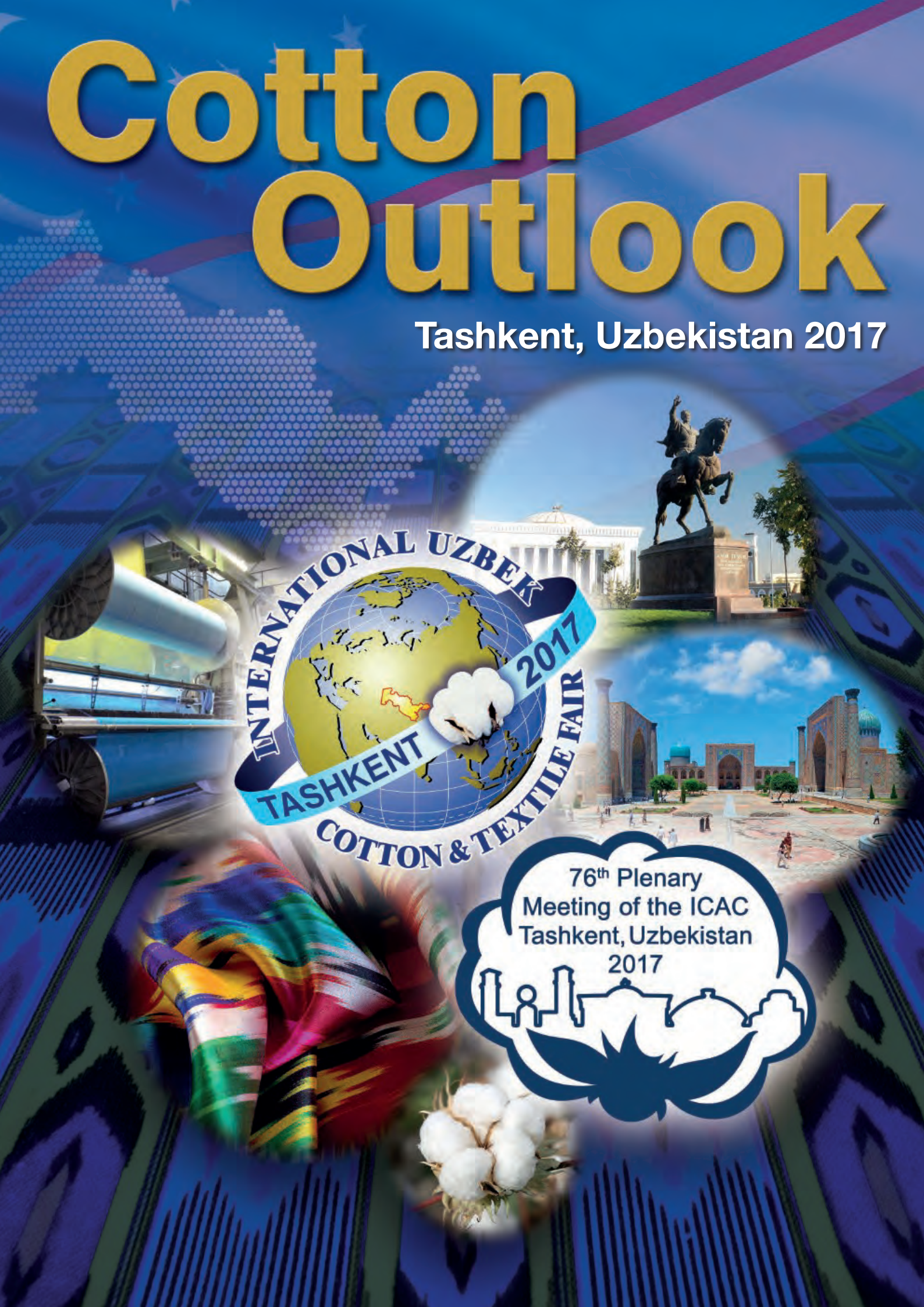
Cotton Outlook

Tashkent, Uzbekistan 2017

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Uzbekistan Welcomes the Return of ICAC

Dear friends! Ladies and Gentlemen!

The Republic of Uzbekistan welcomes delegates and guests of the 76th Plenary meeting of the International Cotton Advisory Committee (ICAC), on the theme of "Cotton in the Era of Globalization and Technological Progress", and those attending the 13th International Uzbek Cotton and Textile Fair. Holding major international forums in Uzbekistan demonstrates the authority gained by the Republic in the world's cotton and textile arenas. Uzbekistan now plays a central role, not just in cotton but also in yarn and finished textile products.

The joint event will provide an unique opportunity for open dialogue and exchanges of experience between international organizations, large companies, traders, textile enterprises, transport and logistics companies, as well as market experts and analysts. Current trends and prospects for both cotton and textiles will be open for review.

The invitation to the ICAC for its Plenary Meeting to be held in Tashkent for a second time during the country's independence provides an opportunity for demonstration of the large-scale structural reforms that have been carried out in the cotton sector since the first such meeting took place in 1996. These reforms have included improvement of cotton variety selection, development of new cotton fibre processing technologies,

improvement in the export mechanism and advanced processing of cottonseed.

Uzbekistan's location in Central Asia is at the intersection of the Great Silk Road, uniting East and West. With a territory of 447,400 sq.km, the Republic has a population of 32 million. In the years of independence, our country has achieved structural changes in the economy – from a mainly agricultural bias to an increased industrial component.

Before independence, the area under cotton was typically 2.2 million hectares, but with radical reform of agriculture and diversification of economic priorities this has been reduced to 1.2 million hectares, thus facilitating an opportunity for other land uses. Hence, the Republic has achieved grain independence, the areas under fruit and vegetable products have more than doubled and the country's food security is now assured.

At the same time, the economy has been modernised. The progressive development of industry has been witnessed, including metallurgical, chemical, oil and gas, machine building, textile and other branches. The country's mineral resources have been strengthened. Uzbekistan is among the world leaders in terms of reserves of gold, copper, natural gas, silver, tungsten, phosphates, potash salt, rare-earth metals and other valuable minerals. It has the fourth largest explored reserves of gold, the seventh of uranium, the eighth of molybdenum, the tenth of copper and the 14th of natural gas.

The list of achievements includes the creation of a national automotive industry, the construction of the Bukhara oil refinery, the Ustyurt and Shurtansky gas-chemical complexes, the Kungradsky soda plant, the Dekhkanabadsky plant of potash fertilizers, the mining and metallurgical plant No. 4 Navoi by MMC, the railroad of Tashguzar-Baysun-Kumkurgan, and the Uzbekistan-China main gas pipeline.

Transformation of the cotton industry has focused on the optimisation of output and quality, which has reinforced the role of Uzbekistan as one of the main participants of the world cotton market. Annually, more than three million tonnes of seed cotton are collected, and the output of lint therefrom still places Uzbekistan among the world's largest cotton producers. About 30 percent of the fibre produced is shipped for export. More than 50,000 of the country's 160,000 farms are engaged in cotton cultivation.

Nowadays, the main varieties grown are *S-6524, Bukhara-6, Bukhara-102, Bukhara-8, Sultan, An-Bayaut-2, Khorezm-127, Omad, Porlok, Namangan-77*, most of which are adapted for machine picking. New selections include genetically-engineered varieties, such as *Porlok* and *Ravnak*.

The preparation and processing of seed cotton is undertaken at 98 gins. Cottonseed preparation is performed in 34 specialised units, which annually produce up to 100,000 tonnes of certified sowing seeds. Uzbekistan has 21 specialised cotton terminals, including four free warehouses, which can together hold at one time about 400,000 tonnes of lint.

In October 2015, the *Uzpakhtasanoatexport* Holding Company was created with the purpose of providing a single organisation in control of seed cotton reception, processing and exports.

Cotton processing and the oil and fat industry, together with cotton terminals and cotton research divisions fall under its remit. The intention is to improve the sector's efficiency, implement technological reforms and attract direct foreign investments.

In the field of breeding, policy is geared toward the preservation of a stable volume of output, and further improvement of qualitative and technical characteristics.

The government pays huge attention to the processing of local raw materials and the production of higher added-value goods. One of the priority directions is the development of light industry – the makers and exporters of goods such as cotton yarn, woven cotton fabrics, knitted cloth and knitted and woven garments. It is possible, without exaggeration, to describe the sector as a vital part of the country's industrial complex.

Today, some 200 textile enterprises in the industry are consuming about 70 percent of the annual cotton output. Enterprises under the umbrella of JSC *Uzbekengilsanoat* have the capacity to use up to 750,000 tonnes, versus merely 152,000 in 1995. Over the same period, exports have grown in value almost 30 times, from 33.9 million to more than one billion US dollars. The industry's share of industrial output is 26 percent (44 percent of 'non-foodstuffs'). Nevertheless, Uzbekistan also remains, for the time being, the fifth-largest exporter of raw cotton.

The light industry's appeal to domestic and foreign investors is enhanced by a stable source of high-quality, rather inexpensive cotton fibre, by low energy prices, and, most of all, by the support and favourable terms extended by the government. Uzbekistan has a developed transport infrastructure, which offers foreign investors a convenient mechanism for the movement of the goods produced. The country's favourable location in the heart of Central Asia is also enhanced by the creation of a new international, intermodal hub at Navoi airport, which takes 21 cargo flights per week (a frequency which it is planned will increase at least one and a half times in the near future).

