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How India Can Double the National Average Cotton Yield

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The views expressed in this column are his own and not that of Cotton Association of India)

Why is it that out of 80 cotton growing countries, India is the only country that cultivates cotton hybrids commercially and that too in more than 94.0% of the area. Why is it that with the best of technologies such as Genetically Modified (GM) Bt-cotton in Hybrids in the entire country, India still ranks 33rd rank in yield per hectare? What can be done to increase the yield per hectare so that India can emerge as a global leader?

EXPERT's Column

Dr K.R. Kranthi

In this context it is important to raise a question whether hybrid cotton is the ideal technology for the entire country. If hybrids were to be the ideal choice, India would have become the global leader by now. There is no doubt that hybrid cotton is a good technology. But some fundamental questions remain. The intention of this article is to initiate an open discussion on the relevance of hybrid cotton technology for Indian conditions and to explore viable alternative systems to enhance yields.

I would like the reader first to know some basic terminologies.

Variety: Seeds of crop varieties can be reused by farmers for several generations with less cross pollination from other varieties. Seeds when planted over generations result in plants that have distinct and uniform characters inherited in a stable manner.

F-1 Hybrid seeds:

a. For F-1 seed production, two different varieties 'A' and 'B' are grown as parents.

b. Emasculation: The pollen from the flower buds of variety 'A' are removed just before the flower opens. The emasculated flowers are covered with a paper bag to prevent pollination from other open flowers.

c. Pollination: The next day pollen of flowers of the variety 'B' are dusted on the stigma of the variety 'A'. The bolls formed from such crosses contain F-1 hybrid seeds which give F-1 hybrid plants.

F-2 seeds:

The seeds obtained from the F-1 hybrid plants are called 'F-2 seeds'. These cannot be reused by the farmer for sowing because the plants from F-2 seeds are not uniform for many of the plant and fiber characters.

Hybrid vigour or Heterosis: When hybrid plants show improvement in any biological quality

compared to the parents, it is called hybrid vigour or heterosis.

Advantages of hybrid cotton

- Lesser seed rate of 2 kg per hectare as compared to 10-12 kg/ha with varieties
- Wider adaptability to varied soil and climatic conditions
- High yield per plant. More boll numbers, bigger boll size and heavier bolls
- More pickings in irrigated cotton with extended crop resulting in higher yields
- Superior fibre quality of higher count yarn
- Excellent boll opening with Bt hybrids for clean picking and low picking cost
- Highly responsive to fertilizers

Disadvantages of Hybrid cotton

- Higher seed cost due to labor intensive and laborious seed production methods
- Higher seed cost due to isolation distance and wastage of flowers from male parent and 20-30% of improper boll setting on female plants
- Needs skilled labor
- High density planting (HDP) can be expensive because of the exorbitant seed cost of about 15 paise per seed
- Nutrient, water and input wastage due to hybrid vigour in unnecessary vegetative biomass
- Long duration leads to longer exposure to insect pests and diseases
- Shallow soils and rainfed conditions lead to stunted plants with few bolls and low yields because of less plant population at 10 to 15 thousand plants per hectare
- Low yields of hybrids in some regions is due to cultivation of hybrids in unsuitable conditions, mismatch of several hybrids in different agro-eco-regions and release of excessive number of hybrids and susceptibility of majority of the hybrids to sap-sucking insects and diseases

Some questions and some answers

Why was Bt technology only available as Bt hybrids, why not as Bt varieties?

The seeds from hybrid crop cannot be reused for sowing whereas seeds of varieties can be reused for sowing. Farmers will have to purchase hybrid seeds every year. Therefore seed companies preferred Bt hybrids over Bt varieties.

Did cotton hybrids improve yields in India?

Hybrid cotton improved yields in some parts of India such as in Gujarat and some irrigated parts of South India. There is no evidence to show that hybrid cotton gave any advantages in North India.

Do hybrids contribute to enhancement of genetic diversity?

