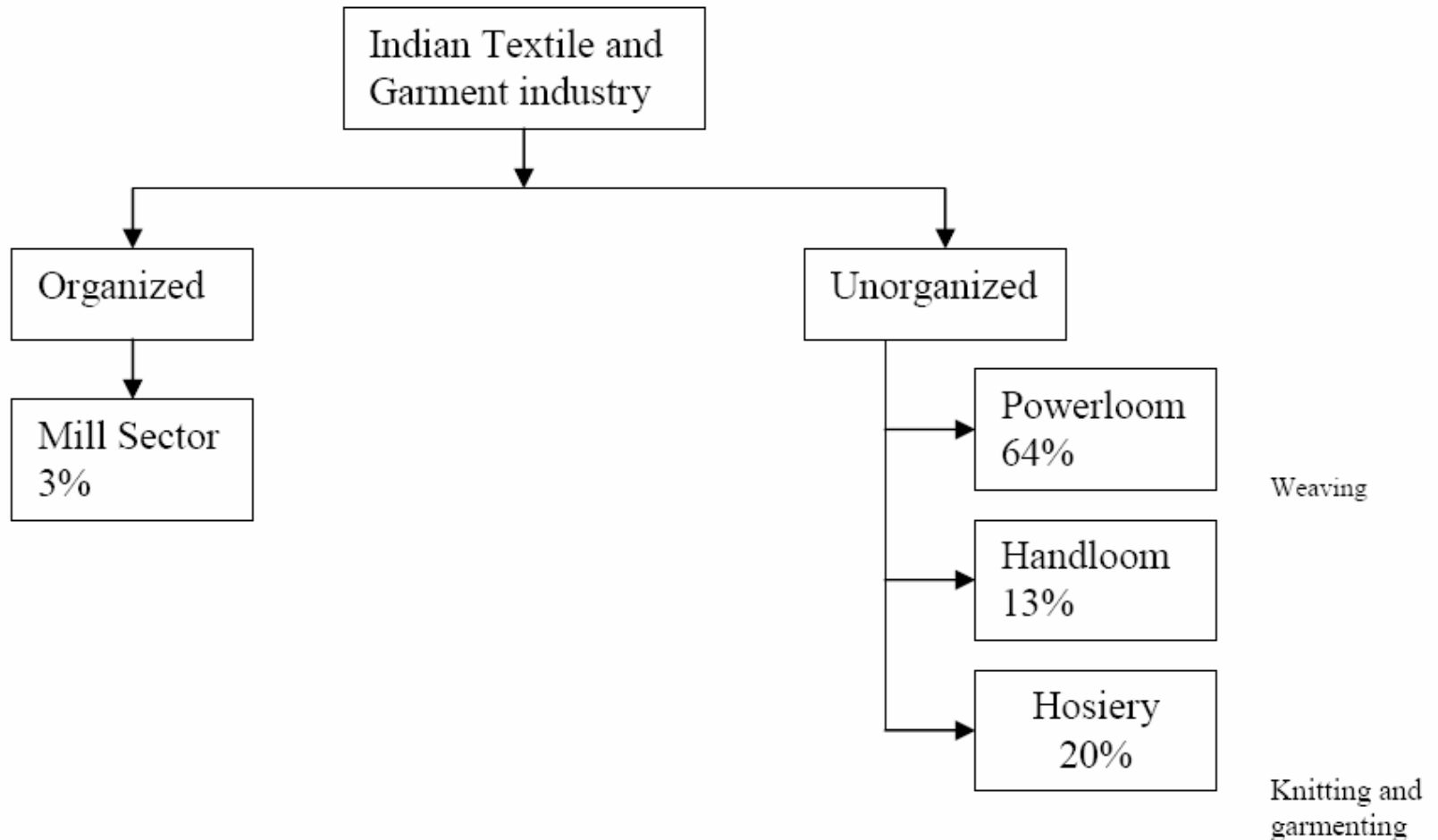


■ By the mid 1980's the export figures of textiles had risen to \$1 billion from \$30 million in 1970s at a CARG of 19% (Tewari, 2005).