Other important factors include the low cost of water and energy resources, a cost-effective and highly-skilled labour force, the proximity of regional and domestic markets and developed banking and legal services. The procedure of licensing has been simplified, as has the registration of enterprises and certification of production.

During the last 10 years, more than two billion dollars of foreign investments have been attracted and over 100 joint ventures created, in more than 250 projects with participants from Germany, Switzerland, Italy, Russia, South Korea, Japan, Turkey, the USA, India and other countries. The modern enterprises include a full cycle of textile production.

We do not intend to stop there! By 2020, more than 140 projects, at a total cost of more than two billion dollars, are planned under a special development programme for the period 2016-2020. The plan's realisation will result in the domestic consumption of the country's entire cotton output, raise industrial production more than 3.2 times and export potential more than 2.7 times.

Taking this opportunity, we invite our partners to cooperate by creating advanced textile production, using fully the available potential and taking into consideration the ready access to a market of three hundred million people in the free trade regime of the CIS.

Dear participants! Ladies and Gentlemen!

The occasion of the 76th Plenary session of the ICAC and of the 13th International Uzbek Cotton and Textiles fair allows an opportunity to discuss current trends in the development of the world cotton and textiles industries and also to examine the prospects for mutually beneficial trade and investment.

Besides the professional purposes, moreover, we invite you to enjoy the hospitality and the cordiality of the Uzbek people.

We wish all participants fruitful work, further progress, and the conclusion of new contracts and agreements!

Organizing Committee
76th Plenary Session of ICAC
and 13th International Uzbek
Cotton and Textile Fair

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Trends in the Development of the Cotton Complex in The Republic of Uzbekistan

A.S. Kamalov, Chairman of the Board,
HC Uzpakhtasanoatexport

The Holding Company *Uzpakhtasanoatexport* has set new targets and tasks for the development of the cotton industry, stemming from the Strategy of Action for the five priority development directions of the Republic of Uzbekistan in 2017-2021.

Specific actions to implement the Strategy are carried out within the framework of the detailed "Concept for the Development of the Cotton Industry in the Republic of Uzbekistan", a document that sets 16 basic directions for capitalising on the industry's potential, and which identifies targets for increasing the economic return, modernising the industry, enhancing 'localisation' by substituting the import of goods previously purchased abroad, and by actively attracting foreign investment for these purposes.

The phased and planned implementation of the Strategy has already brought increased financial returns from the production and sale of cotton and fat-and-oil products, raised the profitability of the industry's subdivisions, helped in the development of new sales markets, optimised the infrastructure for the supply of cotton fibre for export and domestic consumers and augmented the competitiveness of cotton products.

In the short period since the company's formation, positive results have been achieved in strengthening the position of Uzbek cotton in traditional markets, as well as in the development of new ones, in such countries as Pakistan, Indonesia and Vietnam. The Holding Company is a member of the International Cotton Association, the Bremen Cotton Exchange and other leading cotton associations and exchanges.

One of the most important directions now being taken is the phased increase in the number of raw cotton harvesting machines. These are produced in the *Tashkent Mechanical Plant* and *JSC Technologist*. Farmers in two regions – Djizak and Syrdarya – are gradually moving to mechanised picking. Amendments to the state standard for raw cotton in 2016 are designed to encourage farmers to adopt the technology. In the 2016 harvest, the method of seed cotton collection – manual or machine – was recorded and this marking is zealously guarded throughout the processing stages.

In order to increase the competitiveness and liquidity of Uzbek cotton fibre in the world market, the Holding Company, in conjunction with the World Bank's International Finance Corporation, has launched a pilot project to introduce the standard of sustainable development of cotton

production in the Ferghana and Djizak regions of the Republic, based on the principles of BCI.

The Holding Company has established close contact with the originating institutes of cotton breeding varieties and implements measures to develop more competitive varieties that give higher yields, better fibre quality indicators and spinning characteristics, greater seed oil content and increased yield. Surveys are conducted of consumers of Uzbek cotton fibre so as to improve further the selection of cotton varieties and meet the requirements of the world market. The results are demonstrated in increased proportions of lint achieving the highest classes, which has brought additional profit in the amount of UZS348.8 billion. Other parameters include Micronaire (more than 99% of the fibre produced is in the range of 3.5-4.9, which meets international requirements), and fibre length (the share of code 37 increased in 2016/17 from 21.6% to 23.38%).

As for cottonseed, the share of the best quality, first-grade seed in 2016/17 was 76.43%, which is over 10% more than in 2015. Cottonseed producing an oil content of more than 18% accounted for 93.14% of the output, while the proportion with an oil content in the range of 21-23% increased substantially. The overall increase in oil output of 1.29% represented an additional profit of UZS10.0 billion. Technical re-equipment in the oil and fat industry and the introduction of grading systems contributed to the improvement in quality and increase in oil yield.

From the 2016/17 harvest onwards, reciepts of raw cotton from farmers have been assessed by automatic weighing of each individual lot on electronic road scales. Instrumental definition of the initial parameters is carried out for each shipment and is logged in special-purpose documents and databases. All operations are performed online, with the data shown on the monitors of the central computers at the procurement stations, in cotton factories, regional branches of JSC *Uzpakhtaexport* and HC *Uzpakhtasanoatexport*. Thus, the main goals of impartiality, reliability and maximum transparency are attained, together with strict control of quality and quantity.

Similar systems for obtaining operational data using online information and communication technologies have been introduced into the processes of the cotton gin and fat-and-oil enterprises, as well as at cotton terminals. A comprehensive, integrated information system is now in place throughout the cotton complex. In the course of further improvement of the domestic cotton fibre classification system, new classes have been introduced for low grades of cotton fibre (Uchinchi Oliy, Turtinchi Oliy, Beshinchi Oliy/Yakhshi) and a new standard has been adopted, which is harmonised with international requirements. The economic effect of the introduction of the new classification on the basis of the results of 2016/17 crop exceeded UZS5.1 billion.

Based on previous experience, the units of JSC *Uzpakhtaexport* have taken a number of practical measures to increase the export competitiveness of Uzbek cotton fibre, such as improvement in the presentation of the bale, and the preliminary monitoring of quality at gins and at cotton terminals. The monitoring process allows a more reliable estimation of the qualities of cotton produced. The cotton terminals of JSC *Uzpakhtaexport* are equipped with laboratories for quality control, using the latest measuring devices. Similarly, JSC *Uzpakhtayog*, which is responsible for seeds, fats and oils, now has a quality control centre, *Sifat-Chigit*.

In the current cotton season, the Holding Company intends to ensure the implementation of measures to increase the capacity of cotton ginning plants and quicken the processing of seed cotton.

Responsibility for the introduction of new technologies, equipment and laboratory instruments is assigned to the scientific centre JSC *Pakhtasanoat Ilmiy Markazi* and its work is to be accelerated, so as to achieve the maximum possible savings in the use of raw materials and technical resources. Substantial assistance to the industry is provided by the centre's work on improving skills and retraining specialists.

Within the framework of this year's investment programme, 34 projects are in progress with an expected investment cost of US$27.2 million, of which 12 are for the modernisation of gins (at a cost of $17.1 million) and the remainder ($10.1 million) are for the activities of JSC *Uzpakhtayog*. The gin modernisation programme envisages the introduction of high-performance and energy-efficient processing equipment, including new hydraulic presses, jointly with *Sinokot* (PRC) and *Dnepropress* (Ukraine). Domestic manufacturers will supply modern heat generators, seed cotton cleaners, fibre filters, lint cleaners, condensers, separators and other technological equipment.

The modernisation is expected to improve radically the energy efficiency of gins: gains in productivity should increase the average daily output of cotton fibre by five tonnes and lead to savings in each plant of about 450,000 kW of electricity per year.

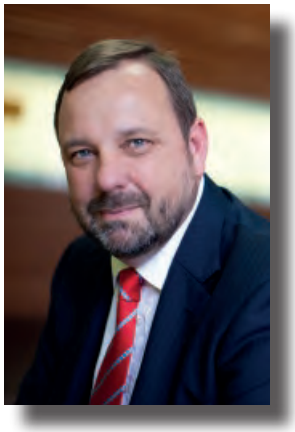
In pursuance of instructions from the country's President, work is being carried out to strengthen the social protection of workers in the industry and create new jobs. A programme under way, at a cost of UZS167 billion, that will create more than 6000 jobs during 2017-2018.

In the oil and fat industry, four projects are in progress for the creation of new facilities and a further 18 involve modernisation, including the replacement of obsolete equipment and the introduction of energy-saving technologies. Production of various items will be enhanced and energy consumption will be lowered.

Import substitution and localisation of production occupy a prominent place in the work to increase monetary returns in the

cotton complex. Cooperation between the Holding Company and dozens of domestic machine-building enterprises plays a vital role and has enabled the industry to make significant savings by reducing the dependence on imports. This year, localisation projects include: the production of edible fats, glycerin, soybean processing products, the production of aluminium gaskets, canvas awnings, PET tapes and soft containers, an increased volume of bale ties, oil presses and packaging. Specific examples are the establishment of canvas cloth production of 4.4 million square metres at *Shumanay Teks* (Karakalpakistan), which should lead to the creation of more than 300 jobs; cooperation with domestic factories for the production of spare parts for fat-and-oil enterprises, which should make it possible to save about US$1.5 million annually; the production of polyethylene terephthalate pellets for the manufacture of PET tape; hydraulic pumping plants; Genie-linter saws; conveyor belts with widths of 600 and 1400 mm; spring carbon steel wire for the manufacture of metal-brush reels of seed-dressing machines; automotive scales for weighing transport with raw cotton, as well as scales for weighing bales at gins and at procurement stations; a wide range of components and spare parts for equipment used in the preparation of cottonseed.