Hybrids do not contribute to genetic diversity because the seed from hybrid crop is not used for re-sowing or selection of new cultures/varieties from progeny.

Hybrid Cotton in India

Hybrid technology was developed and used by plant breeders in India to lay the foundation for high yields. The area under hybrid cotton was 28.0% in 1990; 40.0% in 2000; but increased to more than 95.0% by 2013. The area under hybrid cotton was negligible in North India in the year 2000, but by 2013, more than 96.0% of the area was covered with hybrid cotton.

It is estimated that about 40 intra-hirsutum hybrids were developed by the public sector institutions in the past 40 years but more than 1000 cotton hybrids were released by the private sector in just 6 years during 2006-2012.

How can India double the National average yield per hectare

It is crucial to identify the best Bt hybrids for each of the agro-ecological regions and develop package of practices for yield enhancement. In this context the following recommendations will be important:

1. Approve only 2 best hybrids per company in each district
2. Approve varieties of Bt hybrids that are resistant/tolerant to Cotton Leaf Curl Virus & Whitefly in North
3. Permit varieties or Bt hybrids that are resistant to sap-sucking pests
4. It should be made mandatory for a minimum of two year multi-location trials by ICAR-SAU before any variety or hybrid is approved for cultivation in any part of the country.

5. Hybrids are suitable for irrigated regions of central and south India and should be promoted in such regions only.
6. Short duration hybrids also perform well in rainfed regions especially if early sown.
7. For rainfed regions short duration varieties of 130-150 days with compact plant type are ideally suited for high density planting at 200,000 plants/ha especially in shallow soils especially when early sown.

High Density Planting Systems (HDPS) are commonly followed to obtain high yields with straight varieties across the world, especially in the major cotton growing countries such as USA, Australia, China, Brazil and Uzbekistan. The planting geometry is 8-10 cm distance between plants in a row with row to row distance at any of the spacings at 18 or 30 or 45 or 60 or 75 or 90 or 100 etc. The planting methods are referred as narrow row (NR) if the row-to-row spacing is less than 75 cm and ultra-narrow-row (UNR) if the spacing is less than 45 cm. Generally wider row-to-row spacing is followed in deep soils and irrigated farms and ultra-narrow row spacing in rainfed conditions.

HDPS is more relevant to India to establish sustainable production systems. Cotton is cultivated under rain-fed conditions in 60.0% area in India. Productivity of cotton in these regions is low. Protective and supplemental irrigations are rarely available in rainfed conditions. Water and nutrient requirement during peak boll formation phase are most critical for high yields. Rainfall starts in June and recedes in September in majority of the rainfed cotton zones. Boll formation in long duration varieties and hybrids starts in October after and reaches a peak in November. Boll formation and retention get negatively affected due to low soil moisture, especially in shallow soils thus resulting in low yields.

Soils with very low moisture retention capacity have been found to produce low yields in long duration cotton varieties/hybrids. On such soils, high density planting system with short duration varieties is an approach for improving productivity in rainfed region. Early maturing compact plant types with shorter sympodia have been identified by CICR and efforts are being made to lay foundation for a new system of compact varieties for yield enhancement especially in rainfed regions of the country. Doubling the National average yields to 1000 kg lint per hectare should not be very difficult with the new systems.

CAI Organised 2nd Training Programme on 'Fire Insurance' under 'Learn with CAI' Series

The second programme of the year under 'Learn with CAI' series was organised by CAI on Saturday, the 31st August 2013 on "Fire Insurance" in the Conference Room of the Association.

Shri Kunal Thakkar, welcomed the participants and briefly introduced the course faculty Shri R. Ganatra.

Shri Ganatra guided the praticipants about basics of fire insurance including insurance of profits, fire policy coverage and standard fire and special perils policy, etc.

The programme concluded with a question-answer session and quiz contest. Shri Dhiren N. Sheth, President, CAI interacted with the participants.

