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Agrarian Crisis – Why farmers commit suicide?

Part 1.

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

The issue of farmer suicides is very sensitive, sad and tragic. Over the past two decades, cases of farmer suicides have highlighted the growing agrarian crisis, especially in Maharashtra and Andhra Pradesh. There have been attempts to connect farmer suicides with cotton cultivation in several cotton growing states. Bt-cotton was also critically examined for its possible role in the suicides mainly across Vidarbha. I am making an attempt to understand the farmer-suicide patterns in relation to cotton cultivation, yields, profitability and Bt-cotton. A short note such as this may not be able to deeply examine and surmise the tragic trends of farmer suicides, but can certainly present preliminary insights that could trigger further analysis.

Suicides may not be due to cotton in at least nine cotton growing states

Suicides have been reported from all the eleven major cotton growing states. However, data presented in Table 1, shows that it would be improper to associate cotton with the large number of suicide cases, especially in states which have less than 4.0% of cultivated area under cotton. The suicide trends have been presented in graphs 1, 2 and 3. It must

also be mentioned here that the number of suicides in Karnataka and Madhya Pradesh are high with an average of 2100 and 1600 per year over the past 18 years in both the states respectively. But, cotton occupies 2.0 to 4.0% of the cultivated area in both these states as well as other cotton growing states such as Odisha, Tamilnadu and Rajasthan. The area under other crops is more than 96% and it is unlikely that farmers would depend only on cotton for their livelihood in these states. Therefore it may not be appropriate to link cotton with the total number of suicides in these states.

EXPERT'S Column



Dr K.R. Kranthi

Cotton occupies about 17% of the area in Haryana and 12% of the net cultivated area in Punjab. Therefore cotton cultivation has a larger economic impact in these six states. But the average number of farmer suicide cases over the past 18 years was 79 in Punjab and 204 in Haryana. Cotton economics follow very dynamic and fluctuating trends that generally have a stronger impact, especially when input costs increase, cotton market prices are low and yields start declining. With a consistently lesser average number of suicide cases in the two states, it is also not very likely that cotton crop could have influenced the suicides.

Similarly, farmer suicides have also been reported from Gujarat, albeit at a relatively lesser scale of about 500 to 600 cases each year over the past 20 years at 12 farmers per lakh farmers in the state. Graph 2, shows the patterns of farmer suicides in Gujarat and Central India. Data show that the suicides appear to be unrelated to cotton and also unaffected with any agrarian changes in the state,

Table No 1. Farmer Suicides in 2013

2013	Area in lakh hectares		cotton area %	Total Farmers Number (Lakhs)	Suicide Cases No.	Suicide rate Per lakh farmers
	Total Area	Cotton				
South India						
Andhra Pradesh + Telangana	142.93	24.0	16.8	131.75	3014	22.877
Karnataka	121.61	4.85	4.0	78.32	1403	17.914
Tamilnadu	64.88	1.28	2.0	81.18	105	1.293
Central India						
Gujarat	99.79	24.97	25.0	47.39	582	12.281
Madhya Pradesh	158.36	6.08	3.8	88.72	1090	12.286
Maharashtra	198.42	41.46	20.9	136.99	3146	22.965
Odisha	48.62	1.70	3.5	46.67	150	3.214
North India						
Haryana	36.46	6.14	16.8	16.17	374	23.129
Punjab	39.67	4.80	12.1	10.53	83	7.882
Rajasthan	211.38	4.50	2.1	68.88	292	4.239

least of all with Bt cotton. Gujarat is an important state for cotton with about 25 to 28 lakh hectares which is about 25% of the land under agriculture in the state. Though the cotton area was less than one-fourth, it has been contributing about one third of the total cotton production of the country over the past 12 years. Thus the farmer suicide cases in Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh, Karnataka, Odisha and Tamilnadu are less likely to be connected to cotton cultivation.

Farmer suicides in AP and Maharashtra are more worrisome

Cotton is cultivated in a vast area of about 42 lakh hectares in Maharashtra, which is about 21% of the total cultivated area in the state. In Andhra Pradesh + Telangana, cotton is cultivated in about 24 lakh hectares which is about 17% of the cultivated area in both states put together. The suicide rates are relatively higher at about 23 persons per one lakh farmers in Maharashtra and Andhra Pradesh + Telangana during the recent years of 2012 and 2013. The average number of suicide cases over the past 18 years is also high at 2100 per year in Andhra Pradesh and 3300 per year in Maharashtra. It is possible that farmer suicides or agrarian crisis may be associated with cotton cultivation in these states. Thus it would be logical to surmise that the issue of farmer suicides is a matter of more serious concern in the central Indian region of Maharashtra and Andhra + Telangana.