■ In 2003 the Indian textile exports had reached \$6.8 billion and in 2008 it touched \$20.5 (Ministry of Textiles, 2005)

Source: calculated from UN statistics, table 4 Chatterjee and Mohan (1993) and Tewari (2005).
Trade value in current US (million), deflated by CPI index base 1995 (Source WDI).

Structure of the Indian Textile Industry and Source of Fabric



The Indian Textile Industry

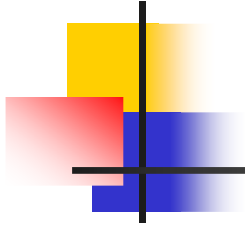
- The textile industry in India is characterized by the presence of ***small-scale non-integrated spinning, weaving and knitting and cloth finishing units***, which are labour intensive in nature.
- The decentralized powerloom and hosiery sector is the biggest segment accounting for the largest figures in terms of employment, exports as well as fabric production (84%).
- The mill sector presently makes-up only **3%** of the total fabric output and mainly caters to the ***export and quality sensitive market***. The figures of mills share in total textile production had fallen from 70% in 1950 to the present level as a result of unfavorable policies.
- The decentralized sector, is characterized by ***low productivity*** due to ***lack of modernization, stagnation*** due to the inability to expand in the export market and also ***increased cost of inputs*** in production.



Technological Constraints and Quality

- Low technology adoption in India has to a large extent hindrance the development of quality in the textile industry.
- The large scale integrated mills is the only segment that have access to capital intensive technology helping them upgrade and scale-up production according the needs

Segment	Level of Technology Adoption
<i>Spinning</i>	Near obsolete-almost 65% of Spindles over 10 years old OE rotors account for only 1.3% of total spindles
<i>Weaving</i>	only 2.24% of the looms are shuttleless; most units have less than 20 looms
<i>Processing</i>	Low-end dyeing and finishing machinery; numerous hand processors
<i>Garmenting</i>	simple sewing, embroidery machines; numerous manufacturing units with less than 20 machines



- The various segments arranged according to size of exports show that the percentage share of India in the large segments of garments is small.
- In the small segments like the women's/girls knitted blouses and shirts, the share of India is high.

Size of Export Market of Selected Segments of Textiles and India's Share and Growth

Segments	Size of Export Market (billion \$)		India's Share in Exports (%)		Growth in Share (%)
<i>T-Shirts/Singlets (610910)</i>	14.35	19.95	6.12	6.83	2.78
<i>Men's/Boys Trousers & Shorts, Woven (620342),</i>	12.97	15.24	1.53	2.75	15.78
<i>Women's/Girls, Shorts, Trousers, Woven (620462)</i>	12.33	16.29	1.18	1.64	8.57
<i>Women's/Girls Blouses, Shirts, Woven (620630)</i>	3.59	4.75	17.41	19.93	3.43
<i>Men's/Boys Shirts, Knitted (610510)</i>	3.09	4.08	12.11	8.83	-7.59
<i>Women's/Girls Blouses, Shirts, Knitted (610610)</i>	3.06	3.97	6.61	7.31	2.54
<i>Babies Garments, (611120)</i>	2.69	3.64	4.35	5.55	6.28



Competitiveness of Textile and Garment Industry in Selected Countries

- Comparing the competitiveness of the textile and garment industry in selected countries based on parameters relating to ***technology, policy environment and structure of the industry*** China appears to be competitive in all sectors of the textile industry except in design capabilities as their production patterns are largely based on economies of scale.
- Though India has an advantage in the textile and garment sector in ***availability of skilled labour and labour cost***, its poor infrastructure and logistics along with poor quality cotton affects its competitiveness
- The small scale and domestic orientation of the industry and the inherent problems in the supply chain like the quality of cotton constrains the development of economy of scale and scope for higher investments into the sector