Shri R. Ganatra was welcomed with a Bouquet of Flowers by one of the participants

Shri Kunal Thakkar addressing the participants

Shri Dhiren N. Sheth, President, CAI interacting with the participants.

A cross section of participants

Support Price for Cotton Season 2013-14

Sr.No.	CLASSES OF COTTON	Fibre Quality Parameters		Minimum Support Price (MSP) for 2013-14	Names of the indicative varieties used by the Trade
		Basic Staple Length	Micronaire Value		
(I)	(II)	(III)	(IV)	(V)	(VI)
	Short Staple (20 mm & below)				
1		-	7.0-8.0	3200 (3100)	Assam Comilla
2		-	6.8-7.2	3200 (3100)	Bengal Deshi
	Medium Staple (20.5 mm – 24.5 mm)				
3		21.5 -23.5	4.8-5.8	3450 (3400)	Jayadhar
4		21.5 -23.5	4.2-6.0	3500 (3350)	V-797/ G.Cot.13/G.Cot.
5		23.5 -24.5	3.4-5.5	3550 (3450)	AK/Y-1(Mah&M.P.) / MCU-7(TN)/SVPR-2 (TN)/PCO-2(AP& Kar)/ K-11(TN)
	Medium Long Staple (25.0 mm – 27.0 mm)				
6		24.5-25.5	4.3-5.1	3700 (3600)	J-34(Raj)
7		26.0-26.5	3.4-4.9	3800 (3700)	LRA-5166/KC-2(TN)
8		26.5-27.0	3.8-4.8	3850 (3750)	F-414/H-777/J-34 Hybrid
	Long Staple (27.5 mm – 32.0 mm)				
9		27.5-28.5	4.0-4.8	3900 (3800)	F-414/H-777/J-34 Hybrid
10		27.5-28.5	3.5-4.7	3900 (3800)	H-4/H-6/MECH/RCH-2
11		27.5-29.0	3.6-4.8	3950 (3850)	Shankar-6/10
12		29.5-30.5	3.5-4.3	4000 (3900)	Bunny/Brahma
	Extra Long Staple (32.5 mm & above)				
13		32.5 - 33.5	3.2-4.3	4200 (4100)	MCU-5/Surabhi
14		34.0 - 36.0	3.0-3.5	4400 (4300)	DCH-32
15		37.0 - 39.0	3.2-3.6	5200 (5100)	Suvin

Note: Figures in brackets of 2012-13 prices

(Source: O/o. the Textile Commissioner, Mumbai - Order No.1/20/2013-14/Cotton/MSP dt.4th Sept.2013)

ICAC'S Cotton This Month

As per the latest Press Release of September 3, 2013 of International Cotton Advisory Committee (ICAC), the Cotlook A Index and the price of polyester in China were essentially equal during most of the 2000s, with cotton sometimes the cheaper of the two. The price series diverged in 2009/10, and it appears that 2013/14 will be the fifth consecutive season in which cotton prices will be substantially above polyester prices in the largest cotton spinning market in the world.

During August 2013, the Cotlook A Index averaged approximately 93 cents per pound, while polyester in China averaged approximately 76 cents. In a high-volume, low-margin business like yarn spinning, a cost difference of 17 cents per pound of fiber is enormous, and cotton will continue to lose market share this season. Cotton's share of world apparel fiber use is estimated at 31%, down from 40% in the 2000s and 50% in the 1980s.

Despite the loss of market share, world cotton consumption is rising in absolute terms and is estimated at 23.7 million tons in 2013/14. The value of world cotton mill use, calculated using the Cotlook A Index, is expected to rise from $45 billion to more than $50 billion.

Not surprisingly with the differential between cotton and polyester prices in China, mill use of cotton in China is falling. Nevertheless, mill use in most other countries is either stable or rising. The cotton procurement policy in China, which keeps the price of cotton above the price of polyester, is encouraging a significant shift in the location of mill use to other countries.

