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The ICA Bremen 'International Laboratory Certification Scheme'

Born in 1957 in Managua of Nicaragua, Mr Fritz A. Grobien was the youngest ever President of the Bremen Cotton Exchange in 1991. From 1992 to 1994 he was the Chairman of CICCA. In June 1999 he became President of the Bremen Cotton Exchange for a second two-year term. Additionally, in 1999, he was nominated as member of the Private Sector Advisory Panel of the ICAC. Since 1998 he has been a member of the Board of The Liverpool Cotton Association Ltd., elected second Vice-president in December 2002 and after renaming the first president of the ICA. Since 2012, he has been the President of the Bremen Cotton Exchange.

GUEST COLUMN

Fritz Grobien, President, Bremen Cotton Exchange

About ICA Bremen

Operating from its worldwide recognised laboratory facilities in Bremen, Germany, ICA Bremen is a Joint Venture company combining the global reach of the International Cotton Association (ICA) with the internationally recognised quality expertise of Bremer Baumwollboerse (BBB) and the Bremen Fibre Institute (FIBRE).ICA Bremen is a clear example of how partnerships between key players in the cotton trade with a shared vision can drive up standards and increase trust and confidence in a market that has suffered badly over the past few years. A good example of this shared vision is the development of the ICA Bremen laboratory certification scheme.

Why do we need a certification scheme?

Currently, if there is a dispute on the quality of cotton traded under ICA Bylaws & Rules, the two parties may agree on any laboratory but failing that, the samples have to be sent to ICA Bremen. The vast majority of international trade is conducted under ICA Bylaws & Rules, so that would mean that samples could be sent from as far away as Asia, Australia, Brazil and the USA. But it does not make sense for ICA Bremen to build its own testing laboratories around the world while testing facilities do exist already.

There is therefore a need for more 'locally qualified' laboratories which can test samples for arbitration. However, buyers and sellers need to have trust in that laboratory. They would need to feel confident that it is operating impartially and to the highest standards, so any test results produced by that laboratory would be trusted and that these standards would be continually monitored and verified. In the case that the two parties cannot agree or there may be an appeal on test results on a laboratory, ICA

Bremen becomes the reference laboratory and will be the instance of last and deciding resort.

About the 'International Laboratory Certification Scheme'

The scheme involves the assessment and international certification of cotton testing laboratories to implement an internationally recognised standard.

With existing generic laboratory certification models available such as ISO 9001 and 17025, the obvious question is whywould we develop yet another certification standard? Whilst these other certification standards are perfectly good, they have not been developed to fulfil the specific requirements of the cotton trade. To fulfil these specific requirements and to ensure credibility, the ICA Bremen certification procedure had to be developed at the very highest levels. So, we built on the criteria of the United States Department of Agriculture (USDA), Commercial Standardisation of Instrument Testing of Cotton (CSITC), American Society for Testing and Materials (ASTM) and used our practical testing experiences gained over many years. Certification is also easily monitored so that it can be suspended or rescinded if a laboratory fails to maintain those standards in any way.

What does the scheme look like?

There are eight criteria in the certification process;

1. Laboratory Specification / Conditioning:

This lays down the requirement for the laboratory's atmospheric conditions, their monitoring, sample conditioning and other specifications. It looks at how the air conditioning system is maintained and whether the tolerances are in line with the ASTM and ISO.

2. Instrument and Maintenance:

This lays down the requirements for instruments and their maintenance.

3. Calibration and Internal Verification:

The laboratory must conduct a daily internal check test programme and the check test results must be within established tolerances set by the industry.Calibration must be based on valid and suitable calibration standard material.

4. Testing Procedures and Samples:

This lays down the testing procedure and the specification of cotton samples.

5. External Verification:

The laboratory must be a participant in the CSITC Round Trial for at least one year. It would be preferable to be involved in other recognised Round Test programmes such as USDA monthly Round Trial or ICA Bremen quarterly Round Trial.

6. Quality Management:

The laboratory must have an operational and effective external or internal quality assurance programme. The external quality assurance programme should be based on ISO. Any internal quality assurance system should conform to standards set and investigated by an ICA Bremen questionnaire. The quality control system should cover amongst other things document control and traceability. The calibration of the instruments must be conducted using the standard procedure laid down by the manufacturer or in line with standard industry practice.

7. Human Resources:

Operators need to be well trained in line with the quality assurance system.

8. On-site Inspection:

This lays down the criteria for on-site inspections both planned and 'unplanned'.

All laboratories applying for certification will need to be assessed first. A number of questionnaires are sent to the laboratory which will need to completed and returned to ICA Bremen.

ICA Bremen then evaluates the information contained in that questionnaire and prepares a proposal to be put before an Advisory Committee, which consists of five members appointed by the ICA Bremen Board and consists of a representation taken from across the cotton sector;

- Controllers
- Spinners
- Merchants
- Growers and
- ICA Bremen staff

If the Advisory Committee on Laboratory Certification agrees to proceed with the certification procedur,e then an on-site inspection will be conducted. The cost of this must be paid for by the laboratory and is non-refundable regardless of the outcome of the certification procedure. Following the inspection, ICA Bremen may either make a final proposal to the Advisory Committee as to whether to accept or not accept the laboratory as a certified laboratory or raise any major or minor

non-conformances with the laboratory and give them a time frame to take any corrective actions.