Is there any connection between yields and suicides?

Cotton yields before and after the introduction of Bt cotton are presented in Table 2. It would be pertinent to mention here that the average yields increased by 41.9% in Punjab, 56.7% in Haryana

and 24% in Rajasthan after 2005 subsequent to the introduction of Bt cotton in north India. However the yield increases were significant at 103% in Maharashtra and 79.5% in Gujarat after 2002, when Bt cotton was introduced in central and south India. After 2002, yields increased by 15% in Andhra Pradesh + Telangana, 37% in Karnataka and 65% in Tamilnadu. However, the average yields in Madhya Pradesh declined by 3.8% after the introduction of Bt cotton in the state. Thus as seen in Table 2, suicides do not appear to be influenced with the yields.

Farmer suicides in Vidarbha -are they linked to cotton?

Farmer suicides were mainly reported from Akola, Amaravati, Buldhana, Wardha, Nagpur and Yavatmal. However, the average lint yields during 1999 to 2005 were only about 150 kg/ha prior to the wide-spread adoption of Bt cotton in these districts. Productivity almost doubled to an average of 290 kg lint per hectare over the five year period 2006 to 2010 with increased adoption of Bt cotton.

Data presented in Table 3, clearly reflects the yield increases in all the Vidarbha districts. Bt cotton contributed to effective bollworm control in Vidarbha thus resulting in reduction of pesticide usage and increase in yields. Nevertheless, it must also be noted that the input costs, mainly seeds, fertilizers and labour had also increased significantly during this period. Net profitability is an important consideration. Expectations increased and input costs also increased during the period when yields increased in Vidarbha. CICR conducted surveys in Maharashtra for three years from 2006 to 2009 to understand if cotton cultivation was in any way mainly responsible for 'farmer suicides' in the state with specific focus on Vidarbha. We interviewed 720

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Table 2. Changes in yield kg/ha lint before and after Bt cotton

Yield kg/ha lint		State	% change
*Prior to Bt cotton	**With Bt cotton		
409	581	Punjab	41.93
337	528	Haryana	56.74
398	494	Rajasthan	24.10
370	664	Gujarat	79.56
152	308	Maharashtra	103.28
507	487	Madhya Pradesh	-3.86
493	570	Andhra Pradesh	15.58
255	350	Karnataka	37.01
438	722	Tamilnadu	64.90
351	369	Others	5.21

*Average yield over 7 years in north India prior to 2005

**and 7 years from 2006 to 2013 with Bt cotton. * Average yield over 11 years in central and south India prior to 2002 **and 11 years from 2003 to 2013 with Bt cotton.

farmers from 120 villages in Wardha, Yeotmal and Nagpur districts. The net profit had increased from Rs. 1855/ha in 2007 to 5209/ha in 2008. Interestingly this period coincided with a sudden increase in the area under Bt cotton from 35% in 2007 to 98% within the next two years. The net returns were Rs. 5722/ha in Wardha and Rs. 6733/ha in Nagpur during 2007-08 when Bt cotton had reached a saturation. Bt cotton controlled bollworms effectively and thus resulted in significant reduction in insecticides that were hitherto used excessively to manage the insecticide resistant bollworms. Moreover, insecticides had become ineffective and yield losses could not be prevented efficiently.

The pattern of suicides in relation to the yields, as seen in Graph 4, is actually difficult to explain in Maharashtra. Productivity in Maharashtra increased

over the years from 159 kg/ha lint in 1995 to 274 kg/ha lint in 2006. Strangely, farmer suicides in the state increased steadily during this period with 1083 cases in 1995 to 4453 cases in 2006. Subsequently the suicide numbers came down to 2872 cases in 2009 and fluctuated between 3141 and 3786 until 2013. The yields were relatively better at 330 to 350 kg/ha lint during 2009 to 2013. Though the yields increased in Vidarbha and Maharashtra over the past 7-8 years, after extensive adoption of Bt cotton, an in-depth analysis of the changes in economics during the period 2009 to 2012 needs to be examined critically to understand as to why suicides increased when the yields were increasing during this period.