The strategic objective of HC *Uzpakhtasanoatexport* is to implement a permanent technical and technological upgrade of enterprises, develop infrastructure and improve the quality of cotton products.



ICAC – An Opportunity for Change?

Kai Hughes, Executive Director, ICAC

The International Cotton Advisory Committee (ICAC) is nearly eight decades old, and the world has been amazingly transformed since the organisation was created. I am delighted that our Plenary this year being held in Uzbekistan, a country that is itself undergoing a transformation, firstly as a major source of high quality cotton fibre and significant textile production.

With regard to ICAC, it is appropriate to ask after eight decades whether the organisation is still relevant. Should the structure of ICAC, the way it is governed and funded, the functions it performs and the services it provides be fundamentally altered to fit a fast-changing world of 7.5 billion people?

I am deeply honoured to have been chosen as the seventh Executive Director in the history of the ICAC. I welcome the challenge of change, or perhaps I should say evolution, as change implies a totally new direction. There is no doubt from amongst those inside the cotton industry that ICAC is a very good and highly effective organisation providing essential services to governments and industry. Nevertheless, the world now needs a "bigger" ICAC in the sense of the services and the functions the Committee provides. For me, exploring the opportunities to make ICAC even more relevant in today's cotton world is the real excitement and challenge as the new Executive Director.

ICAC was created by governments in the 1940s at a time when government measures dominated movements in commodity prices and government policies largely determined production and consumption decisions. Over the decades, information provided by the Secretariat has become timely and more analytical, a technical information section was created in the 1980s, and during the 2000s the Task Force on Commercial Standardization of Instrument Testing of Cotton (CSITC) and the Expert Panel on Social, Environmental and Economic Performance of Cotton Production (SEEP) were created. The creation of CSITC and SEEP fundamentally expanded the nature of ICAC from a Secretariat providing statistics and a committee serving as a forum for discussion, to an organisation providing specific and concrete services to industry.

ICAC added a Private Sector Advisory Panel (PSAP) in 1999 to formally incorporate the concerns of the private sector into government discussions. Nevertheless, despite the changes in the activities of the Secretariat and the existence of the PSAP, ICAC is still fundamentally an organisation of governments responding

to the interests of governments and government officials. Government policies and programmes remain crucial to the efficient functioning of the cotton market, and the interests of governments must always remain at the core of the mission of ICAC. Nevertheless, after eight decades, it may be time to evaluate the governance of ICAC, the way the activities of the Committee are funded, and the services and functions ICAC provides.

The budget of ICAC, at US$1.8 million this fiscal year, is smaller today in real terms than in the 1980s. The ICAC budget and the structure of the Secretariat is neither reflective of the size and importance of cotton to the world economy, nor of the scale and diversity of challenges facing the cotton value chain. The current ICAC budget is not based on a rational and systematic evaluation of strategic goals and needs. Perhaps now, more than any time in the past, ICAC should review its structure and services with an open and enquiring mind, consulting with key stakeholders such as Member Governments and the private sector through the Private Sector Advisory Panel to look at ways to build upon its strengths, deal with the many challenges facing the cotton sector and take advantage of the numerous opportunities in this fast-developing technological world. Such a review would serve as the basis for the development of a new strategic plan for the Committee, making sure it is fit for purpose in the 21st century.

Communicating Effectively

One example of an area of potential growth in the role of ICAC is public communication on the impacts of cotton production. The world needs an ICAC that serves as a central point of information on cotton sustainability issues. ICAC must be communicating globally with objective information that reaches beyond the ears of government officials. ICAC must improve its use of information technology and social media to reach more people, more effectively. ICAC must facilitate greater interaction within the global cotton community to include brands and retailers, fashion buyers and fabric suppliers, civil society, environmentalists and regulators.

Modern agriculture is highly technical and constantly developing, improving and adapting, but to listen to critics, you would think cotton production technologies are simple, destructive and static. Critics of cotton use evocative language, exaggeration, and repetition of allegations years out of date to demonise, rather than inform. ICAC must serve as an effective counterweight, not only by providing information at the highest level of scientific rigour, but also by communicating such information in compelling formats, using media that reaches consumers.

ICAC is unique in that it is the only organisation in the cotton world that brings governments together and its Plenary meetings, along with world and regional technical conferences, provide a wealth of high-quality information about cotton production practices and future developments. However, that information often remains bottled-up within ICAC publications intended for government officials and researchers. More must be done to extend the horizon over which ICAC is communicating, and to communicate and engage effectively with every player in the supply chain. We need to make full use of social media to speak with one, common voice to the textile industry instead of the current multitude of different and sometimes conflicting and confusing messages. We also need to address disinformation in a way that is not aggressive or combative but factual, using the positives in the industry to highlight the benefits of cotton.

I am very much looking forward to the outcomes from the World Café session on Boosting Demand for Cotton during the 76th Plenary Meeting for the insights from industry and government on how best to further this objective.

Boosting Productivity

Another area of potential growth is production technology development and dissemination. There are more than 200 centres focused on cotton research around the world, and an estimated 3,000 PhD level scientists are devoted to the development of cotton technology in disciplines ranging from conventional breeding to soil science, entomology, physiology and mechanical engineering. ICAC is the clearing house for information swirling in this subculture, providing summaries of major research findings with full citations and conducting world and regional technical conferences to ensure that all scientists know what each other are doing. This work is crucial to the long-term viability of cotton production, and ICAC must ensure that its structures and services are fit for purpose in a world now dominated by cell phones, rather than journals published in hard copy.

Technology development and technology transfer to farmers does not occur spontaneously; it occurs because of investments in science, engineering, chemistry, genetics and other disciplines. Because the benefits of technology are often a public good, governments invest in research. For those benefits of technology that can be captured economically, the private sector is also a major source of innovation and developer of new technology. ICAC can encourage and facilitate both public and private technology development by advocating increased public R&D expenditures in order to strengthen intellectual property rights and to support research organisations directly.

Conclusion

ICAC serves a unique role within the world cotton industry, and that role can and should evolve and grow in response to current challenges, creating a bigger, more effective ICAC that brings added value to the whole cotton and textile chain. But ICAC cannot do this alone. It must seek out strategic partners in order to combine resources and effort, so as to achieve a greater good. ICAC is ideally positioned to take that leadership role within the industry.

I want to take this opportunity to express my appreciation to the Officers, Board of Directors and Members of the International Cotton Association (ICA) for the opportunity to serve as the Managing Director of the ICA since 2008. The ICA is a great institution, and if it did not exist it would have to be invented. The world cotton industry could not function without the trade rules and arbitral services provided by the ICA. During my tenure as Managing Director, I have had the privilege of working with nine presidents and more than 50 different members of the board of directors from all continents. I have learned much during my time with the ICA, lessons which I hope to bring with me to ICAC – the importance of partnership working, having a good communications strategy involving the use of social media, and most importantly, being relevant by providing added value to members. I also need to learn much, and I welcome the opportunity to talk to as many people as possible, to hear their ideas and views so we can have an informed debate as to how ICAC can become a more powerful and effective body in the cotton world.

Finally, I would like to thank the Uzbekistan Organising Commitee for the work they have undertaken in hosting our Plenary meeting.

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From Cotton to Textiles

Ray Butler, Managing Director,
Cotlook Ltd

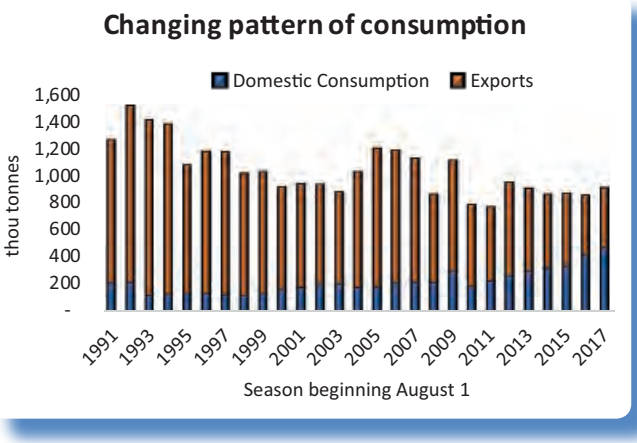
The first occasion on which the ICAC Plenary came to Tashkent, in 1996, coincided with the opening of the Intercontinental Hotel, which itself was a landmark development in the progress of the city's international development. ICAC's return comes on the back of the hotel's refurbishment and installation of new management. This and other visible developments in downtown Tashkent bear witness to the further strides made over the intervening years in augmenting the presence of both the city, and indeed the country, on the international stage.

In 1996, Cotlook produced its first publication[1] devoted specifically to Uzbekistan, containing informative articles from a range of international and domestic industry and government sectors. The then Minister for Foreign Economic Relations[2] remarked that the aim was to 'process as much cotton fibre as possible in the Republic, and export higher value-added products'.

