

All India Coordinated Cotton Improvement Projects

PROJECT COORDINATOR'S REPORT: 2002-03

Introduction

The last cotton production season in the country ended up with 16% reduction in total area and reduction in production by 11.4% from that of last year. However, the productivity was 322 kg lint/ha during this year. The price of cotton fiber ruled the roost in the world by being scarce over the demand and hence the growers in crop in less favorable environment due to severe drought in several cotton-growing states during 2002-03 season.

Analysis of the lint productivity over the last decade shows that we have set into stagnation (Fig.1). The current stagnation in production as well as productivity are some concern for us. While the industry's demand for raw material has been fairly met, albeit abiotic constraints in production, I am happy to note that various frontier scientific technologies have been in operation, in cotton production and processing in our country. What is now anticipated is if we can reduce cost of cultivation in small and medium farms with these genetically modified seeds.

The spokespersons from Textile industry have been consistently demanding extensive revamping of fibre production system. The Textile Ministry also have been providing a good feedback to determine the cause of various programmes of cotton production in Ministry of Agriculture. We launched Technology Mission on Cotton (TMC) in the year 2000. After two years, I am confident that the essential fibre requirements of the industry could be met from the outcome of the R&D that has come out of TMC so as to sharpen our capabilities to achieve goals of fibre production.

The debates generated out of growing concern in industry regarding the production of quality fibre have to be viewed as triggers to enhance internal churning of ideas to achieve this end. We need to produce smart ideas to deftly execute these into workable plans for each zone.

As a commercial commodity, the paradigm of market-driven production system has to be emphasised. The post-harvest handling and marketing should provide enough advantages for the farmer to what they think would be fruitful for production of quality raw material. If the farmer is the beginning of production chain of this strategic raw material of our country, let us patronise the economical production of the best in quality and quantity fibre.

As a dryland crop, it has allowed subsistence as well as the destiny of small and marginal farmers over decades. The cotton hybrids have swelled up in acreage in this region, enabling enhanced productivity. Over the last few years, the extensive presence of private

R&D houses in bringing out most of these hybrids is significant. Much R&D effort is in progress to emancipate diploid cotton and a GMS hybrid from private R&D has since been released this year. This is a great breakthrough since these 'desi' hybrids could offer better solution in managing both biotic and abiotic stresses to yield good quality fibre for the industry.

This is the first year of commercial cultivation of genetically modified cotton by the introduction of **three MECH hybrids (12 in 271 .6 ha, 162 in 18,964 ha & 184 in 9837.2 ha)** of M/S Maharashtra Hybrid Seed Company with B.t. delta-endotoxin expressing gene for bollworm resistance. **The total area under these hybrids was 29,072.8 hectares.**

The Breeders Conclave that was convened on 3rd February was another major event of the year to evaluate the status of breeding materials in various centres that have good tolerance to leaf hoppers and possess good fibre quality as per CIRCOT norms. These materials could be only promoted under AICCIP. The materials emanating from MM-I projects would be taken on a fast-track mode through AICCIP evaluations.

Supply & demand position of cotton lint in the country

The opening stock of 40 lakh bales ensured the steady supply for consumption and while this year's production is estimated around 140 lakh bales. These may be import of 16 lakh bales of fibre to make it to 196 lakh bales. The demand from the mill and non-mill consumers would be around 174 lakh bales. A closing stock as on March shall be 22 lakh bales, based on the assessment of Cotton Advisory Board (CAB) in March 2K3.

World cotton scenario

There was a fall in production by 1.89 million tones of the fiber in the last season due to adverse climate condition and reduction in planting area by 3.37 million hectares. The reduction in area is attributed both to the adverse climate and low process of last year. The production estimates have been reported to be lower in 14 out of 15 large producers. But there shall be only marginal fall in production from 21.09 to 19.20 million tonnes, as estimated today. As is naturally expected, there shall be an increase in area next season due to the higher price this year.