World cotton production is estimated at 25.6 million tons in 2013/14, down 3.5% from last season and 2.3 million tons below the record production achieved in 2011/12. Production in China and Uzbekistan are projected to remain unchanged in 2013/14, while small increases are expected in India, Pakistan and Brazil. The United States will account for most of the decline in world production, with U.S. production falling 900,000 tons, or 25%, to 2.8 million tons. U.S. harvested area is falling 18% mostly because of competition with maize and soybeans, and the U.S. yield is forecast down 8%.

World trade in cotton is forecast to decline by approximately a million tons to less than 9 million, with essentially the entire decline accounted for by reduced imports by China. Shipments from all major exporters save the CFA zone are expected to fall; producers in the CFA zone are increasing production in 2013/14, and thus exports, in response to higher cotton prices.

World ending stocks are forecast to climb to 19 million tons by July 2014, more than 80% of world mill use.

The forecast for the season average Cotlook A Index in 2013/14 ranges from 85 to 126 cents per pound, with a midpoint of 103 cents per pound. Since August 1, 2013, estimates of mill use in India and Pakistan during 2011/12, 2012/13 and 2013/14 have been lowered, resulting in higher estimates of ending stocks and a reduction in the forecast of the Cotlook A Index.

(Source : ICAC Monthly September 2013)

Weekly Percent Departures of Rainfall - Monsoon 2013

LEG EXCESS NORMAL DEFICIENT SCANTY NO RAIN

S. No.	WEEKS ENDING ON ---> / MET. SUBDIVISIONS	07 AUG 2013	14 AUG 2013	21 AUG 2013	28 AUG 2013	4 SEPT 2013
1.	ORISSA	-40%	-29%	21%	-69%	-46%
2.	HAR. CHD & DELHI	-4%	-12%	68%	-71%	-79%
3.	PUNJAB	16%	-39%	202%	-78%	-65%
4.	WEST RAJASTHAN	18%	142%	170%	-89%	-100%
	EAST RAJASTHAN	27%	93%	22%	-29%	-96%
5.	WEST MADHYA PRADESH	39%	43%	4%	128%	-80%
	EAST MADHYA PRADESH	-44%	31%	62%	65%	-39%
6.	GUJARAT REGION	38%	18%	-47%	-51%	-94%
7.	MADHYA MAHARASHTRA	28%	-20%	-53%	-35%	-91%
	MARATHWADA	54%	-9%	-50%	-64%	-95%
	VIDARBHA	75%	-28%	14%	-17%	-92%
8.	COASTAL ANDHRA PRADESH	-7%	-28%	69%	-87%	-26%
	TELANGANA	32%	-44%	91%	-72%	-48%
	RAYALASEEMA	-7%	4%	51%	-85%	164%
9.	TAMILNADU & PONDICHERRY	4%	103%	25%	-75%	125%
10.	COASTAL KARNATAKA	15%	-47%	30%	-34%	-75%
	N. I. KARNATAKA	-14%	-59%	8%	-73%	-4%
	S. I. KARNATAKA	60%	-38%	-10%	-46%	77%

Note: Rainfall Statistics given above is based on real time data receipt and is subject to be updated
(Source: India Meteorological Department)