This aim has been pursued ambitiously and aggressively in recent years, to the point that the industry has been revitalised, not just in the cotton field, but from cotton ginning through to spinning, and in more recent years to downstream sectors. Regular attendees at Uzbekistan's annual International Cotton and Textiles Fairs will undoubtedly have noted the greater emphasis placed from year to year on the textiles side of the event, which has attracted an ever-greater number of exhibitors and participants. The annual clothing fashion show has opened the eyes of visitors to the skills and capabilities of the sector. Every year, furthermore, an increasing number of speakers at the accompanying conference have addressed issues of interest to textile manufacturers, rather than those of direct relevance to cotton production and trading.

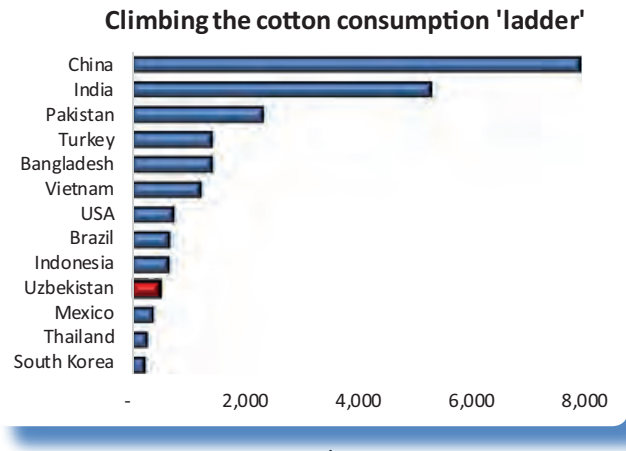
In 1996, of course, many of these changes were still embryonic and much work was outstanding to bring them to fruition. At the time, Uzbekistan's cotton production was in the order of 1.25 million tonnes, making it then the world's fifth largest cotton-producing country. Merely around ten percent was being used by the domestic industry, so annual raw cotton exports were of a magnitude greater

[1] *Cotton Outlook Special Edition*, ICAC 55th Plenary Meeting, 1996
[2] T. Rakhimov, Minister for Foreign Economic Relations, *A Welcome to Tashkent*', *Cotton Outlook Special Edition*, ICAC 5th Plenary Meeting, 1996



than one million tonnes. Focus was primarily on the implementation of 'The Cotton Project', approved in late 1995 by Presidential decree and by an official communication from the World Bank. The project had at its core the modernisation of cottonseed production, the raising of cotton fibre certification standards to international levels, the introduction of an integrated system for plant protection and conservation of irrigation water. Farmer education was also a key objective. Perhaps more fundamentally, the Project was perceived to have a role to play in the development of Uzbekistan's market economy.

At the time, no plans were publicly revealed to curtail cotton production, even on marginal land, and this article's author proclaimed that "Uzbekistan, as a major cotton supplier, is here to stay!". This was partly the reasoning behind Cotlook's decision to switch from using a generic 'Central Asian' description for the purpose of an A Index price quotation to one specifically for Uzbekistan, on the introduction of the 1997/98 Index. Admittedly, the scale of exports has diminished in recent years, partly by reason of the diversion of marginal land from cotton to other lucrative crops, such as fruit and vegetables, but chiefly by dint of the expansion of the local processing sector. In the 1995/96 cotton season, Uzbekistan was the world's 21st largest consumer of cotton. By 2010/11 it had risen to 13th and by 2016/17 to tenth place, a position it is expected to solidify in 2017/18, closing the gap on the next highest consuming



market, Indonesia. In 2017/18, the expectation is that close to 70 percent of domestic raw cotton output will be used in country's textile production, compared with the aforementioned 10 percent in the mid-nineties and less than 30 percent prior to 2013/14, which is by any measure an outstanding achievement.

A foreword to Cotlook's publication[3] that accompanied the VI International Uzbek Cotton Fair, in 2010, gave extracts from a speech by the late President Islam Karimov, in which the President noted that, "Growth in the share of exports of finished goods, and decrease of raw materials, has been a clear trend over the last few years," and that this was the result of "deeply thought-out, long-term plans to change radically the structure and diversity of the economy, to establish, in a short period, vital economic activities that are absolutely new for us…" By looking at the data, and by listening to what foreign industrialists have to say who have invested in the country, one might argue with some conviction that the textile sector and associated industries have figured prominently in this achievement.

Uzbekistan nonetheless continues, at least for the time being, to be a source of several hundred thousand tonnes of high grade cotton fibre that is appreciated by spinners in a number of countries, particularly in Asia, where marketing efforts have been concentrated in recent years. In 2013, the then Ministry of Foreign Economic Relations, Investment and Trade wrote that, "great importance is attached to improvement of the system of cotton fibre sales for export,"[4] and, since then, the substantial changes in the marketing agencies within the country, and indeed in the structure of the government entities involved within the cotton sector, are doubtless indicative of the ambition. In 2016, the chairman of the newly-formed *Uzpakhtasanoatexport* Holding Company identified the major tasks[5] facing the organisation, which (in addition to its role of overseeing the four joint stock companies under its remit) include a transition to corporate management systems that meet international standards.

The changes in progress in Uzbekistan will doubtless be of interest to regular participants in the annual International Cotton and Textile Fairs and to the members of the International Advisory Committee. In 1996, the ICAC Plenary in Tashkent attracted thirty-five member countries, representatives of 14 non-member countries and five international organisations participated as observers[6]. Currently, ICAC has 29 members (a reduction occurred when the European Union acceded to the Committee earlier this year as a single bloc). Any participant from 21 years ago that has not visited Tashkent in the intervening period will, I am sure, be pleasantly surprised by the development of the city, by the facilities of international standard that will be available to them and by the sites of historical interest that are today accessible easily and speedily from the capital. Indeed, visiting these alone are perfectly good reasons for visiting Uzbekistan.

The occasion will of course provide an opportunity for Uzbekistan to showcase its achievements in modernising the cotton sector, in expanding value-added processing and, not least, in the field of scientific research. In the last-mentioned context, Uzbekistan already can lay claim to one prominent scientist having taken the mantle of ICAC 'Researcher of the Year', back in 2013. Uzbekistan has a history of engagement and leadership with science, as those familiar with the 15th century astronomer and mathematician, Ulugh Beg, will know. The proud tradition of prominence in fields of excellence is another good reason for those interested in cotton internationally to visit Tashkent this autumn.

[3] Extracts from speeches of the President of the Republic of Uzbekistan, Islam Karimov, published in Cotton Outlook's Special Feature 'Uzbekistan – Weaving a Way into the Developed World', VI International Uzbek Cotton Fair, 2010

[4] Cotton Outlook, Special Feature for the 2013 International Cotton and Textile Fair, 'Marketing of Uzbek Cotton', Ministry of Foreign Economic Relations, Investment and Trade

[5] Cotton Outlook, Special Feature for the 2016 International Cotton and Textile Fair, 'World Trade Centre of Uzbek Cotton', Akmal Kamalov, Chairman, *Uzpakhtasanoatexport* Holding Company

[6] Final Statement, 55th ICAC Plenary, Tashkent, 1996

New Directions in Price Discovery

J.Kadirov, General Director,
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UZPAKHTAEXPORT
joint-stock company

Since the formation of the *Uzpakhtasanoatexport* Holding Company in 2015, reforms have been under way in Uzbekistan's cotton sector, including a search for opportunities to improve the quality of cotton fibre produced and the revision of methods for pricing Uzbek cotton relating to its high instrument readings.

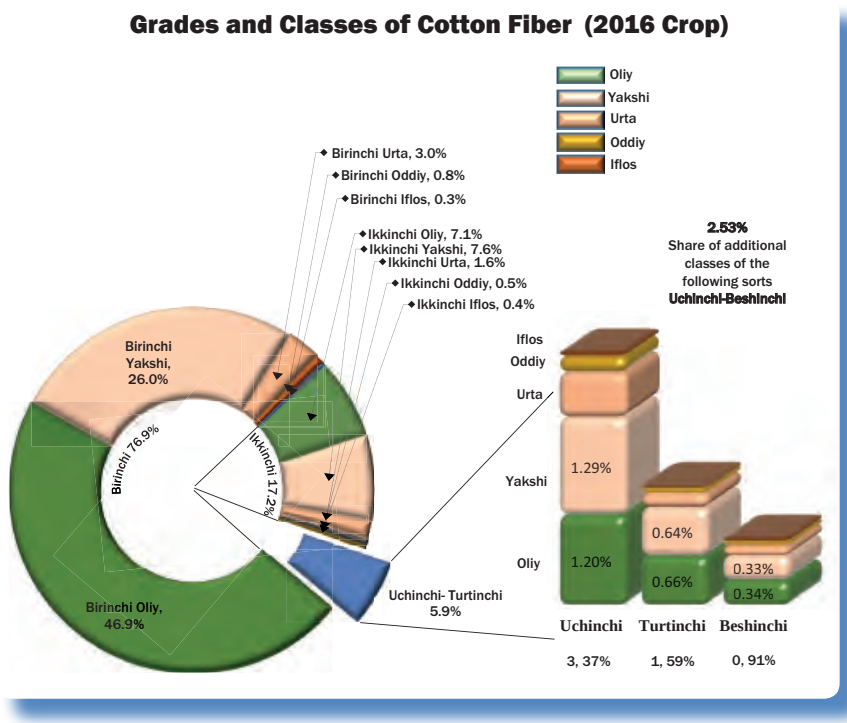
It should be noted that Uzbekistan has not made significant changes to the classification and price differentials of Uzbek cotton for quite some time. Changes that have taken place in the cotton market – the major market players, the observed increase in the quality parameters of cotton fibre throughout the world and the associated change in the staple length basis of the Cotlook Index A – contributed to the need for selected adjustments in the classification and pricing of raw cotton, both on the international and domestic markets.