The cost of maintaining certification is $2,000 per year plus the costs of any on-site inspections that are required. Once certified, laboratories will receive surprise 'verification tests' where ICA Bremen will send that laboratory test cotton samples for testing and verification, or will have to send a subset of samples tested in their facility on a fixed day to get retested by ICA Bremen. Samples of documentation will also be requested for inspection (e.g. calibration or temperature/humidity recording). In additional to annual documentation checks, all laboratories will have to undergo an on-site inspection every three years or if ICA Bremen has received a major customer complaint or there has been a major change in the equipment of a certified laboratory or its setting for example. Should a laboratory fail to meet the standards required following a check, then a plan of action will be agreed on with the assessors. If however, following any corrective action the laboratory still fails to meet the criteria, then ICA Bremen may either suspend the certification of that laboratory for a certain period of time or withdraw the certificate permanently until that laboratory applies again and is certified anew.

How many laboratories are certified?

The certification scheme has been in operation now for just over two years and whilst there has been considerable interest with 16 laboratories registering for certification, only two so far have successfully completed the certification process - Cotton South Africa, the first and more recently Konstantinos V. Markou S.A. based in Greece. We have always said that the success of the scheme will be based on the high quality of the laboratories we certify, not the quantity and we believe that we are demonstrating that.

It is important to the whole cotton community that by certifying a laboratory, ICA Bremen is effectively giving its stamp of approval that a laboratory is operating to the highest standards. This gives users confidence in choosing a certified laboratory as well as offering them more choice. Laboratories need to be participants of the CSITC Round Trial for at least one year before they can apply for certification and that has put a number of the applications on hold but we are envisaging that another two laboratories will have reached the standard to go through the certification process this year.