Table:1 World cotton production

Country	Area (m. ha)		Production (m.MT)		Productivity (kg/ha)	
	2002	2003	2002	2003	2002	2003
China	4.82	4.30	5.31	4.55	1089	1058
USA	5.59	5.26	4.37	3.99	708	758
India	8.74	7.39*	2.57	2.38*	292	322
Pakistan	3.13	2.83	1.70	1.74	610	615
Others	11.70	10.83	7.14	6.54	610	604
Total	33.98	30.61	21.09	19.20	621	627

* estimates

The decade analysis of the area, production and productivity of our country are given in Table: 2,3 & 4 below.

Table:2 State-wise cotton area (Lakh hectares) during the last ten years

State	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03
Punjab	7.01	6.06	7.50	7.42	7.02	5.47	4.75	5.50	6.00	4.25
Haryana	4.90	5.52	6.46	6.49	6.55	5.87	5.10	5.80	6.10	5.35
Rajasthan	4.55	4.61	6.06	6.54	5.80	6.38	4.64	4.82	3.47	3.35
Gujarat	9.21	13.28	14.10	15.24	14.58	16.97	15.16	15.78	16.87	14.98
Maharashtra	27.30	27.60	30.70	30.90	31.00	31.99	32.53	27.93	29.80	26.17
Madhya Pradesh	6.08	5.75	5.37	5.27	5.48	5.32	5.41	5.57	6.23	5.50
Andhra Pradesh	6.55	7.28	10.57	10.07	8.50	10.03	9.09	8.87	10.02	9.00
Karnataka	5.96	5.96	6.74	6.68	6.00	6.09	5.29	5.35	5.11	3.62
Tamil Nadu	2.39	2.72	2.65	2.60	2.65	2.20	2.50	1.33	1.60	1.15
Others	0.45	0.43	0.53	0.50	0.50	0.80	0.81	0.53	0.73	0.53
Total	74.40	79.21	90.68	91.71	88.08	91.12	85.28	81.48	85.93	73.90

* CAB Estimate of March 2K3

Table:3 State-wise cotton production (Lakh bales) during the last ten years

State	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03
Punjab	13.96	14.50	14.35	16.00	7.50	5.50	9.50	11.50	9.25	8.00
Haryana	9.88	11.54	11.30	13.50	9.00	7.50	11.00	11.50	5.50	8.50
Rajasthan	11.11	9.92	13.75	14.00	11.50	12.00	12.50	11.50	7.00	5.00
Gujarat	19.76	26.59	31.25	34.25	42.00	45.00	35.00	27.00	32.50	31.00
Maharashtra	14.65	15.84	28.75	33.00	20.50	25.00	38.00	24.00	34.25	26.00
Madhya Pradesh	14.21	15.85	14.25	18.75	23.00	20.00	15.00	17.50	20.00	17.00
Andhra Pradesh	24.55	28.36	27.35	26.50	24.75	25.00	23.00	26.09	26.75	21.50
Karnataka	8.41	9.30	9.50	9.00	7.50	8.50	8.00	9.00	7.00	6.50
Tamil Nadu	5.72	6.00	5.00	5.50	5.50	5.50	5.50	5.50	5.00	4.00
Others	1.00	1.00	1.00	1.00	1.00	1.25	1.50	1.50	0.75	1.00
Loose supply	-	-	-	5.00	5.75	6.25	8.00	8.00	10.00	11.50
Total	123.3	138.9	156.5	176.5	158.0	161.5	167.0	153.00	158.00	140.00