Firstly, analysis of recent cotton processing data reveals some inconsistencies in classification and trash indicators in low grades of Uzbek cotton fibre, significant volumes of which show less contamination than the reference samples but without any subsequent compensation to the cotton gins. This issue of low-grade cotton fibre that is purer/cleaner than the standard needed to be resolved.

In this regard, on the initiative of the Holding Company *Uzpakhtasanoatexport*, starting from the 2016 crop in the state standard "O`z Dst 604: 2016 Cotton fibre. Technical conditions" the number of classes in low grades have been extended from to five, with the introduction of the missing classes "Oliy" and "Yakhshi". In the current season, cotton fibre of industrial grades "Turtinchi" and "Beshinchi" are sold only via the Uzbek exchange.

Starting from the 2016 harvest, about 43% of cotton grade "Uchinchi" – "Beshinchi" are listed in a group of new classes. In general, the share of "Uchinchi" – "Beshinchi" is about 5.87% of the total volume; the new classes "Oliy" and "Yakhshi" account for 2.43% of the total assortment of grades and classes of Uzbek cotton.

Secondly, one of the indisputable advantages of Uzbek cotton is its high quality as shown by instrument readings, determined on the standardised systems for assessing the quality of cotton SITC (HVI). Introduced on August 1, 2015, the change in the basis of the upper average staple length of the Cotlook Index has not been taken into account when pricing Uzbek cotton. Thus, approximately 15% of cotton fibre was sold at a discount applicable to 34 and 35 length



codes (V type), with the exception of upland cotton of Porlok-type breeding lines.

With the establishment of the basis length as 36 code, the question of clarifying the selling price for cotton fibre 36 and 37 codes of type 4 is currently under consideration, which is a logical step and has practical application on the world cotton exchanges. It should be noted that more than 23% of Uzbek cotton from 2016 crop has staple length indicators of 37 codes.

It should be emphasized that the current differentiation of prices for cotton fibre does not take into account the high instrument quality indicators of domestic cotton. According to the test laboratories of *Sifat*, which undertakes 100% instrument evaluation of the cotton fibre bale, most of our fibre is in the premium range in terms of the strength and the uniformity indicators used in the cotton trade.

Internationally, discounts and premiums based on instrument parameters are widely used. A study shows that in such major cotton countries as the US, Australia, China and India, the price of fibre is determined by quality indicators for the Specific Breaking Load and the Uniformity Index.

The application of this practice in Uzbekistan will lead to the inclusion of a wider range of quality indicators of cotton fibre in determining its price, which will thus be more closely linked to the instrument indicators defined on SITC (HVI) systems.

Studies of experience of pricing cotton fibre in the US and China, and also taking into account accepted ranges for fibre quality instrument indicators in the national standard[1], a proposal[2] has been made on the initiative of JSC *Uzpakhtaexport* to include in the state standard the specific breaking load ranges and the uniformity index with the characteristics of their levels for the industrial varieties "Birinchi" and "Ikkinchi", which has been submitted to the Technical Committee "COTTON" for consideration.

The international practice of pricing shows that the average breaking load is 27-28.9 gm/tex. Ranges for the specific breaking load have a step of 2.0 gm/tex. Table 1 shows the average distribution over five seasons of raw cotton processing; it can be seen that the bulk of Uzbek cotton is in the premium range.

Preliminary calculations show that the highest indicators for the specific breaking load are observed in cotton fibre produced in the Bukhara and Kashkadar provinces. More than a third

Table 1.

The range of specific tensile load values and their characteristics, as well as the actual distribution of cotton fibre (2012-2016)

The range of values for the specific breaking load of the fibre (Str), gm/tex	Distribution according to sorts Birinchi and Ikkinchi	Strength of the fibre
Less than 23		Very Weak
23-24,9	0,26%	Weak
25-26,9	2,25%	Average
27-28,9	11,40%	Average
29-30,9	12,81%	Average
31-32,9	47,50%	Strong
33 and over	25,86%	Very strong

[1]CPR GB 1103 - Cotton-Upland Cotton
[2]O`z Dst 604: 2016 Cotton fibre. Specification

of the volume of cotton fibre in the Bukhara region, as well as about 30% of the fibre of the Kashkadar region, have characteristics in the range of specific breaking load “Very strong”, equal to 33 gm/tex and higher.

On the uniformity index, the average is the range of 80-81.9%. To a less uniform fibre with the indices of 79.9% and below, discounts will be applied twice as large as those for fibre with uniformity values of 82.0% and higher (Table 2).

Table 2

Range of values of the index of uniformity and their characteristics; the actual distribution of cotton fibre volumes 2012-2016

Range by the index of uniformity/by the staple length of the fibre,%	Distribution according to sorts Birinchi and Ikkinchi	The degree of uniformity of the fibre along the length
<77,0		Very low
77,0-78.9	0,06%	Weak
79.0-79.9	0,59%	Low
80,0-81,9	**7,95%**	**Basic uniformity**
82,0-83,9	75,45%	Above average
84,0-85,9	13,82%	High
86 and over	2,09%	Very high

The introduction of these instrument indicators into pricing practices will lead to a more differentiated approach in the evaluation of fibre and a more complete relationship between quality and price. At the same time, producers of the best cotton fibre from different regions of the republic will receive an additional mark-up for high instrument quality indicators and correct processing of raw cotton. Preliminary calculations show additional profit to producers of US$5-6 million.

As a reliable supplier of cotton fibre, JSC *Uzpakhtaexport* pursues a policy of improving the quality of services provided. To this end, an arbitration laboratory is being established to determine the qualitative parameters of cotton fibre and yarn. For the laboratory, the completion of which is planned this year, laboratory equipment from the German company TEXTECHNO was selected and purchased. To conduct instrument and organoleptic (manual) tests of fibre and yarn in the laboratory, the Cotton Classification System (CCS) will be used.

Determination of such instrument indicators of accepted volumes of cotton fibre as Upper Average Length, Specific Breaking Load, Uniformity Index, Micronaire, as well as neps, dust content in cotton fibre, will allow effective control over the observance of primary cotton-processing technology at cotton ginning plants of the Holding Company.

In addition, in order to further verify the compliance of the claimed fibre parameters with the actual quality by grade and class, a laboratory is located at each cotton terminal for a selective 10% inspection of the mass of cotton fibre bales, and 5% sampling is taken from the bales selected.

Within the framework of the model of corporate management, JSC *Uzpakhtaexport* pays special attention to work with both foreign buyers and local textile enterprises, as well as introducing the practice of reserving cotton fibre. In the future, the joint-stock company will be able to offer certification of yarn and logistics services for products of the textile industry.

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2016 Fibre Quality

The Uzbek Centre *SIFAT*

Sifat is an independent organization for the certification and quality control of cotton fibre. It has 13 regional laboratories across the Republic which carry out quality control of each bale of cotton fibre, linters, cotton wool and seeds. All laboratories are equipped with high-volume instruments (HVI) and other up-to-date testing facilities. Sifat also carries out weighing of bales of fibres and linters.

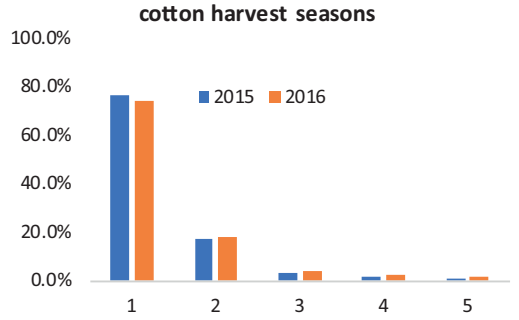
To improve the degree of accuracy of tests conducted on HVI systems, *Sifat* has participated for more than ten years in international comparative instrumental round trials, involving more than a hundred laboratories, in cooperation with the Bremen Cotton Institute (Germany) and the Washington-based International Cotton Advisory Committee (ICAC). Sifat participates in the work of the Committee on Commercial Standardisation of Instrument Testing (CSIT) as a regional technical centre under the auspices of the ICAC.

In accordance with the "Programme of modernisation, technical and technological re-equipment of the Uzbek Centre for Certification of Cotton Fibre *Sifat*, for the years 2013-2017" HVI 900 systems are being replaced with high-performance, automated Uster 1000M 1000. Thus, the process of evaluating the quality of Uzbek cotton will be fully compliant with accepted standards in the world market.

During the past few years, a series of measures have been introduced aimed at reducing trash content and improving quality. The length of the harvesting period has been reduced, and seed cotton processing and storage conditions improved. The reconstruction and modernization of ginneries have led to considerable improvement in Uzbek cotton quality.