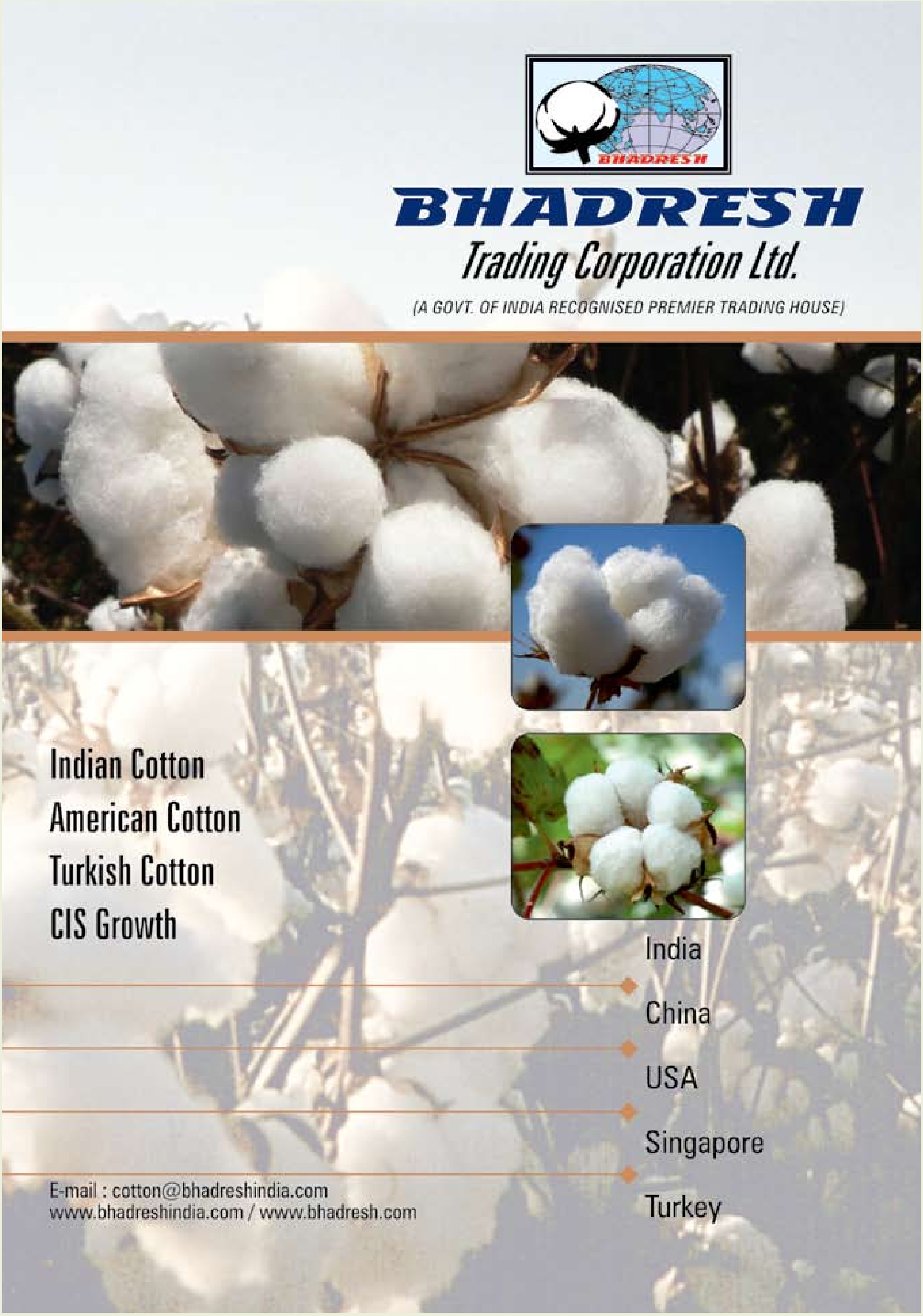
Two years on…

The certification scheme has been a resounding success, promoting a choice of laboratories that users can trust with the added knowledge that they are operating at the highest certifiable levels applicable to the cotton trade.

Update on Cotton Acreage (As on 2nd April 2014)

Sl. No	States	Normal of Year*	Normal on Week**	Area sown (during the corresponding week in)			
				2014	2013	2012	2011
1	2	3	4	5	6	7	8
1	Andhra Pradesh	20.09	0.00	0.00	0.00	0.00	0.00
2	Gujarat	26.97	0.00	0.00	0.00	0.00	0.00
3	Haryana	5.82	3.77	5.31	4.25	3.39	3.66
4	Karnataka	5.28	0.51	0.62	0.40	0.76	0.38
5	Madhya Pradesh	6.55	0.00	0.00	0.00	0.00	0.00
6	Maharashtra	40.71	0.00	0.00	0.00	0.00	0.00
7	Orissa	0.98	0.00	0.00	0.00	0.00	0.00
8	Punjab	5.24	4.58	4.00	5.30	4.00	4.44
9	Rajasthan	4.18	1.38	1.50	1.50	2.00	0.65
10	Tamil Nadu	1.28	0.00	0.00	0.00	0.00	0.00
11	Uttar Pradesh	0.00	0.20	0.20	0.15	0.22	0.22
12	Others	0.43	0.00	0.00	0.00	0.00	0.00
	Total	**117.53**	**10.44**	**11.63**	**11.60**	**10.37**	**9.35**

** Normal area mentioned above is average of last three years ** It is average of last three years*
Source: Directorate of Cotton Development, Mumbai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Cotton in the Climate Trap

EXPERT's Column

Dr K.R. Kranthi

(Dr. K.R. Kranthi, Director of Central Institute for Cotton Research (CICR), Nagpur has completed his Ph.D in Entomology from IARI, New Delhi. He has more than 20 years of experience in the field of cotton research.

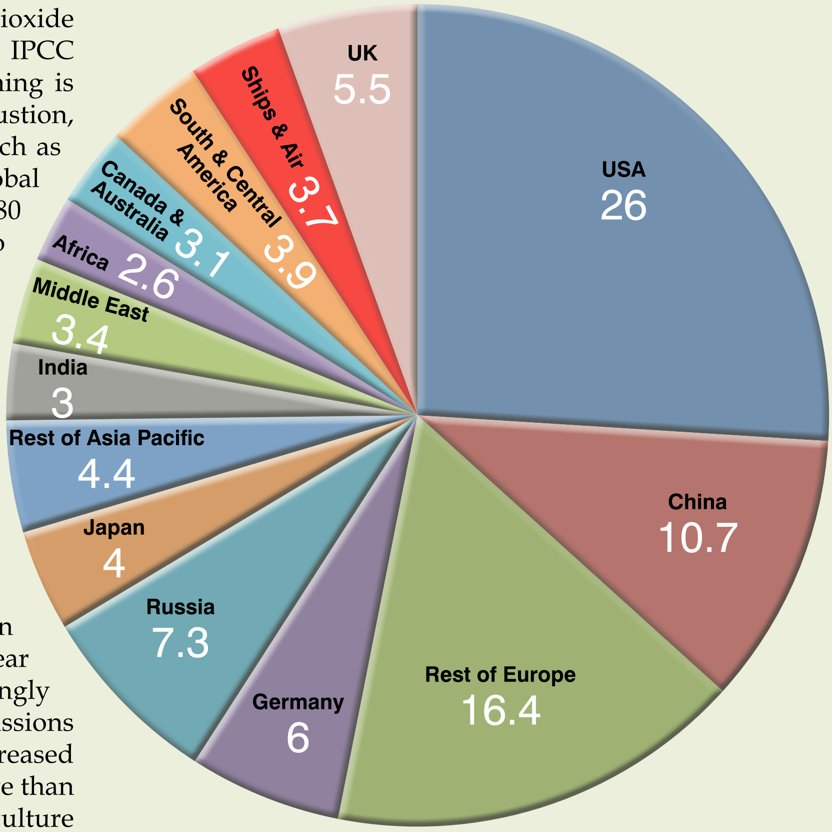
The views expressed in this column are his own and not that of Cotton Association of India)

Over the past few decades climate has become erratic. Even sceptics are now inclined to believe that 'climate change' effects are for real. Climate change can result in expansion of deserts, reduced glaciers ice and snow, severe droughts heavy rains, severe heat waves, ocean acidification, rise in sea levels, disturbed agricultural systems leading to reduced food production and loss of habitats, species extinction and loss of diversity.