* CAB Estimate of March 2K3

Table:4 State-wise cotton productivity (kg lint/ha) during the last ten years

State	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03
Punjab	339	407	325	367	182	171	340	355	255	320
Haryana	343	355	297	353	234	217	367	337	181	270
Rajasthan	415	366	386	364	337	320	458	406	318	253
Gujarat	365	340	377	382	490	451	392	290	342	351
Maharashtra	91	98	159	182	112	133	199	145	194	169
Madhya Pradesh	397	469	451	605	714	639	471	534	409	525
Andhra Pradesh	637	662	440	447	495	424	430	498	458	406
Karnataka	240	265	240	229	213	237	257	286	266	305
Tamil Nadu	407	375	321	360	353	425	374	703	584	591
MEAN	281	298	293	327	305	266	333	319	309	322

* CAB Estimate of March 2K3

**Table:5 Mean cotton area, production and productivity for the last five years
(1997-98 to 2K2-2K3)**

State	Area (Lakh ha)	Production (Lakh bales)	Productivity (kg/ha)
Punjab	5.26	8.9	291
Haryana	5.79	13.3	390
Rajasthan	4.53	9.8	366
Gujarat	16.33	34.8	362
Maharashtra	29.68	30.8	177
Madhya Pradesh	5.59	16.9	516
Andhra Pradesh	9.4	26.62	445
Karnataka	5.17	7.9	260
Tamil Nadu	1.92	5.6	519

Season & Climate

The cotton season got influenced during 2K3 of severe drought especially in western and southern region of the country. The north zone had mixed intensity and distribution of rainfall. At Faridkot, there was adequate rain in August and September, when the boll maturation was due. However, in Sirsa, the rainfall was quite scanty after July. In southern Rajasthan, the gap in rainfall in July and reduced rainfall and rainy days of August and September adversely affected cotton production. Central zone, generally, experienced rain-gap in July critically affected the growth and flowering of the crop. Similar situation prevailed in rainfed districts of Karnataka and Andhra Pradesh.

Consequence of this was that the area fell down by 16% in the country with a break up of 15% in north, 11% in central and 22% in south zones. The production was reduced by 14%.

The weather conditions shows that there has been a fall in rainfall during the beginning and mid-season in most locations of central and south zones. The number of rainy days of each month when rains were received also were less than 5-7 days; 20 to 300 mm rainfall was experienced in this time interval. There was chance for more of run off than sub-surface percolation. The cotton growing tracts of rainfed area were benefited in those farms where water harvesting techniques were adopted. Madhya Pradesh, some parts of Maharashtra and Gujarat led the way in this regard. States such as Andhra Pradesh and Karnataka could emulate these for effective water management in this cash crop.

Pest and diseases

The adverse season did not only bad to crop, but also to major cotton pests. The reduced effect of depredation due to pests, particularly of bollworms, made the productivity stable in spite of adverse climatic conditions. The hope offered by the introduction of four genetically modified hybrids to reduce the lepidopteran pests was a positive attitude to many farmers who took to these. There has been, however, a mixed reaction to their

performance in the 6 states where these were cultivated. The ultimate message seems that the new GM hybrids should be agronomically adapted to the region where it shall be introduced.

Evidently, under the low pest pressure, the consumption of pesticides also fell. This is a major advantage the farmer received enabling him to reduce the cost of cultivation, in a year when hope for a good harvest was bleak. Late season damage due to Pink bollworm was seen in central and south zones. Farmers did not take up any measures for their management. In the absence of other species of bollworms, the evident dominance of Pink bollworm was seen. Another alarm was the increased aphid infestation in the winter months in central and some states of south zone. A new report from CICR, Nagpur about the minor incidence of Sesbania borer, *Azygophleps scalaris* Fab., making the affected cotton plants to wilt, was noticed in central India, mainly due to prolonged dry conditions.

There was no major crop loss due to the Cotton leaf curl virus in northern states. The damage due to other diseases was very low.

Cost of Cultivation

There has been a reduction in cost of cultivation, mainly due to the reduction in pest incidence and damage during 2K2-2K3. The cotton cultivators have taken advantage of the dry conditions to harvest good quality cotton. The late-season aphid infestation did not adversely affect the quality of crop harvest.