Particulars	India	China	Pakistan	Hong Kong	Sri Lanka	Bangladesh	Vietnam	Indonesia	Turkey
<i>Raw material availability</i>	Good	Good	Good	Poor	Poor	Poor	Poor	Good	Good
<i>Integration level</i>	Low	High	Medium	High	Medium	Low	High	High	Medium
<i>Technological application</i>	Low	High	Low	High	Low	Low	Low	Medium	High
<i>Processing</i>	Poor	Good	Poor	Good	Average	Poor	Average	Poor	Good
<i>Skilled labour availability</i>	High	High	High	High	Medium	Low	High	High	High
<i>Labour cost advantage</i>	High	High	High	Low	High	High	High	High	Medium
<i>Design capabilities</i>	Good	Poor	Average	Good	Poor	Poor	Poor	Poor	Average
<i>Infrastructure</i>	Poor	Good	Poor	Good	Average	Poor	Poor	Average	Average
<i>Government policies</i>	Partly restrictive	Supportive	Supportive (except polyester)	Open, unrestrictive	Supportive	Supportive	Supportive	Neutral, unrestrictive	Supportive
<i>Investments</i>	Rising but still low	High	High	Declining	Medium	Medium and growing	High	Declining	Low but grown largely in 2005
<i>Textile machinery industry</i>	Moderately developed	Medium-good	Poorly developed	Good	Poorly developed	Poorly developed	Poorly developed	Poorly developed	Poorly developed
<i>Logistics/supply chain</i>	Poor	Good	Poor	Good	Good	Poor	Poor	Average	Average
<i>Preferential access</i>	GSP benefits of EU & US	No	Beneficiary of EU GSP but not GSP plus	Chinese market	EU	EU, US, canada japan	GSP benefits of EU & US	Beneficiary of EU GSP, ASEAN members	EU
<i>Strong segments</i>	Home textiles, garments(a)	Almost all T&G segments	Home textiles (cotton towels and bed linen)	Garments	Garments	Low cost garments	Garments (a,b)	Manmade fabrics and fabrics	Garments, made-ups (especially carpets)