Scientists believe that the greenhouse gases being produced by human activities are the main cause for global warming. There are four main greenhouse gases - water vapour, carbon-dioxide (CO_2), methane (CH_4) and ozone (O_3). The IPCC states that the largest driver of global warming is carbon dioxide emission from fossil fuel combustion, cement production, and land use changes such as deforestation. Studies show that the current global atmospheric concentration of CO_2 is about 380 ppm which is 100 ppm more as compared to pre-industrialisation. The IPCC and the Indian Institute of Science have now projected a figure of 575 ppm of CO_2 in the atmosphere by 2085. About 25% of green house gases are because of electricity and heat. Industry contributes 14.7% to greenhouse gases, about 14.0% to agriculture, 12.0% to land use change and the rest about 34% is due to transportation, industrial processes, fugitive emissions and waste. Alarmingly, recent reports showed that greenhouse gas emissions have increased by 2.2% per year between 2000 and 2010, compared with 1.3% per year from 1970 to 2000. Thus, there is a disturbingly increasing trend in the greenhouse gas emissions every year. The concentration of methane increased from 715 ppb in 1950 to 1800 ppb in 2011, more than an estimated 52% of it contributed by agriculture and animal husbandry.

The constant rise in temperatures and carbon-dioxide, erratic monsoon patterns, and constant increase in green house gases, are being recorded all across the globe. Since the early 20th century, the average temperature of the earth's climate system has increased by about 0.8°C. It has been observed that over the past 40 years, 90% of the global warming occurred in the oceans. A recent (2013) report of the Inter-governmental Panel on Climate Change (IPCC) predicts an increase of 1.1 to 2.9°C at low emissions and 2.4 to 6.4°C for high emission scenario, during the 21st century. Over two decades from 1990, the CO_2 emissions increased by 54% to 34.8 billion tonnes in 2011. The increase was 43% due to coal burning, 34% due to oil, 18% due to gas 4.9% due to cement and 0.7% due to gas flaring. The developed countries contribute most to CO_2 gas emissions and global warming. USA is responsible for 26% of CO_2 emissions, China contributes 10.7%, Germany 6.0%, UK 5.5%, rest of Europe 16.4%, Russia 7.3%, and Japan 4.0%. Other developing and under developed countries contribute less than 4.0% each.

Contribution of countries to CO_2 emission



Climate change and cotton

The cotton crop is sensitive to the climate induced effects and responds to soil, pests and diseases. Cotton crop production, processing and maintenance of clothes contribute to emission of greenhouse gases, but the contribution is less than 1.0% of the total. Irrigated cotton in developing countries is responsible for most of the CO_2 and N_2O emissions. Various sources estimated that for cotton cultivation, 1263 kg CO_2/ha is emitted due to chemical inputs, 642 kg CO_2/ha due to irrigation pump sets and 1800 kg N_2O/ha is emitted due to high inputs. But maximum greenhouse gas emissions are because of garment maintenance. The process of washing garments using detergents in washing machines and tumble drying consumes more energy and is responsible for higher CO_2 emission.

Climate change causes extreme fluctuations in temperature, rainfall, solar radiation and carbon-dioxide (CO_2) concentration. The climate changes influence crop growth, pathogens that cause diseases, and insects that occur in the cotton eco-system. Therefore, research on the influence of temperature, rainfall, radiation, CO_2 concentration, changes in soil moisture retention and nutrient holding capacity, on cotton production and productivity is important. However, some studies have shown that cotton crop in some regions may benefit from increased temperatures and carbon-dioxide. Cotton crop can tolerate higher temperatures and water stress to a great extent. Because of the tap root system, the cotton crop overcomes drought stress comfortably with subsequent availability of water. However, irrespective of any change in the CO_2 levels, yields are reduced if the crop suffers moisture stress at the time of flowering and boll formation. The Central Institute for Cotton Research has been working on projects that are focused on identification of adaptable cotton cultivars for increased CO_2 concentration, enhanced temperature, better drought tolerance characteristics and improved resistance to emerging pests and diseases, especially under elevated CO_2 levels.

Slightly high CO_2 levels enhance cotton yields

Cotton is a C-3 plant and is expected to respond positively to higher levels of CO_2. Cotton plants can utilise the elevated CO_2 levels when available in the atmosphere to produce larger leaves with greater surface area for enhanced photosynthetic activity to grow more vigorously. Elevated CO_2 levels can lead to more number of branches, more vegetation and more bolls. But, higher temperatures can cause boll shedding irrespective of the CO_2 levels. However, the vegetative and reproductive vigour of plants under elevated CO_2 levels can create higher demand for irrigation pesticides and fertilisers, in the absence of which yields could decline.