Are farmer suicides linked to cotton in Andhra Pradesh?

The yield trends in Andhra + Telangana appear to be associated with suicide cases, albeit in a manner that shows short term immediate effects. Perusal of Graph 5, shows that yields were stagnant from 1995 to 2005 and the number of suicides doubled during the period from 1196 suicides in 1995 to 2666 cases in 2004. However a closer look at the patterns show that whenever yields increased in the short term, suicide numbers also decreased. Decline in yield also appears to have lead to increase in suicides over the short term in spurts. For example yields increased from 471 kg/ha in 2004 to 687 kg/ha in 2007 and the suicides decreased from 2666 cases in 2004 to 1797 in 2007. Subsequently the yields declined from 687 kg/ha in 2007 to 505 kg/ha in 2010 and the suicides increased from 1797 in 2007 to 2525 in 2010. The trend after 2010 is a bit difficult to comprehend, with concomitant increase in yields and suicides until 2013.

Conclusion of Part 1:

Agrarian crisis is a sad phenomenon. It must be tackled at all levels. Insightful studies have been conducted on the phenomenon of farmer suicides

Table 3. Productivity (kg/ha lint) in Vidarbha

	Akola	Amravati	Buldhana	Chandrapur	Nagpur	Wardha	Washim	Yavatmal	Average
1999	166	130	174	191	278	222	151	171	170
2000	116	82	69	112	151	193	86	90	102
2001	143	119	153	120	163	154	153	119	135
2002	171	148	197	129	165	161	144	132	154
2003	155	174	237	210	264	229	141	173	188
2004	113	136	128	165	235	219	122	146	146
2005	118	148	196	171	229	186	177	148	160
2006	365	151	214	310	212	227	172	202	224
2007	334	342	379	354	287	327	421	412	371
2008	292	271	290	284	244	208	147	319	284
2009	288	293	266	243	238	233	230	220	251
2010	325	320	320	325	443	348	315	280	319

Compiled by Reddy, A. R (2012) CICR, Nagpur

in India. Some very useful data and analysis have been published by P. Sainath, Dr. Dhandekar, Dr. Srijit Mishra, Dr. Nagaraj, planning commission and many others. Based on analysis, I feel that farmer suicides are certainly related to the growing agrarian crisis. Many suicides in Andhra Pradesh and Maharashtra may be related to the growing input and labour costs, stagnant yields, decreasing market demand and prices of cotton. Suicides in Karnataka and Madhya Pradesh merit special concern and attention. Suicides in all the other cotton growing states are unlikely to be associated with cotton since other crops play an important role in agrarian

economics, unlike the predominant role of cotton as in Andhra Pradesh and Maharashtra. As mentioned in almost all publications, the issue of suicides relates to indebtedness, backlog in irrigation projects, mismatch between expectations and actual yields, poor infrastructure and ever increasing production costs that are not commensurate with market prices. I will focus more on these issues in the next part of this article. To surmise, there is no escaping the fact, that, more than anything else, there is need for a strong political will from the establishment to frame appropriate policies to find long term sustainable solutions to the problem.

CAI Urges the Government to Support the Cotton Sector to Tide Over the Current Crisis

The Cotton Association of India (CAI) released its December estimate of the cotton crop for the season 2014-15. The CAI has placed the cotton crop for the season 2014-15 beginning on 1st October 2014 at 400.25 lakh bales of 170 kgs. each. The projected Balance Sheet drawn by the CAI for the season 2014-15 estimates total cotton supply at 472.15 lakh bales while domestic consumption is estimated at 306.00 lakh bales thus leaving an available surplus of 166.15 lakh bales.

Owing to a drastic cut in imports of cotton by China coupled with a large surplus, the world over prices of cotton have fallen drastically. In India too, the entire cotton sector is reeling under the intense pressure of the unabated falling prices and MSP operations are taking place all over the country.

With a bumper crop of around 4 crore bales and a huge available surplus resulting in a glut, the cotton sector in India is facing a major crisis. In order to tide over this situation, the CAI urges the Government to support the entire cotton sector including the ginning, trading and exporting sectors through banking channels and other means.