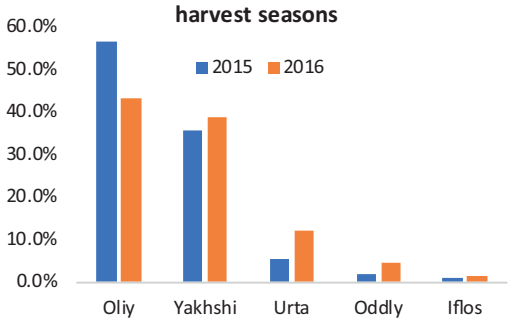
The high quality of Uzbek fibre ensures it has a permanent client base. In 2016, the proportion of high-quality cotton fibre (first and second

Figure 1. The share of first and second grades cotton fibre in 2015 and 2016 cotton harvest seasons



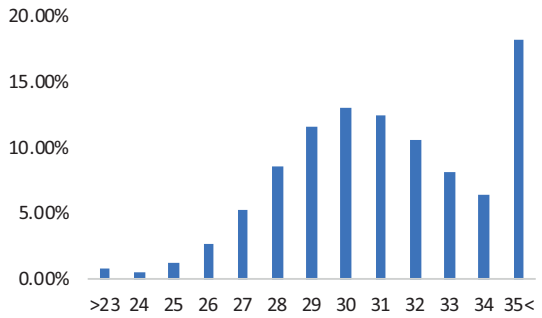
grades) produced was 94.1%. These two categories accounted for all the cotton produced in Bukhara, 99.3% in Navoi and 98.9 percent in Kashkadarya.

Figure 2. The share of Oliy and Yakhshi cottton fibre grades in 2015 and 2016 harvest seasons



A reduction in impurities (trash and dust), achieved by means of effective technology in the processing of low-grade raw cotton, has meant that cotton falling in the *Oliy* class can be produced from third and fourth grade, and both *Oliy* and *Yakhshi* have been secured from fifth grade. 36% of third grade and 41% of fourth grade cotton were classed as Oliy, and 74% of fifth grade received such an appraisal.

Figure 3. Distribution of cotton fibre strength in 2016 (gm/tex)



High strength is also noted (as shown in the Figure 3). The Khorezm and Namangan regions both recorded percentages in the higher strength bracket above the national average.

The Uniformity Index is shown in Figure 4.

Figure 4. Distribution of the Uniformity of cotton fibre in 2016 (%)

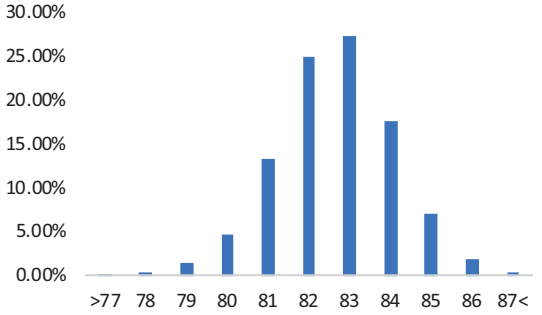


Figure 5. Quality indicators of selected varieties in the 2016 season

Selection grade	Mic	UHML	STR	RD %	+b %	ELONG %	UNI %	SFI %	SCI	CSP
An-Bayont	4,7	110,5	30,4	78,4	8,9	6,8	82,5	7,6	133,7	2158,6
Bukhara-6	4,5	112,9	30,4	79,6	9,0	8,9	82,8	5,0	138,5	2212,4
Mekhnat	4,6	113,1	33,8	79,2	8,3	9,3	83,3	6,0	149,4	2254,0
Namangan-77	4,6	110,9	31,1	77,4	8,5	7,7	83,3	6,8	139,1	2178,6
Omad-27	4,5	114,4	33,1	78,3	9,0	7,7	83,1	6,4	146,9	2228,6
C-6524	4,7	112,0	32,4	76,6	8,6	7,3	83,4	7,2	143,1	2182,0
Khorezm-127	4,8	113,2	34,3	79,3	8,2	9,7	83,4	5,7	150,1	2252,0
Sulton	4,7	110,9	31,7	77,4	8,7	7,1	83,2	6,6	140,5	2174,3
Kupaysin	4,7	113,6	31,7	79,3	8,7	7,7	82,8	6,5	140,3	2214,3
Khorezm-150	4,7	113,0	34,2	79,0	8,4	9,2	83,3	5,9	149,1	2240,1
Bukhara-102	4,5	113,0	31,2	79,5	9,0	7,7	82,9	5,5	140,5	2216,1
Bukhara-8	4,5	113,2	30,7	79,5	9,0	8,7	82,8	5,0	139,1	2216,3
Andijan-35	4,8	110,6	32,1	75,1	8,6	6,9	83,4	9,5	139,8	2134,6
Porlok-1	4,6	113,7	32,1	78,2	8,9	6,8	82,8	6,7	141,5	2204,0
Porlok-2	4,6	115,5	31,8	78,7	8,7	8,4	83,1	5,5	143,8	2239,5
C-8286	4,8	112,3	35,1	73,6	8,0	7,6	84,4	7,3	152,6	2179,6

IFC Commits to Helping Uzbekistan develop a Sustainable Cotton Supply Chain

By Moazzam Mekan,* IFC *Regional Manager for Central Asia

IFC | International Finance Corporation
WORLD BANK GROUP

Creating Markets, Creating Opportunities

Cotton is one of the key products in Uzbekistan's economy, accounting for around a quarter of the country's 4.5 million hectares of arable land. The country produces around 3 million tons of seed cotton annually, which puts it in sixth place globally. Cotton (fiber, yarn, and textiles) also accounts for 17 percent of export revenues (around US$1.8 billion in 2015).

In recent years, Uzbekistan has been taking steps to modernize its cotton sector and farming methods, including measures to increase productivity and profitability of growing cotton, and replacing hand-picking with mechanization in lower productivity areas.

The country is also aiming to increase the processing of raw cotton locally, to create an export market for higher-value-added products and diversify job opportunities for people in rural areas.

Uzbekistan has increased its focus on the acceptability of Uzbekistan cotton around the world. On January 5, 2016, the Government of Uzbekistan began new initiatives towards this end and issued a *List of Measures Aimed at Improving Working Conditions and Social Protection of Workers in Agriculture, № 02/7-28* which was approved by the Prime Minister. This list defines 39 measures aiming to:

1. Improve the labor regulatory environment
2. Systemically increase efficiency and mechanization in agriculture, including implementing a pilot project in several districts introducing sustainable, socially responsible cotton-production technologies
3. Improve practices related to hiring seasonal workers

Evaluation of pilot farm's cotton crop, August 2017

4. Institutionalize and further improve feedback mechanisms on child and forced labor
5. Improve the population's access to information about their labor rights

The International Finance Corporation (IFC), a member of the World Bank Group, is supporting Uzbekistan in these endeavors. IFC has launched a new advisory programme in Uzbekistan, focusing on developing a sustainable cotton supply chain, and introducing modern, socially and environmentally sound cotton-growing technologies and farming practices. The aim is to help the industry introduce a globally-recognized Sustainable Cotton Standard System and increase efficiency.

In particular, the project aims to support Uzbek cotton farmers in introducing modern agronomic cotton-growing technologies, which will help increase the yield per hectare, reduce the environmental impact – including the use of water, fertilizers and pesticides – and protect the fragile biodiversity in water-scarce areas. Increasing profitability will also help create the right conditions for the introduction of decent work practices at the farm level.

The project also aims to establish a credible traceability system, based on the Better Cotton Chain of Custody requirements, to ensure the cotton produced meets the responsible sourcing commitments of global textile brands and retail chains.

These improvements will all support the government's objective of modernizing and growing the local processing industry, and will help create new jobs by opening new export markets for higher-value-added Uzbek textile products. The country has the potential to double its production efficiency in the cotton supply chain by meeting global sustainability benchmarks in water use, maintaining soil fertility, and improving the environment. Meeting these standards will also help the industry attract the investments it needs to unlock its potential.

In addition, improved agronomic practices and increased productivity will create opportunities for Uzbek farmers to introduce more diversified crop rotation practices, and better manage their production, weather, marketing and financial risks.

The project is being implemented in two phases. In 2017-2018, during the pilot phase, IFC will focus on localizing, testing and implementing the Sustainable Cotton Standards System at selected farms in the Fergana and Djizak regions, and on helping them to prepare for an independent third party audit to confirm their compliance with the Better Cotton Standards.

During 2019-2022, the roll-out phase, IFC will focus on building up the institutional capacity of *Uzpakhtasanoatexport* to scale up the system at country level and introduce the Sustainable Cotton Standard System throughout Uzbekistan. The Holding Company *Uzpakhtasanoatexport* will be IFC's key implementing partner for the Sustainable Cotton Standard System.

IFC will be partnering with the Association of Farmers, the Federation of Trade Unions, the Ministry of Agriculture and Water Resources, the Ministry of Labor, and with the International Labor Organization's (ILO) Decent Work Country Program on Piloting Labor Market Measures in Selected Districts of the Republic of Uzbekistan in 2017-2018, to maximize impact and ensure that the key stakeholders are fully involved. IFC will also cooperate with major private sector cotton processing companies, including its investment client, *Indorama Kokand Textile*.

A successfully tested and implemented Better Cotton Standard System will serve as a sound basis for Uzbekistan to apply to the Better Cotton Initiative (BCI) to initiate the BCI New Country Start-Up Process.

The IFC Project agronomist with the pilot farmers, April 2017

Major global apparel companies, retail chains and brands have already committed to increasing the share of Better Cotton licensed merchandise within the global cotton market to 30 percent by 2020, from the current level of 12 percent. Establishing the framework for Uzbekistan's cotton industry to produce BCI-licensed cotton would thus help create a solid competitive advantage for Uzbek cotton in the global market, and help integrate thousands of Uzbek cotton farmers into global cotton supply chains sustainably.

IFC's project builds on the long-term cooperation between the World Bank Group and the government of Uzbekistan and is being implemented with financial support from the Hungarian EXIM Bank, IFC's long-term donor partner.