Pioneering studies were initiated at CICR (Dr Khader and team) in 1990, to study the impact of climate change on cotton physiology and productivity. The primary focus was to understand the effects of CO_2 at varying temperatures on various stages of the crop. Their research resulted in enhanced understanding on the following aspects. A number of positive effects on cotton plant growth were observed due to increased level of CO_2. Increasing CO_2 levels up to 650 ppm was found to be favourable for the cotton plants. Increasing CO_2 levels higher than 650 ppm was not favourable for cotton plant growth and productivity. However, plants maintained in elevated CO_2 level of 650 ppm only until squaring or flowering phase did not give full potential yield. Morphological, physiological and productivity attributes improved favourably in plants under elevated CO_2 level maintained until peak boll formation stage of the crop. The crop responded better to water stress and the fertilizer DAP (Di-ammonium phosphate) under elevated CO_2 conditions resulting in higher yields as compared to plants maintained at normal CO_2 conditions. Elevated CO_2 levels at 650 ppm also resulted in faster leaf expansion and increased photosynthetic rate that continued for a longer period. Maintenance of higher nitrate reductase activity in subtending leaf throughout the boll development period under elevated CO_2 levels was observed. Boll and boll components developed to the full extent under elevated CO_2 levels and took 10 days longer compared to the normal duration of 40–45 days under normal conditions.

Elevated CO_2 levels of 650 ppm and temperature of 40 degrees centigrade was found to be optimum for growth of cotton plants. Elevated levels of CO_2 significantly increased plant height, node number, sympodia number, leaf number, leaf area, dry matter production, reduced shedding of bud and bolls and delayed senescence of leaves. The total number of boll and weight increased significantly by 73% due to enhanced CO_2 levels, thus enhancing overall productivity of cotton. Interestingly, the fibre quality also improved significantly under elevated CO_2. The stomatal resistance decreased significantly and photosynthetic rate increased by 34-45%. Diurnal studies revealed that the nitrate reductase enzyme activity was inducted two hours earlier in plants grown under elevated CO_2 levels. Elevated CO_2 led to an increase in free amino acids in plants and a significant reduction in total and ortho-dihydric phenol content in the leaves. Cotton varieties irrespective of their origin from North, Central and South Zones responded to elevated CO_2 atmosphere significantly. LRK 516, H 777, LRA 5166 and CNH 38 gave more dry matter production under elevated CO_2 atmosphere than other varieties. Interestingly, the microbial population increased in soil under elevated CO_2 atmosphere. By and large, it appears that the impact of climate change on cotton production and productivity may be favourable in some parts of the country.

Impact on cotton insect pests, pathogens and weeds

Although it appears that cotton crop will do better in the changed atmospheric scenario at least during the later part of the 21st century, studies indicate that the pest problem will be aggravated further leading to an increased use of pesticides. In general, climate change is likely to affect agriculture very significantly through alteration or aggravation of biotic stress. Increase in temperature and carbon-dioxide can reduce the yields of many crops apart from increasing problems of insect and diseases. For example, studies at CICR showed that the leaf eating cotton caterpillar Spodoptera litura consumed 30% more leaves of cotton plants under elevated CO_2 compared to control plants, Further the insect laid more eggs after feeding on the CO_2 exposed plants.

The Inter-governmental Panel on Climate Change (IPCC) predicted that the global mean surface temperature may increase additionally from 1.4 to 5.8°C by 2100. The climate change, especially the temperature shift can have significant effects on each insect species specifically with reference to distribution and abundance and more importantly, could influence interactions between insect species within different ecosystems. Plant-insect interactions are key components of agriculture that attract frequent human interventions, which in turn have profound impact on greenhouse gas emissions and carbon sequestration. Studies conducted by several groups spread across the globe, suggest that insect abundance increases with rising temperatures and also indicate that temperature is the major factor in global climate change that directly affects insects that mainly feed on crop plants. Elevated global temperatures were found to create favourable conditions for the survival and reproduction of many insect pests such as the cotton sap-sucking pests whiteflies, thrips, aphids, mealybugs, etc. Among various sap-sucking pests the whitefly, B. tabaci B biotype causes serious yield losses to cotton, vegetable and ornamental crops not just as a direct pest but also as a vector of the cotton leaf curl virus in India and Pakistan. Elevated temperatures can have serious effects on increasing populations of the whitefly and the cotton leaf curl virus disease.

Insects are known for their high propensity for adaptability to changes in temperatures. The adaptation is not only related to adjustment in their body temperatures, but also adaptation to changed dietary environments. Elevated CO_2 in the atmosphere could result in increased ratio of carbon to nitrogen in leaf tissues which could decrease the nutritional value for insects. However, many insect species that thrive on cotton are known to be highly adaptive in nature to their dietary needs. The polyphagous insects that can eat on many plant species adjust rapidly to the changing diets, while insect that feed only on cotton plants and related species are already endowed with capacity to overcome many adverse effects, by entering into diapauses or adapting to the new nutritional status of the plants.