A statement containing the State-wise estimates of the Crop and Balance Sheet for the season 2014-15 with the corresponding data for the previous season are given below:-

CAI's Estimates of Cotton Crop
as on 31st December 2014 (in lakh bales)

State	Production *		Arrivals as on 31.12.14
	2014-15	2013-14	
Punjab	14.50	15.00	6.70
Haryana	26.00	23.50	9.25
Upper Rajasthan	6.75	5.50	3.80
Lower Rajasthan	10.50	8.25	4.35
Total North Zone	57.75	52.25	24.10

Gujarat	120.00	129.25	31.90
Maharashtra	82.25	87.00	25.25
Madhya Pradesh	18.00	19.50	9.00
Total Central Zone	220.25	235.75	66.15
Telangana	53.00	78.00	26.00
Andhra Pradesh	24.00		9.95
Karnataka	32.00	29.00	10.70
Tamil Nadu	7.25	7.25	1.10
Total South Zone	116.25	114.25	47.75
Orissa	4.00	3.00	1.00
Others	2.00	2.00	0.50
Total	400.25	407.25	139.50

Note: (1) * Including loose

(2) Loose figures are taken for Telangana and Andhra Pradesh separately as proportionate to the crop for the purpose of accuracy

The Balance Sheet drawn by the Association for 2014-15 and 2013-14 is reproduced below:-

(in lakh bales)

Details	2014-15	2013-14
Opening Stock	58.90	52.58
Production	400.25	407.25
Imports	13.00	11.75
Total Supply	472.15	471.58
Mill Consumption	270.00	266.68
Consumption by SSI Units	26.00	24.00
Non-Mill Use	10.00	10.00
Exports		
Total Demand	306.00	300.68
Available Surplus	166.15	170.90
Closing Stock	-	-

Cotton Research and Development in Asia: Similarities and Differences

Cotton production, research and consumption in Asia have dramatically changed in the last thirty to forty years. For analytical purposes, the ICAC Secretariat divides Asia into the following subcategories: China; Central Asia; South Asia; East Asia; and West Asia. Available statistics show that 27 Asian countries planted cotton on at least 10,000 hectares in 2013/14. The total area planted to cotton in Asia exceeded twenty million hectares, i.e., almost 70% of the world cotton area in 2013/14. Cotton production in those 27 countries is slightly higher than their share of the world cotton area, indicating that the average cotton yield in Asian countries is near to the world average. However, Bangladesh, Indonesia, Vietnam, Thailand, Republic of Korea and Taiwan are net importers of cotton and their addition to the cotton producing Asian countries amounted cotton consumption in Asia to 88% of total world consumption in 2013/14 (Bangladesh meets only 5-6% of its consumption requirements from local sources). The similarities and differences in the production systems of Asian countries constitute the subject matter of this article, which is also an opportunity to learn and compare experiences among countries.



hectares is greater than in the highest yielding country in the Francophone and Southern African countries that plant cotton on the same basis. Taken as a whole, West Asian countries have a higher yield than any other region. Turkey is second only to Australia in the world ranking of highest yields. Asia consumed over 80% of the 23.35 million tons of cotton consumed in the world in 2013/14. Asia also consumed more cotton than it produced in 2013/14: production was 68% of the world total, while consumption was 80%. Simultaneously with the contraction of cotton consumption in Europe and the USA, mill consumption of cotton has been concentrating in Asia. Of the sum total of world cotton imports in 2013/14, 83% were directed to 12 Asian countries. The fifteen countries that produce smaller amounts of cotton or are exclusively cotton consumers do not appear in the table above. The role of the three major producers and consumers - China, India and Pakistan - is clearly highlighted. Bangladesh is capable of consuming all the cotton produced in

the West African countries, including Burkina Faso (the largest producer of cotton in Africa), together with Mali, Benin, Nigeria and the other countries. Taken individually, Bangladesh could also consume all the cotton exports from South America, the rest of Africa, the Central Asian countries and Europe.