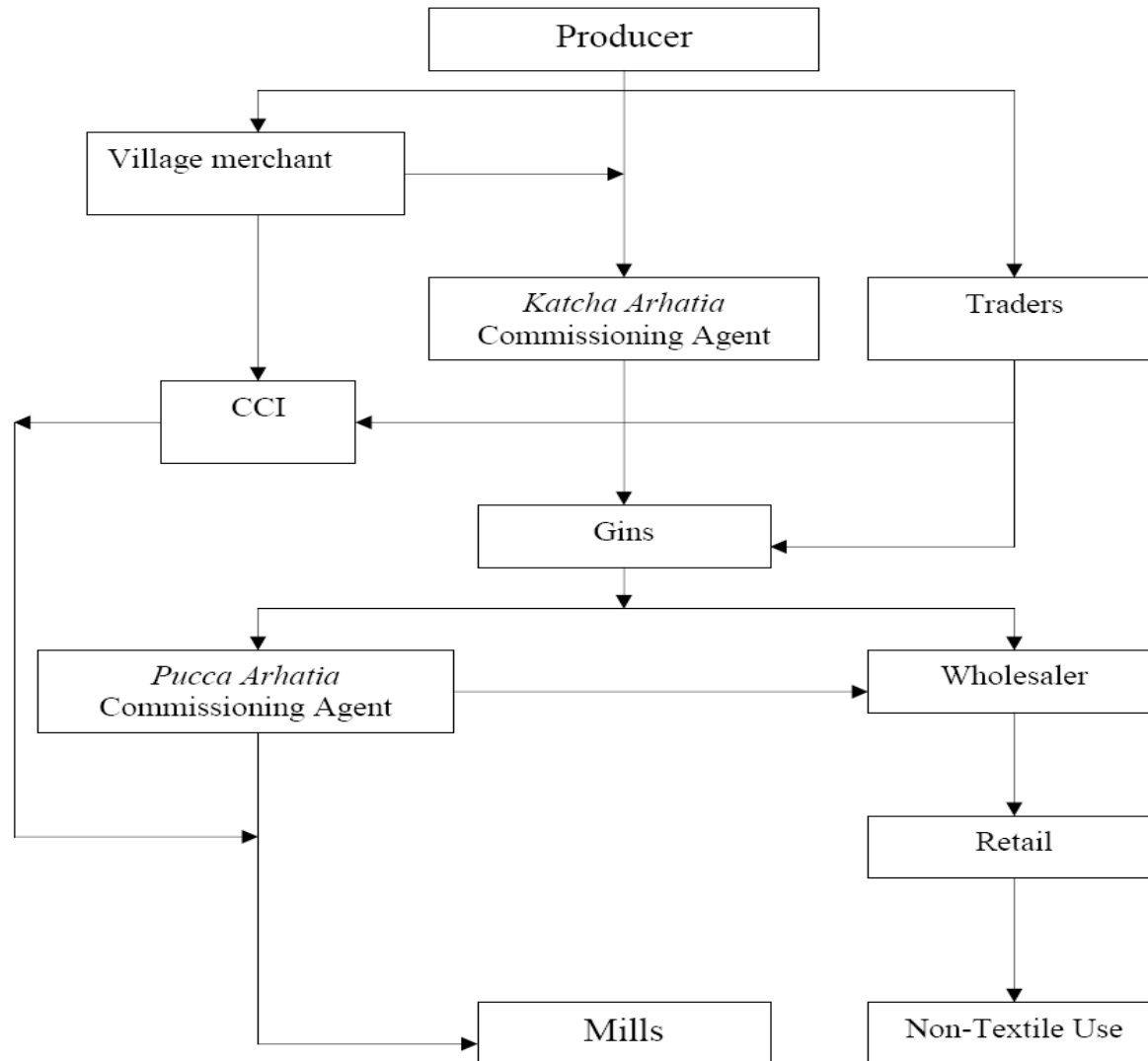
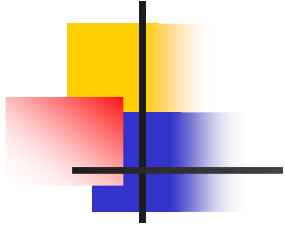
Source: Source: Dun & Bradstreet, Indian Textiles & Garments Industry, 2008

Reasons for Market Failure

- In the absence of grading and standardisation, there emerges a problem of information asymmetry in the market as buyers and sellers possess different levels of information during transactions.
- Akerlof (1970) states that information asymmetry among producers and consumers make it hard to determine the quality of the product transacted. In this absence of information, consumers assume the quality of the products sold is low as a result of the mixed quality of the product that is available.
- This shifts the perceived quality of the product towards low quality resulting in the 'lemon problem', where the low quality goods drive out the high quality goods from the markets.
- This leads to adverse selection – a market failure where products are sold at a single price irrespective of quality, leading to too much low quality goods and too little high quality goods.

- The three channels through which cotton is marketed in India are; private trade, state-trading and co-operative marketing. The Agriculture Produce Marketing Committee (APMC) is the primary market infrastructure in the country for the transaction of commodities.
- The main functions of these markets or *mandis*, is to regulate market practices like weighing, method of sale, grading and payment. It also provides facilities for storage, boarding and lodging for buyers, sellers etc.
- In India, there are 7062 functioning *mandis* today. The cotton marketing chain in India is highly fragmented and is characterised by many intermediaries
- In a fragmented system coupled with the problem of poor awareness among primary producers and absence of grades and standards has led to the problem of information asymmetry leading to ***poor price-quality linkages, poor price realisation to primary producers and low awareness of good practices among them.***