Quality of Indian Cotton

The country is emerging as a major yarn exporter and has utilized the cotton stocks for this purpose. The current quality of cotton that was harvested in this season is able to meet the existing demands of processors.

Meanwhile Central Institute for Research of Cotton Technology (CIRCOT), Mumbai has specified the fibre quality norms upon which the breeders have been given the guidelines that the country's need for 40s and 50s count cotton is the maximum. For the modern spinning technology the accent on strength to length ratio shall be 0.8 and above, particularly, in this category of lint. The fact that many processors are under-spinning longer staples so as to achieve desirable strength gives thought provoking issues on the wastage of raw material in the absence of such raw material that has good strength to length ratio. It seems to be ideal if a dialogue to delineate prevailing cotton demand in each count-group, with specified strength requirement between spinners and cotton breeders in the country shall be facilitated by CIRCOT in 2003.

Private sector participation

It is very interesting to note that more than 45 private seed companies, that have recognition of the Department of Science and Industrial Research under Ministry of

Science and Technology, have been offering their hybrids for national trials and those that are qualifying to be forwarded are entering the respective AICCIP trials. These companies also have now to take cognizance of the CIRCOT norms, while entering in the AICCIP trials in order to unify process of development of raw material for the industry in addition to tolerance/ resistance to pests and diseases that are prevalent in each zone to which they target their genotypes. This opening up for the AICCIP participation by private R&D houses has led to awareness about the raw material's quality requirement. It also encouraged them to weed out those untested hybrids that were widely marketed. They could maintain a good vigil on the marketing of spurious seeds and F₂s by taking recourse of appropriate measures, available in the country.

In the evolution of methods for undertaking trials, refinements are being brought in to seek accuracy of result and better methodologies of experimentation. The private R&D houses have to gear up for these changes, especially in the conduct of the trails with the onus of developing accurate results. Strong monitoring measures are being placed to see that there is a reduction in inaccurate trials.

Release proposals for varietal identification

The following list of varieties/hybrids have been released and notified during 2002-03 by the Central Varietal Release Committee.

Name of variety/hybrid	Species	States for which released	Sponsor breeder
Swadeshi-1 (ADCH.1)	Gossypium arboreum	Central zone states	M/S Ankur seeds, Nagpur
Mallika (NCS.207)	Gossypium hirsutum	South zone states	M/S Nuziveedu seeds Pvt.Ltd., Guntur

The proposals for state release was F.1861 for Punjab, JK.4 for Madhya Pradesh, and in Gujarat, F.cot.10, G.cot hy.102, G.cot. MDH.11, G.cot.Hy.10, G.cot.23 and VICH.5 were accepted by the Central Sub-committee on Crop Standards, Notification & Releases of Varieties for Agriculture Crops.

Testing of Bt cotton hybrids

The season witnessed the testing of MECH.915 of M/S Maharashtra Hybrid Seed Company of in nine centres north zone, at the request of Department of Biotechnology.

M/S Rasi Seed Company came up with 5 hybrids for central zone (2 centres) and three for south zone (three centres) under ICAR-AICCIP trial.

The reports of these have since been complied and submitted for further necessary action.

The country grew three MECH Bt delta endotoxin transformed cotton hybrids, viz., 12,162 and 184 of M/S Maharashtra Hybrid Seed Company in 29072.8 ha of central and south zones.

Linkages with other Research efforts

The Mini Mission-I of Technology Mission on Cotton operated 23 projects across 8 programmes during last year in the 28 centres. During last year, there were 4 Mission-Mode Projects, seven projects for Production System Research under irrigated ecosystem, 13 projects under Rainfed Cotton Production System, one under Coastal agro-ecosystem and one Competitive Grant project. In addition, some ICAR Ad- hoc Projects were also being pursued.