Share in World Production

According to the latest ICAC estimates, cotton was planted on 32.4 million hectares around the world in 2013/14. Four of the top five countries in terms of area, three of the top five in production and four of the top five cotton consuming countries are located in Asia. The average yield in a typical Asian country producing cotton on at least 20,000

Similarities in Production Systems

No two countries have the same production system. What they do share is common pests, comparable fiber quality targets, similar concerns in the cotton industry and long-term plans. On the basis of existing cotton production systems, the Asian countries can be divided into at least four

Share of Asian Countries in the World Cotton - 2013/14 (%)

Country	Share in Area	Share in Production	Share in Consumption	Share in Exports	Share in Imports
China	14.2	26.0	34.6	< 1	34.4
India	35.2	25.3	21.8	16.3	2.9
Pakistan	9.0	8.0	9.7	0.9	5.3
Uzbekistan	3.8	3.6	1.5	8.2	< 1
Turkmenistan	1.7	1.3	< 1	2.2	0
Turkey	1.4	3.3	< 1	< 1	10.3
Myanmar	1.0	0.5	< 1	0	0
Bangladesh	< 1	< 1	3.3	0	8.8
Indonesia	< 1	< 1	2.6	0	7.0
Vietnam	< 1	< 1	2.1	0	7.0
Thailand	< 1	< 1	1.5	0	4.3
Republic of Korea	0	0	1.2	0	3.4
Total for 12 countries:	66.4	68.0	80.4	28.7	83.4



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different groups. The grouping criteria are not based on size, but on similarities in cotton production practices and the challenges faced by the industry in connection with growing conditions, research, level of input use and prospects for cotton production. The division also takes into account the statistics reported by the ICAC.

Group	Countries
Group I	Afghanistan, Bangladesh, China, India, Myanmar, Pakistan, Sri Lanka
Group II	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Group III	Azerbaijan, Iran, Iraq, Israel, Syria, Turkey
Group IV	Indonesia, Japan, Republic of Korea, Malaysia, Philippines, Singapore, Thailand, Vietnam

Group I

The three top producers in this group are China, India and Pakistan. In contrast, Bangladesh has humid conditions that do not favor transfer from vegetative growth to the fruit formation stage. When fruit formation begins, vegetative growth continues, thus generating tall and late maturing plants. The rate of fruit formation remains slow and in turn, bolls are sparsely located on the plant and take too long to mature.

China, India and Pakistan have extensive research systems with extremely high and consistent emphasis on the development of varieties and insect pest control. Cotton breeding has received preferential treatment among researchers in all three countries. Variety development has been fiercely competitive within and among the different countries, thus impeding the introduction and adoption of foreign varieties. Cotton suffers from the high temperatures prevailing in all three locations, but researchers have come up with different solutions to the heat sterility problem. The approaches followed were different, but the problem was the same: an extended growth period characterized by a short window for the plant to form bolls and, consequently, a delay in maturation. The three countries have very formal variety approval processes and, despite the fact that planting seed production has shifted to the private sector, still follow a basically similar pattern. The emergence of seed companies in China and India preceded the establishment of domestic seed companies in Pakistan. Many seed companies were registered in Pakistan and engaged in the seed business, but were not able to fully perform their role before the leaf curl disease crippled production and the presence of biotech cotton was officially acknowledged. Since then, seed companies have come to dominate the planting seed business, which was totally in the hands of two public sector

provincial seed corporations in the Punjab and Sindh provinces until the 1980s.

Insecticide chemicals were embraced in the three countries in a similar manner. Organophosphates were extensively employed, while pyrethroids were used for the control of bollworms, particularly the pink bollworm and the American bollworm. The bollworm, which is notorious for its ability to develop resistance to insecticides, did, in fact, develop such resistance, prior to which insecticide mixing had already been exhausted almost simultaneously. The three countries had to deal with almost identical levels of resistance to the same chemicals. A series of insecticide resistance management programs were set in motion, following, in principle, an approach similar to the one that had proved its worth in Australia. The ICAC, realizing the extent of the resistance problem and its consequences, encouraged the countries to work in concert on a joint project. This project, entitled 'Sustainable Control of the Cotton Bollworm *Helicoverpa armigera* in Small-Scale Cotton Production Systems' (CFC/ICAC 14), was sponsored by the ICAC and financed jointly by the Common Fund for Commodities (CFC) together with the national governments and the United Kingdom. The project was implemented over a period of almost five years, from 2000 to 2005, and focused not on fundamental research, but on finding a practical solution to the resistance problem. China, India, Pakistan and the UK worked together and Natural Resources International Ltd., UK, managed the project. A team of leading researchers from these four countries was assembled and all results were shared.