Cotton Marketing Chain in India



Price-Quality Linkage

- 535 cotton samples were collected from different markets of Gujarat, Haryana, Punjab, Rajasthan and Karnataka In order assess the relationship between price and quality of cotton in the Indian markets.
- The price offered was also collected from the market committees. In order to determine the extent of price-quality linkage prevalent in cotton sales, markets of various cotton growing states were assessed individually.
- On a given day (supply-demand situation known) the difference in price quoted for different lots should be explained fully by the quality parameters of the lot and therefore, the intra day price variation across lots in the market should fully explain the variations in the quality characteristics.
- This is consistent with the Lancaster model which says that the price of a product is a function of quality characteristic. That is, if P_i is the price of lot i , C_{ij} is the j th characteristic of the lot i and a_j are the weights, then:

$$P_i = \sum_j a_j C_{ij}$$

The various quality characteristics used in this analysis as variables were

- *2.5 Span Length (Len), 50% Span Length (Len5), Uniformity Ratio (UR), Strength (STR), Elongation (EL), Micronaire (MIC), Reflectance, Yellowness, Colour Grade (CG), Floating Fiber Index (FFI), Mean Length (ML), Seed Coat Index (SCI), Short Fiber Content (SFC), Trash and seed coat.*

- Therefore, to assess the relationship between price and quality, the following regression equation can be estimated.

- **The regression model estimated is:**

$P = f(\text{LEN, LEN5, UR, STR, ELG, MIC, Reflectance, Yellowness, CG, FFI, ML, SCI, SFC, Trash, dummy variables})$



Estimated Model

Model	Adjusted R²	Std. Error of the Estimate	f	Prob> chi2
Haryana	.264	8.97	2.67	0.7927
Punjab	.510	81.16	15.18	0.0000
Rajasthan	.646	86.83	25.96	0.3298
Gujarat	.016	271.10	1.34	0.0527
Karnataka	.452	254.13	7.90	0.0000



Price Determination in the Absence of Grading and Standards

- The informal grading and premium determination in the APMC has led to a wide range of uncertainties in the system of price and quality determination in the markets
- The most common form of assessment of quality to determine price in the absence of established testing facilities is often through visual and tactile assessments
- The prices quoted by different merchants for a particular lot of cotton often have large variations and are not based on test data.
- Therefore, the price realization for farmers is low as sampling does not determine the characteristics and quality of the entire lot.



Methods of Sale

- Open Auction System (Gujarat, Rajasthan, Punjab and Haryana)- market participants openly bid for lots in the market yard which belong to different commission agents and the lot is sold to the highest bidder. In both these practices there are no limiting conditions or prices.
- Closed Tender System (Karnataka) - cotton is hoarded in the market yards where traders inspect these lots or samples of lots and quote their buying price in sealed envelopes. The envelopes are opened up and the lot is sold to the trader with the highest bidder.

Percentage range (with respect to mean) of prices quoted by Market Participants for three given samples of cotton (Open Auction)

State	Market	Percentage Range of S- 1	Percentage Range of S- 2	Percentage Range of S- 3
Gujarat	Amreli	0.85	0.85	2.73
	Botad	1.74	1.22	2.70
	Kadi	0.97	2.04	1.65
	Rajkot	2.69	1.84	2.97
	Karjan	1.58	0.85	1.30
	Bodeli	1.34	0.61	1.42
	Jetour	1.46	2.05	2.65
Rajasthan	Sriganganagar	1.42	1.42	4.81
	Hanumangarh	1.42	4.95	6.65
	Kesrisinghpur	3.84	4.81	2.62
	Padampur	4.79	4.90	9.27
	Anoopgarh	1.42	3.45	2.00
	Raisinghnagar	4.95	5.70	1.42
	Suratgarh	4.78	6.05	1.25
Punjab	Abhor	1.41	0.89	0.83
	Maur Mandi	0.75	0.53	0.64
	Raman Mandi	0.49	0.43	0.86
	Jetu	1.39	0.66	0.6
	Mutsar	1.08	0.45	0.62
	Bhatinda I	0.47	0.58	0.48
	Bhatinda II	0.69	0.51	0.63
Haryana	Hisar	0.27	0.32	0.21
	Dabwalli	0.34	0.22	0.34
Karnataka	Hubli	2.06	2.83	2.52
	Bailhongal	1.18	1.98	1.75