Some reports indicate that elevated CO_2 levels resulted in decline in the levels of Cry toxins in Bt cotton. Studies also showed that higher temperatures resulted in a decline in the efficacy of insecticides such as the synthetic pyrethroids and Spinosad.

Many pathogen species can adapt very easily to the changes in environment. Many diseases which are less severe now because of less favourable ecosystems, could find the changed environment more favourable.

Theoretically, since cotton plants are C-3 type and majority of weeds are C-4 type, the cotton crop can compete more effectively to dominate over weeds. However, some weed species may be endowed with higher diversity and better capacity for ecological adaptation as compared to crop plants, which would give them a selective advantage over the crop. Some tropical weed species could also adapt competitively to the changes in environment and become more detrimental.

Cotton in North India likely to be more vulnerable

Climate change can severely reduce the water availability in many countries, especially due to reduction in glaciers. Irrigation during the crucial reproductive phase enhances cotton yields. Irrigation sources of northern India and Pakistan are derived from the glaciers of Himalayas and the Tibetan plateau. There are several studies and simulation models that predict reduction in snow and ice in the mountains. Mountain glaciers and snow cover have declined in both the hemispheres contributing to a rise in sea levels. It has been reported that the elevated temperatures during the past few years have reduced the 30 km long Gangothri glaciers that feed the perennial Ganges. Thus the quality of water and the amount of irrigation water available for cotton could be negatively affected. Since timely irrigation is one of the crucial factors for high yields, problems with irrigation sources can be critical for productivity. Several changes in the overall monsoon patterns have been observed over the past few decades in various parts of India. Higher rainfall intensity was recorded in the west coast, Telangana region and North India contrasting with decrease of rainfall intensity in northeast India, Kerala and some parts of Gujarat and Madhya Pradesh which had 6-8% less rainfall than normal over a 100 year period. A technical paper 'Cotton and climate change - Impacts and options -to mitigate and adapt' published by the International

Trade Centre in 2011 indicates that the Sabarmati and Luni river basins, which cover about a quarter of Gujarat and 60% of Rajasthan, are likely to experience acute water scarcity conditions, and the Mahi, Pennar, Sabarmati and Tapi river basins constant water scarcity. The Cauvery, Ganga, Narmada and Krishna river basins are likely to experience seasonal or regular water-stressed conditions. The Godavari, Brahmani and Mahanadi river basins are projected to experience water shortages only in a few locations (India, 2004).

Cotton needs 100-120 days of soil moisture for proper growth. In general, about 600-700 mm rainfall in rainfed regions facilitates proper crop growth. The initial growth and peak vegetative phase need 2-3 mm water per day, while the flowering and boll formation phase need more water at 5-7 mm per day. Abnormal weather conditions may lead to shedding of fruiting parts, but the plants start recovering to produce a fresh flush. Some varieties are endowed with more regenerative capacity and high yields can be obtained through compensative mechanisms. Plant breeding efforts would be needed to identify varieties with such recuperative capacity to adapt to climate change.

Slightly warm conditions are better suited for sowing, early plant growth and bud formation. As the plant enters the reproductive phase, warmer conditions are more suited with positive effects on yields. However, boll retention, boll size and maturation are sensitive to higher temperatures. Increase in temperatures during peak boll formation and boll maturation leads to boll shedding. In general, a range of 20-40°C, that starts with the low temperature regime at sowing, increase in temperature during peak vegetative and early reproductive phase, to culminate at low temperature during boll formation is best suited for high productivity. Any major shifts in temperature during the crop growth phase can have negative effects on the yield. Higher temperature may lead to a longer growing season. Sowing in north India takes place during hot conditions. The subsequent high temperatures lead to a longer growing season, often resulting in sterility and poor boll formation due to higher temperatures. However, studies also show that higher temperatures could also increase micronaire, fibre maturity and strength. It is important to initiate plant breeding efforts to develop varieties that produce good quality fibre and that can tolerate high temperatures in such regions.

The vulnerability of cotton in north India also extends to the possibility of higher levels of whitefly infestation and whitefly transmission of the leaf curl virus disease due to increase in temperature. Central and South India could be less affected by climate change because of the diversity of cropping systems prevalent in the region as compared to the lesser crop diversity of North India. Thus North India could be more vulnerable to climate change compared to rest of the country.

Mitigating the effects of climate change and global warming

There are concerns in scientific and academic circles to find ways to mitigate the ill effects of climate change. Most importantly, there are two kinds of questions. One – is it really possible to slow down the effects through proactive plans? Second – is it possible to develop adaptive systems, crop and animal varieties that can still be equally productive despite the climate change?

The first plan to slow down effects of climate change, will eventually depend on the developing countries which may have to find ways to reduce the greenhouse gas emissions. The second alternative to develop mitigation measures can help only to a certain extent. It is now clear that organic systems can help immensely in reducing CO_2 emissions, but these are technically highly demanding and need robust scientific technologies to obtain higher yields. The methane and nitrous oxide emissions can be reduced by reorienting crop production systems towards optimisation of inputs, input application methods and also placing more emphasis on the utilisation of bio-fuels and enhancing the organic component in crop nutrition, and pest management. Energy efficient technologies and renewable energy sources should be identified and promoted.