Breeder seed production

Breeder seed production was undertaken in the AICCIP during the 2K2-2K3 season. The incentives from Mini Mission II of Technology Mission on Cotton for the production and supply of breeder seed was Rs.10 lakhs and was distributed to all centre who were involved in breeder seed production. As the following table provides the details about the breeder seed production of various varieties and hybrids, the total indent was for 90.85 quintals while 130.90 quintals have been produced. The indent for 2K3-2k4 is 90.23 quintals.

Status of Breeder's Seed indent and Production

Sl.No.	CULTIVAR	INSTITUTION	2002-03		Indent for 2003-04
			Indent	Production	
1	AAH.1	CCS HAU, Hisar			
	Female	-do-	-	-	0.10
	Male	-do-	-	-	0.04
2	F 505	PAU, Punjab	3.51	2.00	1.91
3	F 846	-do-	6.83	3.50	5.03
4	F 1054	-do-	-	-	0.71
5	LH 900	-do-	0.16	3.00	1.41
6	LH 1556	-do-	2.00	13.00	3.55
7	F 1378	-do-	1.00	4.00	3.31
8	LD 327	-do-	3.00	4.00	2.96
9	HS 6	CCS HAU, Hisar	4.38	4.40	3.77
10	HS 182	-do-	-	-	0.65
11	H 1098	-do-	3.30	6.00	2.34
12	H 777	-do-	1.78	4.70	1.97
13	H 1117	-do-	-	-	1.12
14	HD 123	-do-	0.10	16.80	1.38
15	HD 107	-do-	0.10	0.10	-
16	BN	RAU, Sriganganagar	2.27	3.00	1.50
17	RST 9	-do-	12.26	6.00	7.71
18	RS 875	-do-	2.05	3.00	0.60
19	RS 810	-do-	9.31	3.00	9.90
20	RG 8	-do-	16.12	13.00	18.12
21	RS 18	-do-	4.15	3.40	3.30
22	RS 2013	-do-	-	-	3.15

23	Pusa 8-6	IARI, New Delhi	0.30	NA	0.30
24	VIKAS	CSAUAT, Kanpur	1.00	1.00	1.00
25	JK Hy.1	JNKVV, Khandwa			
	K2 MB (F)	-do-	0.20	0.20	0.02
	REBA B50(M)	-do-	0.13	0.15	0.01
26	VIKRAM		0.20	1.50	0.20
27	KHANDWA 2	-do-	0.30	-	0.30
28	G.Cot.Hy.8	GAU, Surat			
	G.Cot.10 (F)	-do-	0.21	1.00	0.06
	Surat Dwarf(M)	-do-	0.33	5.60	0.30
29	G.Cot.Hy 10	-do-			
	BC 68-2 (F)	-do-	0.45	1.50	-
	LRA 5166 (SB)	-do-	0.31	4.10	-
30	G.Cot Hy.6	-do-			
	G.Cot.100 (F)	-do-	0.20	1.00	0.04
	G.Cot.10 (M)	-do-	0.45	1.10	0.01
31	NHH 44	MAU,Nanded			
	BN.1 (F)	-do-	0.84	2.00	0.15
	AC 738 (M)	-do-	0.52	-	0.09
32	Renuka	-do-	-	-	0.50
33	PKV.Hy.2	PDKV, Akola			
	AK 32 (F)	-do-	0.32	0.00	0.08
	DHY 286 (M)	-do-	0.16	0.18	0.04
34	AKA 7	-do-	-	-	1.00
35	AKA 5	-do-	-	-	0.50
36	AKA 84635	-do-	-	-	2.05
37	Y-1	MPKV, Rahuri	0.27	0.20	-
38	Varalaxmi	UAS, Dharwad			
	Laxmi	-do-	0.36	1.00	0.16
	SB 289 E	-do-	0.23	1.00	0.08
39	DCH 32	-do-			
	DS 28 (F)	-do-	0.85	1.50	0.34
	SB 425 YF (M)	-do-	0.52	1.00	0.18
40	DHH 11	-do-			
	CPD 423 (F)	-do-	0.03	0.47	0.03
	CPD 420 (M)	-do-	0.03	0.17	0.03
41	Narasimha	Lam, Guntur	1.45	4.00	0.51
42	MCU 5	TNAU, Coimbatore	0.15	0.20	0.30
43	MCU 7	-do-	-	-	0.66
44	Savita	CICR, Ciombatore			
	T7 (F)	-do-	0.38	0.75	0.06
	M 12 (M)	-do-	0.21	0.50	0.06
45	LRA 5166	-do-	2.99	3.52	2.30
46	Anjali	-do-	2.07	1.00	1.46
47	Supriya	-do-	1.00	1.00	1.08
48	Surabhi	-do-	0.71	1.00	0.91
49	MCU 5VT	-do-	1.36	1.36	1.26
		Total	90.85	130.90	90.23