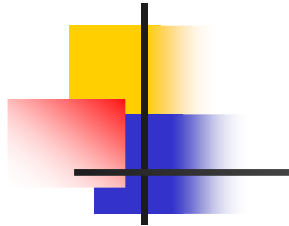
Average percentage range of Bid Prices (with respect to mean) of cotton on 5 days in two cotton markets of Karnataka

Market	Commissioning agent	Average percentage of variation in bids on five days				
		1	2	3	4	5
Hubli	1	8.01	8.03	11.04	10.90	9.88
	2	9.04	7.64	8.21	11.91	7.79
	3	9.02	8.18	7.54	8.40	10.91
	4	10.03	11.29	8.20	9.25	9.37
	5	7.34	10.46	8.87	11.43	9.25
Bailhongal	1	8.39	13.27	12.19	9.82	11.20
	2	27.68	51.84	35.36	43.66	13.49
	3	33.28	30.57	32.04	32.94	31.88
	4	31.73	64.59	56.38	66.13	67.17
	5	20.87	33.34	32.94	29.62	32.25




Prevalent Farm Practices in Cultivating Cotton and Farmers Awareness in India

- In order to study the problem of cotton contamination at the farm level, a survey was conducted to assess the level of awareness among farmers.
- The survey reveals that the problem of cotton contamination begins at the farm level as a result of poor harvest and post harvest practices. This is a serious concern for producing quality cotton for the markets.
- Poor practices are a result of lack of awareness as well as the lack of physical infrastructure at the farm level.
- In some cases though the farmers were aware of good practices they didn't have the resources for the infrastructure pertaining to good harvest and post-harvest practices.