Biotech cotton was commercialized at almost the same pace, but its non-proportional impact on yields produced uneven results. The adoption rate was similar, most probably because of the resistance problem. Currently, over 90% of the cotton area in the three countries is planted to insect-resistant biotech varieties. Emphasis on biotechnology research has not only been accelerated but also received priority over other disciplines, particularly in cotton. While China and India have already deregulated their own insect-resistant biotech genes, Pakistan seems to be coming up with its own novel biotech genes whose effect may not be solely limited to insect resistance. Bangladesh is seriously considering importing hybrid biotech varieties. A pressing need for short-duration short-stature varieties weighs heavily when compared to biotech and hybrid seeds. Myanmar, another significant cotton producer in the region, commercialized biotech as far back as 2006/07 and is estimated to have close to 85% of the cotton area planted under biotech varieties. Ngwe chi 6, a biotech variety that was developed locally and is also known as 'Silver Sixth' is extremely popular and was planted on more than 300,000 hectares in 2013/14.

The weed issue differs due to the differences among cropping systems, but the control measures are the same. Herbicide use is just beginning to pick up in response to rising labor costs, reduced need for insecticide use, and pressure to use any option that increases yields. Among the four groups listed in the preceding pages India and Pakistan have suffered greatly from the cotton leaf curl virus disease. Inbuilt tolerance-resistance is the only way forward and a huge genetic stock of resistant genotypes has become available in both countries. This stock is the best reservoir of tolerance to the disease ever created in cotton in the world. The need for sharing information and germplasm tolerant to the cotton leaf curl virus has only grown with time, since the virus has shown a high frequency of natural mutations. New strains may have many similarities in terms of DNA sequence, but have proved quite capable of infesting previously resistant genotypes.

Of the five countries discussed above (Bangladesh, China, India, Myanmar and Pakistan), Bangladesh and Myanmar have never produced organic cotton. Currently, India accounts for about 75% of world organic production. China and Pakistan started producing organic cotton about 15 years ago and have never abandoned organic production since then.

Fiber quality attributes have improved in all the countries, although measurement precision has been improved only in China. China has brought into operation a network of over one hundred HVI labs with technical advice from the USDA and is close to bringing its national cotton classing system in line with that of the US Department of Agriculture. Once the system is 100% operational, it will allow for the classification of every single bale of cotton produced in the country. Bangladesh, India, Myanmar and Pakistan have yet to follow suit with their national cotton classing systems.

Group I is the largest cotton-producing block in the world but certain non-technological reasons prevent its component countries from sharing production technologies. Production systems are characterized by small-scale farming with mostly similar rotation crops, except in the northwestern cotton-producing region of China. Close cooperation and exchange of information among the countries of the group could very well have a dramatic impact on cotton production, supply and demand in the world. The only common platform devoted to cotton is the Asian Cotton Research and Development Network, established by the ICAC in 1999. Of the six meetings of the Network held so far, four countries (Bangladesh, China, India, Pakistan) have hosted one meeting each in the past fifteen years; Pakistan hosted another meeting in 2011 and a central Asian

country, Uzbekistan, hosted a meeting in 2002. The large attendance at these meetings demonstrates the need and desire for closer cooperation among cotton researchers.

Group II

Five Central Asian countries produce cotton: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. These five countries planted 2.2 million hectares to cotton in 2013/14 and harvested 1.5 million tons. Of their output, 75% or 1.1 million tons, was exported; Bangladesh, China and Turkey being the primary destinations. Uzbekistan is the largest while Kyrgyzstan is the smallest producer within the Commonwealth of Independent States (CIS). Kyrgyzstan was traditionally a small producer, even during Soviet times, and its cotton area has not suffered any declines, although it has fluctuated and recently leveled out at around 20,000-25,000 hectares. The four other cotton-producing countries of the Central Asian group also suffered some losses in planted area but either recovered or stabilized rather quickly.

Cotton production systems in this group are a modified form of centralized government input supply and large-scale farming systems under one management. At the time these countries became independent, production was fully mechanized, input use was optimized and yields were high. In 1990/91, the average yield in the region was almost 40% higher than the world average, but had dropped to almost 15% below the world average by 2013/14. In the early 1990s, there was less variation in yield among countries because of the similarity of their production practices and the ready supply of inputs, but the gap in yields among these countries has widened after independence. The decline and variation in yields is attributable to disruptions in their input supply systems, land reforms that converted collective farms into individual farms, and inability to cope with their machinery needs. In a situation where farmers do not have secure tenure of their land, no real vested interest exists in managing the land on a sustainable basis. When this occurs, producers will farm the land on a year-to-year basis, attempting to maximize profit in the season at hand, as opposed to over an extended period of time. Adoption of new farming techniques continues to improve and further improvements are expected. Uzbekistan has maintained its leading role as the top cotton producer in the region with a share of almost 62% in the production of the group in 2013/14, followed by Turkmenistan with 22%.