Some measures to reduce greenhouse gas emissions:

- Adopt conservation agriculture, minimum tillage and appropriate soil conservation practices to prevent soil erosion and consequent loss of soil organic matter. Develop crop residue management practices and strictly avoid burning of crop residues. Simple technologies such as maintaining soil covers also enhance soil carbon sequestration
- Strengthen organic agriculture practices wherever possible. Develop efficient organic alternatives to minimise chemical inputs in the cotton ecosystem. Develop cultural practices to minimise pest and disease infestation. Develop diversity in cropping systems should be established in all the regions that are more vulnerable to climate change.
- Develop robust varieties that are resilient to biotic and abiotic stress factors related to climate change.
- Develop cotton production systems with emphasis on low inputs and high productivity in rainfed regions. Optimise irrigation and synthetic chemical inputs to prevent wastage. Reduce the irrigated area under cotton and develop robust varieties for rainfed regions

UPCOUNTRY SPOT RATES

(₹\Quintal)

May 2014

2013-14 Crop

Growth	P/H/R	P/H/R	GUJ	KAR	M/M	P/H/R	M/M/A	M/M/A	P/H/R	M/M/A	M/M/A	P/H/R	M/M/A	GUJ	M/M/A/K	GUJ	M/M/A/K	M/M/A/K/T/O	A/K/T/O	M(P)/K/T
G. Standard	ICS-101	ICS-201	ICS-102	ICS-103	ICS-104	ICS-202	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-105	ICS-106	ICS-107
Grade	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine
Staple	22 mm	22 mm	22 mm	23 mm	24 mm	26 mm	26 mm	26 mm	27 mm	27 mm	27 mm	28 mm	28 mm	28 mm	29 mm	29 mm	30 mm	31 mm	32 mm	34 mm
Micronaire	5.0-7.0	5.0-7.0	4.0-6.0	4.0-5.5	4.0-5.5	3.5-4.9	3.0-3.4	3.5-4.9	3.5-4.9	3.0-3.4	3.5-4.9	3.5-4.9	3.5-4.9	3.5-4.9	3.5-4.9	3.5-4.9	3.5-4.9	3.5-4.9	3.5-4.9	3.0-3.8
Strength/GPT	15	15	20	21	23	26	25	25	26	26	26	27	27	27	28	28	29	30	31	33
1			...		...		...		HOLIDAY				...		...		...			
2	10967	11107	7311	8577	10404	12429	10039	10545	12598	10264	10967	12879	11445	11838	11867	11979	12063	12345	12626	16591
3	10967	11107	7311	8577	10404	12457	10039	10545	12626	10264	10967	12907	11445	11838	11867	11979	12063	12345	12626	16591
5	11107	11248	7508	8717	10404	12570	10151	10657	12738	10376	11079	13020	11557	11951	11979	12092	12176	12457	12738	16731
6	11164	11304	7592	8773	10461	12626	10208	10714	12795	10432	11135	13076	11614	12007	12035	12148	12232	12513	12795	16731
7	11164	11304	7592	8773	10461	12626	10151	10657	12795	10376	11079	13076	11557	11951	11979	12092	12176	12457	12738	16731
8	11360	11501	7536	8773	10461	12570	10067	10573	12738	10292	10995	13020	11529	11923	11951	12063	12176	12457	12738	16731
9	11360	11501	7536	8773	10461	12598	10067	10573	12766	10292	10995	13048	11529	11923	11951	12063	12176	12457	12738	16731
10	11360	11501	7452	8773	10461	12598	10011	10517	12766	10236	10939	13048	11473	11867	11895	12007	12120	12401	12682	16731
12	11360	11501	7452	8773	10461	12570	10011	10517	12738	10236	10939	13020	11473	11838	11895	11979	12120	12401	12682	16731
13	11304	11445	7396	8717	10404	12513	9983	10489	12682	10208	10911	12963	11445	11782	11867	11923	12092	12373	12682	16731
14	11164	11304	7311	8633	10320	12457	9926	10432	12626	10151	10854	12907	11389	11726	11810	11867	12035	12317	12654	16731
15	11107	11248	7255	8577	10264	12401	9870	10376	12570	10095	10798	12851	11360	11698	11782	11838	12007	12288	12654	16731
16	11107	11248	7255	8577	10264	12429	9870	10376	12598	10095	10798	12879	11360	11698	11782	11838	12007	12288	12654	16731
17	11107	11248	7255	8577	10264	12429	9842	10348	12598	10067	10770	12879	11332	11670	11754	11810	11979	12288	12654	16731
19	11220	11360	7255	8520	10208	12457	9786	10292	12626	10011	10714	12879	11276	11670	11698	11810	11923	12232	12598	16731
20	11220	11360	7255	8520	10208	12429	9786	10292	12570	10011	10714	12851	11276	11670	11698	11810	11923	12232	12598	16591
21	11220	11360	7199	8464	10151	12429	9786	10292	12570	10011	10714	12851	11276	11670	11698	11810	11923	12232	12598	16591
22	11220	11360	7142	8464	10151	12429	9701	10292	12570	9926	10714	12851	11276	11670	11698	11810	11923	12232	12598	16591
23	11360	11501	7171	8464	10151	12401	9617	10264	12541	9842	10686	12823	11248	11670	11670	11810	11867	12176	12541	16506
24	11220	11360	7171	8464	10151	12345	9561	10236	12485	9786	10686	12738	11248	11670	11670	11810	11867	12176	12541	16450
26	11164	11276	7086	8408	10067	12260	9336	10095	12401	9645	10545	12654	11164	11529	11585	11670	11810	12120	12541	16450
27	11164	11276	7086	8408	10067	12176	9336	9954	12317	9645	10404	12598	11107	11389	11445	11529	11810	12120	12541	16450
28	11079	11192	7086	8408	9926	12035	9280	9870	12176	9505	10320	12457	11023	11304	11389	11473	11810	12092	12541	16450
29	11079	11192	7030	8408	9926	12035	9195	9842	12176	9420	10264	12457	11023	11248	11389	11445	11810	12092	12541	16450
30	11079	11192	6974	8352	9842	12063	9055	9786	12204	9280	10179	12485	10939	11164	11389	11445	11810	12092	12541	16450
31	11164	11276	6974	8352	9842	12063	9055	9786	12204	9280	10179	12485	10939	11164	11389	11445	11810	12092	12541	16450
H	**11360**	**11501**	**7592**	**8773**	**10461**	**12626**	**10208**	**10714**	**12795**	**10432**	**11135**	**13076**	**11614**	**12007**	**12035**	**12148**	**12232**	**12513**	**12795**	**16731**
L	**10967**	**11107**	**6974**	**8352**	**9842**	**12035**	**9055**	**9786**	**12176**	**9280**	**10179**	**12457**	**10939**	**11164**	**11389**	**11445**	**11810**	**12092**	**12541**	**16450**
A	**11184**	**11318**	**7277**	**8570**	**10238**	**12400**	**9759**	**10320**	**12557**	**9990**	**10744**	**12835**	**11319**	**11674**	**11736**	**11829**	**11989**	**12280**	**12630**	**16620**