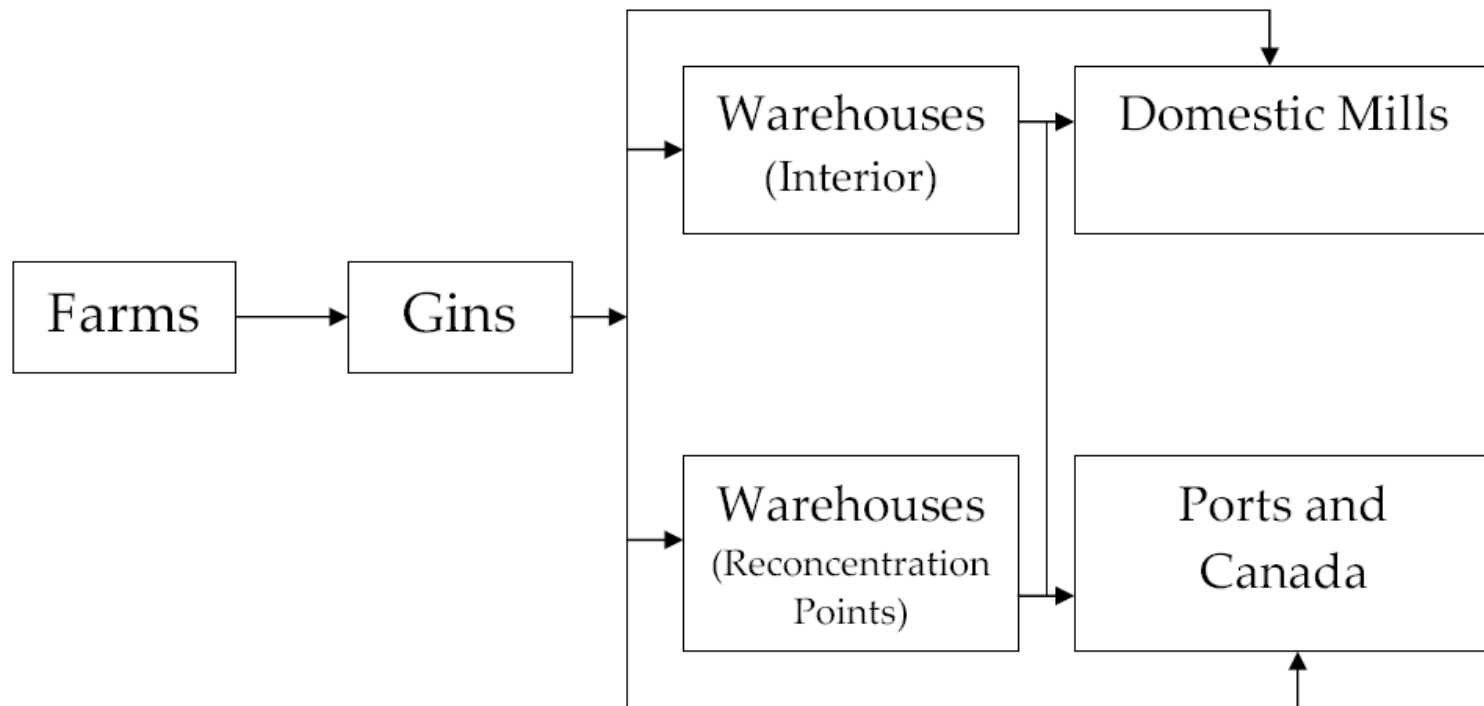


PARTICULARS	Actual practice%	Good Practice awareness %	Good Practices
<i>Harvesting time</i>			
Morning	95	40	Harvesting in the morning and evening when locules are less sticky
Afternoon	95	0	
Evening	95	40	
<i>Method</i>			
Matured	99	40	Pick only mature cotton as locules add to trash
Fiber locules	99	0	
<i>Segregation</i>			
Trash	18	46	All the particulars must be prevented or segregated if they occur to maintain the quality of cotton
Discoloured	70	49	
Immature	55	47	
Diseased	61	47	
Dusty	26	49	
Bird damage	59	49	
<i>Pooling</i>			
On tile pavement	0	29	Pooling needs to be done on concrete or on tiled platforms to prevent contamination
Concrete	0	29	
Heaping on open platform	100	0	
<i>Drying</i>			
Direct sunlight	91	0	Drying needs to be done mechanically or in the shade/partial exposure to maintain reflectance and reduce yellowness
Partial exposure	18	0	
Shade	0	23	
Mechanical drying	0	20	
<i>Transportation</i>			
Cart/truck	95	0	When cotton is transported it needs to be covered properly in closed dust-free conditions
Overhead	0	0	
Motor vehicle	3	21	
Closed containers	0	14	
Dust free	0	14	
Any other	0	0	