SUPPLY AND DISTRIBUTION OF COTTON

September 03, 2013

Seasons begin on August 1 — Million Metric Tons

	2008/09	2009/10	2010/11	2011/12 Est.	2012/13 Proj.	2013/14 Proj.
BEGINNING STOCKS						
WORLD TOTAL	12.257	11.942	8.676	9.580	14.58	17.40
China (Mainland)	3.321	3.585	2.688	2.087	6.18	9.41
USA	2.188	1.380	0.642	0.566	0.73	0.89
PRODUCTION						
WORLD TOTAL	**23.503**	**22.247**	**25.368**	**27.810**	**26.48**	**25.55**
China (Mainland)	8.025	6.925	6.400	7.400	7.30	7.28
India	4.930	5.185	5.865	6.345	6.05	6.23
USA	2.790	2.654	3.942	3.391	3.77	2.84
Brazil	1.214	1.194	1.960	1.877	1.28	2.15
Pakistan	1.926	2.070	1.907	2.294	2.09	1.43
Uzbekistan	1.000	0.850	0.910	0.880	1.00	1.00
Others	3.617	3.369	4.385	5.623	4.99	4.61
CONSUMPTION*						
WORLD TOTAL	**23.862**	**25.520**	**24.502**	**22.740**	**23.51**	**23.72**
China (Mainland)	9.265	10.192	9.580	8.635	8.29	8.04
India	3.872	4.300	4.509	4.340	4.81	5.02
Pakistan	2.519	2.393	2.100	2.163	2.44	2.49
East Asia & Australia	1.714	1.892	1.796	1.646	1.86	1.92
Europe & Turkey	1.458	1.600	1.549	1.495	1.51	1.55
Brazil	1.000	1.024	0.958	0.888	0.89	0.91
USA	0.771	0.773	0.849	0.718	0.75	0.76
CIS	0.596	0.604	0.577	0.550	0.58	0.60
Others	2.666	2.743	2.583	2.305	2.38	2.43
EXPORTS						
WORLD TOTAL	**6.609**	**7.798**	**7.636**	**9.843**	**9.79**	**8.80**
USA	2.887	2.621	3.130	2.526	2.86	2.31
India	0.515	1.420	1.085	2.159	1.62	1.43
Brazil	0.596	0.433	0.435	1.043	0.94	0.81
Australia	0.261	0.460	0.545	1.010	1.10	1.00
CFA Zone	0.469	0.560	0.476	0.592	0.77	0.95
Uzbekistan	0.650	0.820	0.600	0.550	0.65	0.65
IMPORTS						
WORLD TOTAL	**6.647**	**7.928**	**7.725**	**9.761**	**9.65**	**8.80**
China	1.523	2.374	2.609	5.342	4.24	3.17
East Asia & Australia	1.714	1.989	1.825	1.998	2.23	2.19
Europe & Turkey	0.862	1.170	0.972	0.725	1.02	1.13
Pakistan	0.417	0.342	0.314	0.173	0.46	0.43
CIS	0.231	0.209	0.132	0.098	0.09	0.08
TRADE IMBALANCE 1/	**0.038**	**0.130**	**0.089**	**-0.082**	**-0.15**	**0.00**
STOCK ADJUSTMENT 2/	**0.007**	**-0.122**	**-0.051**	**0.013**	**0.00**	**0.00**
ENDING STOCKS						
WORLD TOTAL	**11.942**	**8.676**	**9.580**	**14.580**	**17.40**	**19.22**
China (Mainland)	3.585	2.688	2.087	6.181	9.41	11.80
USA	1.380	0.642	0.566	0.729	0.89	0.67
ENDING STOCKS/MILL USE (%)						
WORLD-LESS-CHINA(M) 3/	**57**	**39**	**50**	**60**	**53**	**47**
CHINA (MAINLAND) 4/	**39**	**26**	**22**	**72**	**113**	**147**
Cotlook A Index 5/	**61.20**	**77.54**	**164.26**	**100.01**	**87.98**	

1/ The inclusion of linters and waste, changes in weight during transit, differences in reporting period and measurement error account for difference between world imports and exports.

2/ Difference between calculated stocks and actual; amounts for forward seasons are anticipated.

3/ World-less-China's ending stocks divided by World-less-China's mill use, multiplied by 100.

4/ China's ending stocks divided by China's mill use, multiplied by 100.