Climate conditions in the region make for a shorter than optimal growing season, but this problem is inherent to the region and has always existed. Low soil temperatures at the time of planting

in April and May, combined with premature forced cutout, induce a shorter fruiting period. The group would be well advised to develop varieties that can mature between May and September. At the present, there are reports claiming that germplasm with a maturation cycle of as few as 120 days has already been developed, but the challenge persists. Researchers from Uzbekistan report that they targeted the RNAi of the cotton phytochrome gene family and its signal transduction system to create genetically engineered cotton with a shorter production cycle and without any adverse effects on yields or on fiber quality. Work on this material has not yet reached the commercial stage, but has great potential for implementation throughout the country. The phytochrome approach is known to alter plants so they expend less energy on stand height and make more resources available for fruiting and expanding root systems. Sharing of technology with other countries in the group could have tremendous benefits for cotton-growing countries in Central Asia.

The group has a very rich store of germplasm accumulated during the Soviet period. Radiation has been extensively used to induce variation. Everywhere else radiation effects, mostly admitted to be deleterious as a tool to create variation, are not employed on cotton, but some countries in this group are still using radiation to identify distinctively unique genotypes.

Cotton research, particularly for breeding new varieties, has attained a level comparable to that of the strongest groups elsewhere in the world. Fortunately, the Central Asian countries have not had to confront the problem of insect resistance. Climate conditions do not easily permit overwintering of surviving insect pest populations and the use of insecticides has always been limited. A strong biological control system combined with the limited availability of alternate host plants have worked together to suppress pest populations. This may be one of the reasons why these countries are not highly motivated to adopt insect-resistant biotech cotton. The whitefly also entered the region in the early 1990s, but unlike in many other Asian countries, was not able to establish itself as a major pest.

Ginning has remained, for the most part, unchanged in almost all countries. The active ginning cycle often extends over a six-month period, so ginning efficiency is quite low. It is generally accepted that the problems associated with lower ginning output rates in developing and transition economies can be effectively resolved simply by means of the introduction of more modern ginning equipment and it is probably time for the countries of the region to pay more attention to this concept.

Uzbekistan was the first country to implement an initiative to install a national cotton classing system similar to the one in place in the USA. Enough HVI machines were installed and a demonstration plan was prepared to implement bale-by-bale testing and trading based on instrument data. Thus far, however, materialization of HVI-based trading has met with only partial success.

As a whole, this group has shown a marked desire to develop collaboration among its constituent members and they have a greater opportunity of doing so. It is generally believed that there is much to share and learn from each other because of the uniformity in production conditions, research based on the same fundamentals and systems, a common language, a common culture and a shared desire to enhance exports. Even though more than one country may be selling cotton in the same market, there is almost no competition that would compromise the market interests of other producers. The countries also share the common goal of enhancing domestic use of cotton.

Group III

This group comprises the West Asian cotton producing countries: Azerbaijan, Iran, Iraq, Israel, Syria and Turkey. Azerbaijan's cotton production practices are more similar to those of the other CIS countries of the former Soviet republics. Cotton in Azerbaijan has been in continuous decline due to its high cost of production in comparison with competing crops. In the early 1990s, cotton was planted on over 200,000 hectares in Azerbaijan, but the cotton area has been shrinking steadily since then and is expected to stabilize at around 20,000 hectares.

In the past, Iran produced cotton on an area two to three times greater than the current level. In Iran, cotton has to compete against high value crops and the cotton area has consequently declined in the last ten years or so, although cotton yields reveal an upward trend, even without the adoption of biotech varieties. Israel had the flexibility of switching between Upland and *G. barbadense* varieties. Recently, it has reduced its cotton area to around 10,000 hectares and is now focusing on producing extra fine quality. Iraq has been afflicted by political instability, but Syria and Turkey have been quite stable in their cotton production until recently, when Syrian cotton production was compromised. In general, the area planted to cotton in the region has stabilized at around 800,000 hectares, slightly lower than the area planted to cotton about 20 years ago.

(To be continued...)

Source: The ICAC Recorder, September 2014

COTAAP Corner

Since harvesting of cotton was at its peak in the month of December, most of the activities of COTAAP during this time were concentrated on that activity.