H = Highest L = Lowest A = Average

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	26th	27th	28th	29th	30th	31st
Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]							Spot Rate (Upcountry) 2013-14 Crop MAY 2014					
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	11164 (39700)	11164 (39700)	11079 (39400)	11079 (39400)	11079 (39400)	11164 (39700)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	11276 (40100)	11276 (40100)	11192 (39800)	11192 (39800)	11192 (39800)	11276 (40100)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	7086 (25200)	7086 (25200)	7086 (25200)	7030 (25000)	6974 (24800)	6974 (24800)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	8408 (29900)	8408 (29900)	8408 (29900)	8408 (29900)	8352 (29700)	8352 (29700)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	10067 (35800)	10067 (35800)	9926 (35300)	9926 (35300)	9842 (35000)	9842 (35000)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	12260 (43600)	12176 (43300)	12035 (42800)	12035 (42800)	12063 (42900)	12063 (42900)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	9336 (33200)	9336 (33200)	9280 (33000)	9195 (32700)	9055 (32200)	9055 (32200)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	10095 (35900)	9954 (35400)	9870 (35100)	9842 (35000)	9786 (34800)	9786 (34800)
9	P/H/R	ICS-105	Fine	27mm	3.5.4.9	26	12401 (44100)	12317 (43800)	12176 (43300)	12176 (43300)	12204 (43400)	12204 (43400)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	9645 (34300)	9645 (34300)	9505 (33800)	9420 (33500)	9280 (33000)	9280 (33000)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	10545 (37500)	10404 (37000)	10320 (36700)	10264 (36500)	10179 (36200)	10179 (36200)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	12654 (45000)	12598 (44800)	12457 (44300)	12457 (44300)	12485 (44400)	12485 (44400)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	11164 (39700)	11107 (39500)	11023 (39200)	11023 (39200)	10939 (38900)	10939 (38900)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	11529 (41000)	11389 (40500)	11304 (40200)	11248 (40000)	11164 (39700)	11164 (39700)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	11585 (41200)	11445 (40700)	11389 (40500)	11389 (40500)	11389 (40500)	11389 (40500)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	11670 (41500)	11529 (41000)	11473 (40800)	11445 (40700)	11445 (40700)	11445 (40700)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	11810 (42000)	11810 (42000)	11810 (42000)	11810 (42000)	11810 (42000)	11810 (42000)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	12120 (43100)	12120 (43100)	12092 (43000)	12092 (43000)	12092 (43000)	12092 (43000)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	12541 (44600)	12541 (44600)	12541 (44600)	12541 (44600)	12541 (44600)	12541 (44600)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	16450 (58500)	16450 (58500)	16450 (58500)	16450 (58500)	16450 (58500)	16450 (58500)

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