5/ U.S. Cents per pound

(Source : ICAC Monthly September 2013)

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]							Spot Rate (Upcountry) 2012-13 Crop SEPTEMBER 2013					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	2nd	3rd	4th	5th	6th	7th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0 – 7.0	15	11304 (40200)	11248 (40000)	11220 (39900)	11079 (39400)	11079 (39400)	11079 (39400)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0 – 7.0	15	11445 (40700)	11389 (40500)	11360 (40400)	11220 (39900)	11220 (39900)	11220 (39900)
3	GUJ	ICS-102	Fine	22mm	4.0 – 6.0	20	8717 (31000)	8717 (31000)	8661 (30800)	8577 (30500)	8520 (30300)	8464 (30100)
4	KAR	ICS-103	Fine	23mm	4.0 – 5.5	21	9842 (35000)	9842 (35000)	9786 (34800)	9701 (34500)	9645 (34300)	9589 (34100)
5	M/M	ICS-104	Fine	24mm	4.0 – 5.5	23	11389 (40500)	11417 (40600)	11417 (40600)	11332 (40300)	11276 (40100)	11220 (39900)
6	P/H/R	ICS-202	Fine	26mm	3.5 – 4.9	26	12626 (44900)	12626 (44900)	12626 (44900)	12541 (44600)	12345 (43900)	12204 (43400)
7	M/M/A	ICS-105	Fine	26mm	3.0 – 3.4	25	12851 (45700)	12879 (45800)	12879 (45800)	12795 (45500)	12738 (45300)	12682 (45100)
8	M/M/A	ICS-105	Fine	26mm	3.5 – 4.9	25	12991 (46200)	13020 (46300)	13020 (46300)	12935 (46000)	12879 (45800)	12823 (45600)
9	P/H/R	ICS-105	Fine	27mm	3.5 – 4.9	26	13076 (46500)	13020 (46300)	12963 (46100)	12851 (45700)	12654 (45000)	12513 (44500)
10	M/M/A	ICS-105	Fine	27mm	3.0 – 3.4	26	13188 (46900)	13216 (47000)	13216 (47000)	13132 (46700)	13076 (46500)	13020 (46300)
11	M/M/A	ICS-105	Fine	27mm	3.5 – 4.9	26	13328 (47400)	13357 (47500)	13357 (47500)	13273 (47200)	13216 (47000)	13160 (46800)
12	P/H/R	ICS-105	Fine	28mm	3.5 – 4.9	27	13244 (47100)	13188 (46900)	13104 (46600)	12963 (46100)	12795 (45500)	12654 (45000)
13	M/M/A	ICS-105	Fine	28mm	3.5 – 4.9	27	13751 (48900)	13779 (49000)	13723 (48800)	13638 (48500)	13582 (48300)	13526 (48100)
14	GUJ	ICS-105	Fine	28mm	3.5 – 4.9	27	13638 (48500)	13666 (48600)	13666 (48600)	13582 (48300)	13554 (48200)	13498 (48000)
15	M/M/A/K	ICS-105	Fine	29mm	3.5 – 4.9	28	13835 (49200)	13863 (49300)	13863 (49300)	13779 (49000)	13723 (48800)	13666 (48600)
16	GUJ	ICS-105	Fine	29mm	3.5 – 4.9	28	13723 (48800)	13751 (48900)	13751 (48900)	13666 (48600)	13638 (48500)	13582 (48300)
17	M/M/ A/K	ICS-105	Fine	30mm	3.5 – 4.9	29	13835 (49200)	13863 (49300)	13863 (49300)	13779 (49000)	13751 (48900)	13694 (48700)
18	M/M/A/ K/T/O	ICS-105	Fine	31mm	3.5 – 4.9	30	13976 (49700)	14004 (49800)	14004 (49800)	13919 (49500)	13863 (49300)	13807 (49100)
19	K/A/T/O	ICS-106	Fine	32mm	3.5 – 4.9	31	14201 (50500)	14257 (50700)	14257 (50700)	14172 (50400)	14116 (50200)	14060 (50000)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0 - 3.8	33	15888 (56500)	16028 (57000)	16169 (57500)	16169 (57500)	16169 (57500)	16169 (57500)

(Note: Figures in bracket indicate prices in Rs./Candy)