IFC in Uzbekistan

Uzbekistan became a member of IFC in 1993. Since 1996, IFC has invested US$144.7 million in Uzbekistan, including $12.9 million in mobilized funds, to support 28 private sector projects in the financial, agribusiness and food processing sectors. In addition, IFC has supported $34.1 million in foreign trade in Uzbekistan through its Global Trade Finance Program. As of June 30, 2016, IFC's committed portfolio in Uzbekistan stood at $50.7 million with investments in the financial and manufacturing sectors.

About IFC

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Textile Industry of Uzbekistan: A Great Past, a Dynamic Present, a Promising Future

STATE COMPANY
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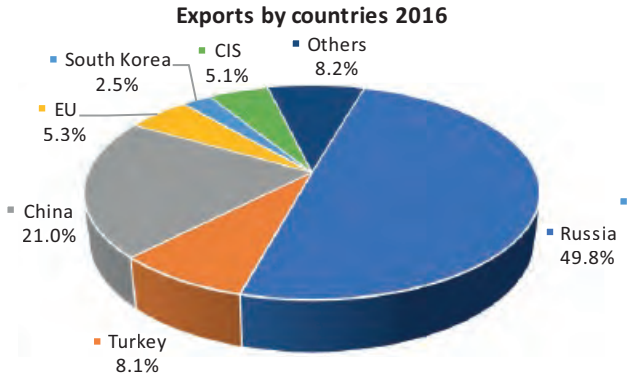
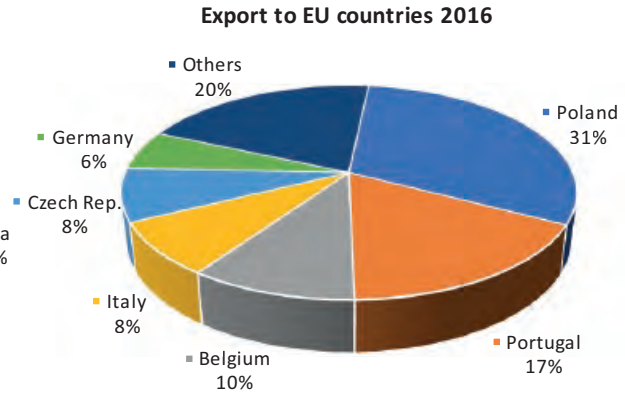
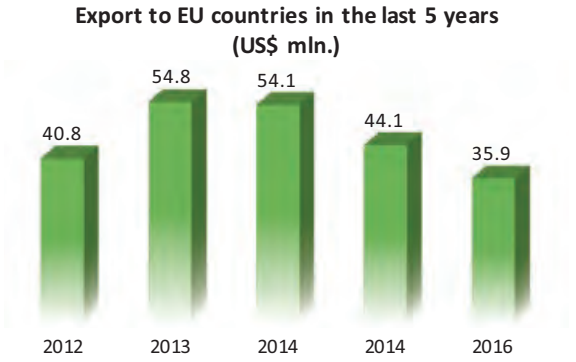
The Textile Protocol to the Agreement on partnerships and cooperation between the EU and the Republic of Uzbekistan, ratified by the European Parliament in late 2016, entered into force on July 1st, 2017. Uzbekistan has achieved the desired result – Uzbek textiles have been recognized in the world market. Now, Uzbekistan is faced with the challenge of widening its niche.

The ratification of the Textile Protocol endorses the flow of foreign investment into the textile industry of Uzbekistan and an increase in the number of products exported to the countries

Export of Textiles







of the European Union. Granting Uzbekistan a free trade regime, in accordance with the textile protocol, will ensure the reduction of import duties and customs payments from the current 12% to 6%.

In achieving this goal, the textile industry of Uzbekistan has changed radically: with its extensive experience in the industry and being one of the world's largest producers of cotton fibre, Uzbekistan has adopted the experience of developed countries and integrated a new Uzbek model for the industry's development.

25 years of Independence

Production of textiles in Uzbekistan has been carried out for centuries. Even in ancient times, Uzbek masters were famous for the art of making exquisite fabrics. Furthermore, in the times of the former USSR, several large textile enterprises were built in the country, which were a solid basis for the development and industrialisation of the industry as a whole.

However, after gaining independence, Uzbekistan faced a serious challenge – it was necessary to build its own, modern branch of a new generation.

The availability of raw materials is crucial, but in order to ensure a balanced and sustainable development of the industry, a phased, deeply thought-out industrial policy is necessary, one that is aimed at the creation of integrated production capacities and appropriate infrastructure, and the introduction of modern, high-tech and energy-efficient technologies. The aim is to increase the competitiveness of products and create conditions for increasing the attractiveness of investing in the industry.

To this end, the Joint Stock Company *Uzbekyengilsanoat* was founded, which, to date, brings together more than 500 textile enterprises. *Uzbekyengilsanoat* was set the tasks of modernizing the existing production facilities and technological equipment, establishing modern production, training skilled and specialised personnel, increasing exports and satisfying domestic demand.

Today, the textile industry of Uzbekistan is one of the country's largest diversified industrial segments. More than 6,000 companies operate in the light industry. Enterprises are subdivided into small (including family-run) businesses, and large and modern factories, with the most modern equipment capable of managing hundreds of production lines turning out semi-finished products.

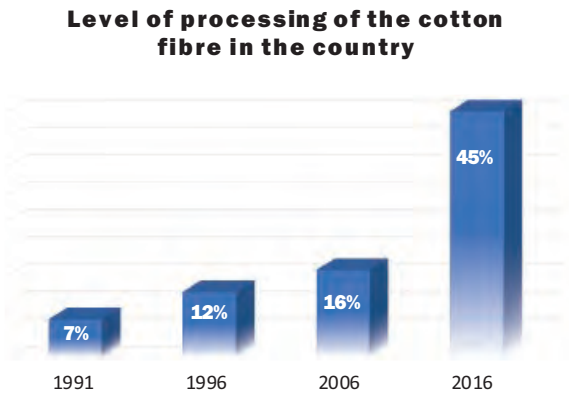
Over the past decade, the industry, with the strong support of the State, has raised employment to more than 110,000 people and its share in the country's GDP to about four percent.

Since 2014, *Uzbekyengilsanoat* has been an Associate Member of ITMF (International Textile Manufacturers Federation), the activities of which are aimed at supporting the development of the world textiles industry.

ITMF has published a report on the outcome of the visit of the delegation of the Spinners Committee to Uzbekistan in October 2016. The Committee's leadership commended the work done in the textiles industry over the years of independence, in particular in the development of the spinning sector.

Such interest on the part of international organisations demonstrates the increased demand for Uzbek textile production in the world market (exports have exceeded US$1.2 billion) and the greater foreign investments (foreign investment has amounted to $2.5 billion).

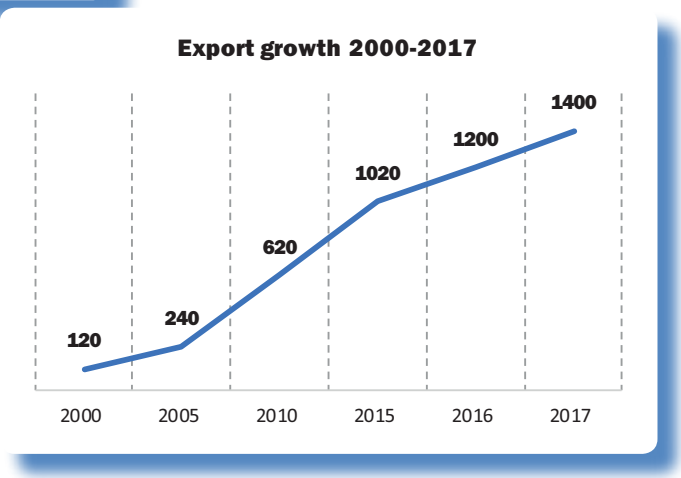
The ITMF's Spinners Committee studied the development of the industry in the Kashkadarya, Samarkand and Tashkent regions. Experts investigated cotton fibre production, conditions for further storage and logistics, cotton processing and testing technology, and onward processing.



Special attention is being given to expanding the range of products that result in local sourcing. Leading academicians of the Academy of Sciences of Uzbekistan are involved in the process of developing new types of fabrics. With their assistance, work has begun on exploring the possibility of producing nano-fabrics. By 2020, Uzbekistan aims to become a producer not only of natural cotton products but also of synthetic and mixed fabrics.

According to the chairman Andrew Macdonald, since the Committee's previous visit in 2004, the textiles industry has become integrated and enterprises are equipped with the latest textile technologies. Mr. Macdonald also pointed to the presence of eminent textile industry players from overseas.

It can be said that by the end of 2016, the textiles sector of Uzbekistan had become a worthy "face" of the entire economy of the country.



For example, light industry was one of the leaders of high-value-added exports, with a share exceeding 40% in 2016. The products of the industry are delivered to 54 countries worldwide.

In 2016, the enterprises of *Uzbekyengilsanoat* recorded growth in exports of 10% and in industrial production of 20% (including a 24% increase in consumer goods).

The Government's programme for the development of the industry, introduction of an export-oriented model of economic development, and search for opportunities to stimulate export production, has led to the creation of a completely new concept of the textile industry.