Developing and Streamlining the Cotton Value Chain

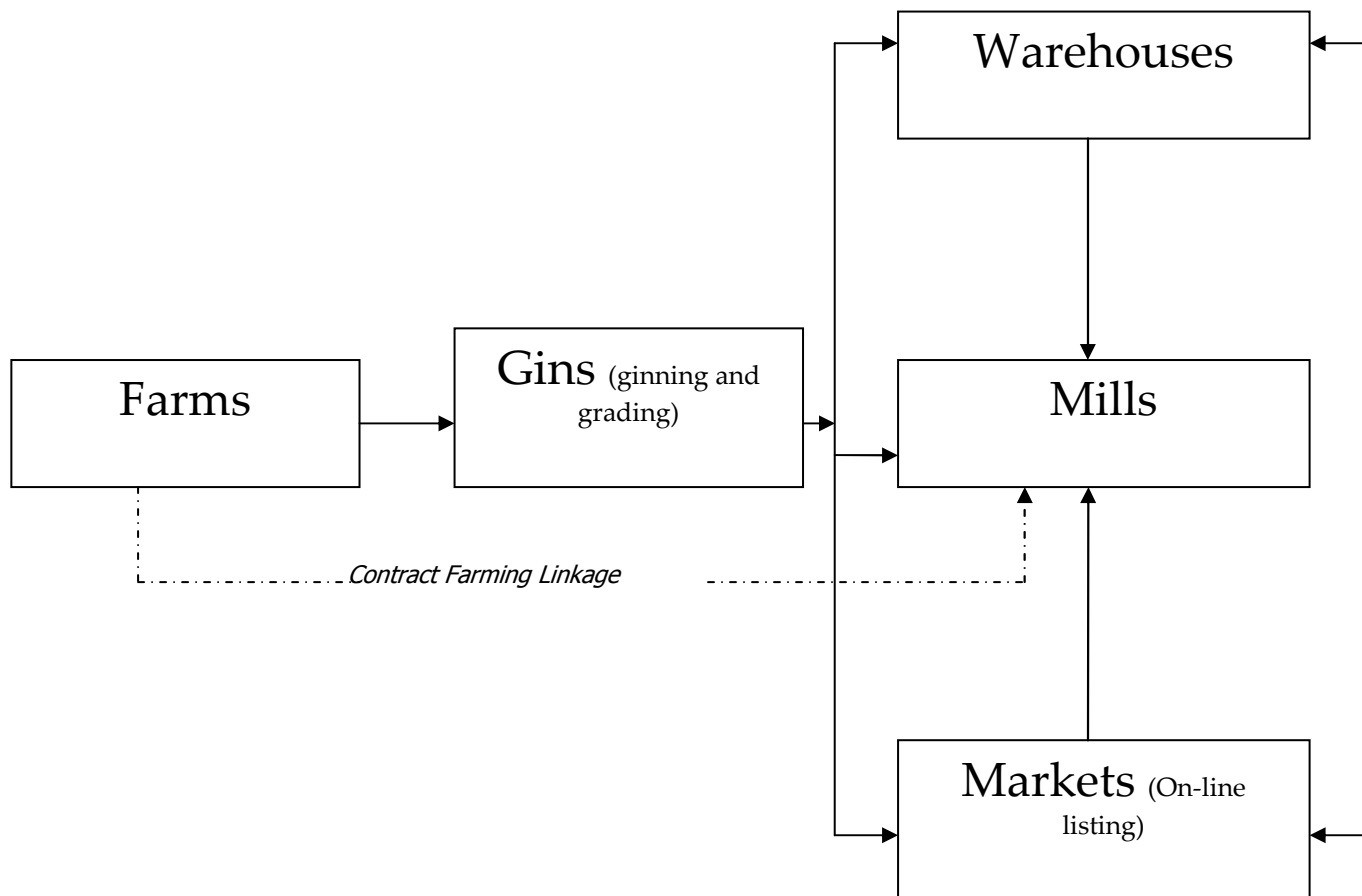
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- A proper functioning market is a prerequisite for dissemination of information, enabling good market practices and also in assuring transactions based on quality with good price-quality linkages.
 - It would generate information at all levels to participants, addressing the problems of information asymmetry through the establishment of grades and standards, warranties to market participants and through signaling.
 - The presence of grades and standards in the markets would act as signals to traders who would have the assurance of quality of the produce they buy. They will also aid farmers to make better pre-harvest and post-harvest decisions.

The US Cotton Marketing Chain



Source: The Cotton Industry in the United States, USDA

Cotton Supply Chain with a System of Feedback





Benefit to ginners

- Higher efficiency of production as a result of better awareness of price quality linkages
- Better relationship with mills as confidence increases in the quality output of the gins
- Ability to provide efficient feedback as a result of having testing and grading facilities in the ginneries



Benefits to Farmers

- Establishment of a system of feedback leading to more awareness regarding price, quality and premiums
- Increased awareness leading to improved cultivation and post harvest practices in order to attain premiums and price realization
- Value addition at an early stage helping with better prices at the marketing stages
- Better marketing opportunities
- Better access to credit



Benefit to market

- Transaction of better quality cotton reducing ambiguities and increasing efficiency
- Development of standards based on price-quality linkages
- Reduced role of intermediaries determining price in the markets
- Improvement in marketing structure and functioning
- Reduced market time and promptness in payment
- Reduced risk of contamination in the marketing yard
- Reduced handling of cotton as a result of grade, quality being determined before cotton entering the markets
- Information dissemination (Forward and Backward)