1. Trials of hand-operated picking machine:

To meet the dual goal of providing contamination free cotton to the industry and reducing cost of harvesting; Arvind Ltd. and COTAAP did a trial of hand-mechanized picker developed by Sickle Innovations. Shri. Nitin Gupta of Sickle Innovations has developed a cotton picking machine which is battery-operated and could be easily used to pick cotton by hand. Accordingly various trials were



conducted in the fields of Chopda tehsil from December 12 - 20, 2014, which included comparative data analysis of:

- 1) Hand-picked cotton as against machine-picked cotton
- 2) Difference in proportion of contamination in cotton picked by both methods
- 3) Effect on quality of cotton
- 4) Cost comparison, etc.

Based on the study made, the team from Sickle are making a final product.

2. Cotton procurement by Arvind Mills with incentive for clean cotton:

As an important partner of the COTAAP PPP project, Arvind Limited has made provisions for providing incentive to farmers for giving clean



cotton. Farmers are transporting cotton from their fields to given destination in cotton bags provided by Arvind Limited. COTAAP employees are coordinating all the activities including collecting cotton in groups, transporting to destinations and facilitating payment of incentive for clean cotton.

3. FFS (Farmers Field School) in last phase :

As an important component in the PPP Project, COTAAP is conducting FFS in ten villages in the taluka, according to the guidelines of the Department of Agriculture, Govt. of Maharashtra. The Chopda unit was expected to complete 19 schedules per village within a year. Having started FFS since the month of June, the Chopda unit has completed 19th scheduled schools at each village chosen for FFS. The last FFS which will be celebrated as 'Farmers Day', will be conducted next month where officers from the Dept. of Agriculture, will be involved.

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) 2014-15 Crop JANUARY 2015					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	19th	20th	21th	22th	23th	24th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	8520 (30300)	8520 (30300)	8464 (30100)	8464 (30100)	8408 (29900)	8267 (29400)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	8661 (30800)	8661 (30800)	8605 (30600)	8605 (30600)	8548 (30400)	8408 (29900)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	7171 (25500)	7086 (25200)	7030 (25000)	6974 (24800)	6917 (24600)	6889 (24500)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	7789 (27700)	7789 (27700)	7789 (27700)	7789 (27700)	7733 (27500)	7705 (27400)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	8436 (30000)	8436 (30000)	8436 (30000)	8408 (29900)	8352 (29700)	8323 (29600)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	8520 (30300)	8577 (30500)	8605 (30600)	8548 (30400)	8436 (30000)	8295 (29500)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	7620 (27100)	7620 (27100)	7564 (26900)	7536 (26800)	7508 (26700)	7424 (26400)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	7761 (27600)	7761 (27600)	7705 (27400)	7677 (27300)	7620 (27100)	7536 (26800)
9	P/H/R	ICS-105	Fine	27mm	3.5-4.9	26	8605 (30600)	8661 (30800)	8689 (30900)	8633 (30700)	8520 (30300)	8380 (29800)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	7817 (27800)	7817 (27800)	7761 (27600)	7733 (27500)	7705 (27400)	7620 (27100)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	8099 (28800)	8155 (29000)	8099 (28800)	8070 (28700)	8014 (28500)	7930 (28200)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	8745 (31100)	8745 (31100)	8773 (31200)	8717 (31000)	8605 (30600)	8520 (30300)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	8492 (30200)	8492 (30200)	8436 (30000)	8408 (29900)	8352 (29700)	8267 (29400)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	8577 (30500)	8577 (30500)	8520 (30300)	8492 (30200)	8436 (30000)	8352 (29700)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	8605 (30600)	8605 (30600)	8548 (30400)	8520 (30300)	8464 (30100)	8380 (29800)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	8661 (30800)	8661 (30800)	8605 (30600)	8577 (30500)	8520 (30300)	8436 (30000)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	8830 (31400)	8830 (31400)	8773 (31200)	8745 (31100)	8745 (31100)	8661 (30800)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	9026 (32100)	9026 (32100)	8970 (31900)	8942 (31800)	8998 (32000)	8914 (31700)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	9364 (33300)	9364 (33300)	9308 (33100)	9280 (33000)	9280 (33000)	9195 (32700)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	12345 (43900)	12345 (43900)	12288 (43700)	12288 (43700)	12232 (43500)	12176 (43300)

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