Transfer of Technology – FRONT LINE DEMONSTRATION IN COTTON

Front line demonstration were undertaken in 4 northern centres, 6 central zones centres and three south zone centres (13 centres). The integrated nutrient and pest management concepts were the mainstay of these programmes in addition to demonstration of high yielding varieties/hybrids. The following table provides the abstract information about the demonstration of high yielding variety/hybrid.

The All India Coordinated Cotton Improvement Project (AICCIP) acted as the Nodal Agency for conducting the cotton Front Line Demonstration programme in the country. **The Project Coordinator (Cotton)** coordinates and monitors the implementation of the FLD Programme with headquarters at the **Central Institute for Cotton Research, Regional Station, Coimbatore**. The FLDs were organized through fourteen centres of the AICCIP network spread over ten cotton-growing states including C.I.C.R, Nagpur.

The Ministry of Agriculture and Cooperation, Government of India sanctioned **Rs.25 lakhs** for organizing **500** Front Line Demonstration in all the cotton growing states of the country during the cropping season of **2002-2003**. In the North zone, 90 FLDs in PAU, HAU, CICR, Sirsa and MPUAT, Banswara were conducted. In the Central Zone, 235 FLDs in GAU, JNKVV, PDKV, MAU, MPKV, OUAT, CICR, Nagpur were done. In South zone, 115 FLDs were organized by ANGRAU, UAS and TNAU. The details are given elsewhere in this report.

Linkages with other Ministries, departments and user agencies

The issue of multiplicity of varieties and contamination of cotton fiber was actively discussed in various for a including the CAB meetings. The Committee that was constituted by CAB for identifying the cotton cultivars to be recommended for denotification submitted its report. The directorate of cotton development of Ministry of Agriculture discussed this and it was suggested by the Project Coordinator that the ICDP funding through TMC Mini Mission II shall be only to those whose Breeders seed is produced. This is based on the fact that these are the only cultivars that have a stable and official demand for large scale cultivation in every zone. The AICCIP had intimate interaction with MINI MISSION III & IV of TMC. It was in constant touch with Indian Cotton Mills Federation, East India Cotton Association, Prominent ginner and trading organizations, oilseed crusher's Association, Marketing Federations etc.

General Policy issues

Trading after pros- harvest processing: The problems related to current marketing and availability of quality cotton shall be addressed by introducing the concept of trading only of LINT instead of seed cotton. The suitable infrastructure including ginning & pressing and transport could be planned to be developed in key cotton growing districts of the country. The other cotton growing countries have switched over to lint transactions and have successfully managed these issues.

The policy makers and traders should come together to initiate immediate action for developing marketing of lint instead of seed cotton in the coming years. This could reduce the problems related to storage, contamination and even pricing. In all forward looking countries, this cotton marketing strategy is already in operation.

The developments that have gone in the buildup of infrastructure and manpower in cotton R&D setup of SAUs and institutions from TMC would enlarge the capability to deliver better results that would satiate the domestic demand of this vital raw material for textile and non-textile sectors.