In less than two decades of export-oriented policies, the supply of Uzbek textiles to overseas markets has grown in value from US$120 million in 2001 to a projected $1.4 billion in 2017, which means that shipments will have increased tenfold.

Uzbekistan is increasingly recognised as a producer and exporter of high-quality products that meet world quality standards and trends in ready-made clothing and knitwear. Improving the quality of products is facilitated by the development of linkages with globally-recognised, foreign certification companies. *Uzbekyengilsanoat* is developing a project, with the assistance of European certification companies, for the establishment by next year of sewing-knitting industry support and product certification in the Fergana region.

Technical re-equipment of the industry

In 2015-2016, a technical audit of cotton-processing enterprises was carried out, from which a programme was devised for the further modernisation of enterprises during the 2015-2018 period, at a cost of US$378 million.

Since 2010, 95 % of spinning mills and 90 % of weaving and knitting factories have been upgraded.

Industry development programme 2017-2019
The main direction of the progress:

Number of projects *(already worked out + more than 50 additional projects with total cost = more than US$660 mln)*		132
Inc.: - new projects **- modernization and expansion**		112 20
The total cost of the projects	bln USD	2,2
Financing 60% of the total cost of the project by the Uzbekistan Reconstruction and Development Fund (UFRD)		
Annual exports	bln. USD	2,5
Created job places	more than	27,000

Industry outlook

The industry is the most attractive industrial branch in the economy for both domestic and foreign investors. In recent years, investment has been drawn from Asia and Europe, and negotiations to establish joint ventures in various regions of the country are under way with Chinese, Turkish, Korean and German companies.

A programme for the further development of the textile and sewing-knitting sectors for 2017-2019 contributes to the confidence of further growth in output being achieved.

In the 1990s, investment in the textile industry was mainly directed to the production of semi-finished goods, which were exported to different countries, and the enterprises were located mainly around the capital. Now, great attention is paid to the creation of enterprises that produce goods of high added value, as well as the development of industry in the different regions.

The programme also envisages the establishment of 112 new, modern, high-tech companies, as well as the expansion, modernisation and technological upgrade of 20 existing enterprises.

A sign of the industry's success is the presence in the country of foreign textile companies such as Young One (manufacturer of the sports brand The North Face), Litai Textile (Jinsheng Group), Indorama Industries, Rieter Machine Works, Daewoo textile of POSCO family.

Jinsheng Group investment project in Uzbekistan

LT Textile International
Organization of textile complex in Karshi (Kashkadarya region)
Total investment – **$ 105 mln.** –
"LT Textile Cooperatief U.A."

Capacity – 22 ths.tn blended yarn
50 mln.sq.m. fabric (two phases)
Created job places – **800**
Export – $ 60 mln.
To be launched in 2017

Another example is the construction and commissioning of spinning production by the Jinsheng Group in the Kashkadarya region, at an investment cost of US$105 million. According to Jinsheng Group Chairman Pan Xuepin, Uzbekistan has a good scale of market opportunities for the development of the textiles industry, taking into account lower production costs, availability of raw materials and proximity to potential markets, as well as an attractive investment climate and developed logistics.

Increasing interest from Turkish investors is also worthy of note. A striking example of successfully implemented projects is the foreign enterprise Best Fashion, which is a fully-owned Turkish investment. The group comprises seven enterprises and produces knitted fabrics and ready-made garments.

During the visit of the delegation of the Republic of Uzbekistan to Turkey in February 2017, discussions were held with Ahmed Can Çalik, chairman of the company Çalık Holding, on the establishment of a textile complex in Uzbekistan for the manufacturing of jeans products. In a meeting with Shahin Eroğlu, chairman of Eroğlu Holding, consideration was given to the production of finished products under the brand Collin's. On the basis of both meetings, agreements have been signed for the implementation of joint projects in Uzbekistan.

Implementation of the cluster system

The next stage in the development of the textile industry of Uzbekistan was the decision of the President to establish cotton textile clusters in four regions.

In the Bukhara region, a cluster will cover all processes – from growing cotton to manufacturing finished products from both natural and synthetic fibres. The plan is to bring together the knowledge of Uzbek scientists and economists and the experience and skills of manufacturers and farmers in a single structure. Some US$123.1 million will be invested and the aims are to produce 6,500 tonnes of yarn, nine million metres of fabrics, 1.5 million pieces of finished products, and to create 3,500 jobs. The basic workforce will be drawn from the graduates of local colleges and Universities.

Human resources

Uzbekyengilsanoat cooperates with foreign training institutes and involves foreign specialists in the training process.

In 2016, Tashkent hosted a ground-breaking ceremony for the construction of the Uz-Kor Textile Technology park, with the assistance of the Korea Institute of Industrial Technology, the Ministry of Economy and Technology of the Republic of Korea, where technologists and designers will be trained. With the introduction of the latest achievements of hi-tech, research will be carried out to develop new products and fabrics for the different sectors of the industry.

Since 2016, the Academy of Rieter, Uzbekistan, has started activities in Tashkent. As the chairman of the company Norbert Klapper noted, the Academy will involve the most experienced technologists of Rieter AG and its partners in the training process.

Uzbekyengilsanoat is negotiating with the Association of Garment Manufacturers and Exporters of Istanbul (ITKIB) on the establishment of mobile training centres, which will provide an opportunity to upgrade skills in the remote regions of the country without interrupting production.

In addition, the country has a Design Institute aimed at training national designers. Many young designers are involved in the production processes of the enterprises and work is being done to organise a fashion show and develop new trends in clothing design, in cooperation with the Design Centre *Sharq Libosrslari*.

Development of trade relations and online marketing

In order to assist enterprises in advancing their products for export, increase the volume

of supplies under direct contracts, and use the export infrastructure organised abroad, *Uzbekyengilsanoat* has established a specialised foreign trade company *Engilsanoatsavdo*. The overseas marketing structure has been steadily improved by expanding the network of distributors and opening the trading houses of *Uzbekyengilsanoat* in traditional and prospective markets. Over 40 are in operation in different countries.

The World Wide Web is widely used to increase and grow sales. Industry is promoting online marketing. Cooperation has been established with specialized foreign and domestic web channels. The use of online trading should facilitate greater geographical diversity of exports and expedite deliveries.

Participation in overseas exhibitions and fairs under the banner "Made in Uzbekistan" has become a common practice. Every year, enterprises take part in more than 40 such events.

Uzbekistan is gradually becoming a centre of the global textiles industry. The work to support and develop the brand "Made in Uzbekistan" is paying off, and it is not an exaggeration to say that, today, Uzbek textiles are a sign of quality, reliability and competitiveness.

Cotton Research Institutions in Uzbekistan - A Summary

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Agriculture is one of the strategic elements crucial to directions in the development of Uzbekistan, and it brings a significant economic benefit to the country. Cotton production and research have a long history of development in Uzbekistan. This paper comprises contributions from a number of Uzbek scientists and details the history of scientific research in Uzbekistan, describing the current organisations, their functions, structures and international relationships. The summaries are below:

Cotton Breeding, Seed Production and Agro-technologies Research Institute (CBSPARI)

The *CBSPARI* was established in 2014 as the successor organisation to the former *Uzbek Research Institute for Cotton Breeding and Seed Production, Uzbek Research Institute for Cotton Growing,* and *Republican Station for Primary Seed Production and Seed Sciences of Agricultural Crops*. It is now the main organisation for cotton sector development in the country and its principal functions and objectives are: (1) identification and development of strategic directions, prospects, priorities, and methodological and practical recommendations for cotton research; (2) organisation and implementation of cotton and alfalfa genetics, breeding, seed production and seed science; (3) conducting extended field trials of novel cotton cultivars and organisation of primary seed production, taking into account different soil and climatic conditions of cotton producing zones with application of the latest scientific findings and intensive agricultural production technologies of world sciences; (4) development of practical recommendations of new and prospective cotton varieties for cultivation; (5) improvement of land reclamation of old irrigation areas, development of a scientific and practical basis for land reconstruction, together with the application and testing of advanced methods of water-saving irrigation technologies and their implementation in irrigation systems; (6) development of crop rotation systems for re-establishment, preservation and improvement of soil fertility; (7) development and implementation of the efficient use of organic and mineral fertilizers, land and water resources, agrotechnologies for preserving soil fertility in cotton cultivation; (8) development of recommendations on testing and using cotton herbicides, defoliants and growth regulators; (9) development of fundamental, applied and innovation research projects and programmes of main, repeated, cereal crops and inter space crop

cultivation; (10) development and introduction of advanced, high-performance and robust agricultural machines; (11) preparation of well-qualified scientists and specialists for cotton science, improvement of the professional skills of the institute's staff and conducting seminars and training; (12) expanding and strengthening cooperation with the leading foreign research institutions, educational organisations, international centres to attract international research and educational grants and provide exchanges of specialists, information and experiences.

Structure and research programmes

The *CBSPARI* has 19 research laboratories, five departments and 12 research and experimental stations to conduct research in the different soil-climatic conditions of the country. Basic, applied, and innovative research projects are conducted on the basis of prioritised cotton research directions for the country, including but not limited to the (1) development of new varieties using modern genetics, genomics, breeding, and physiological and biochemical technologies that are tolerant to pests and diseases, and which are early-maturing, high-yielding, give high fibre quality and quantity, and are drought tolerant (headed by Prof. V.V. Avtonomov); (2) development of the initial breeding materials using the marker-assisted selection (MAS) technology that are tolerant to biotic and abiotic stress factors (headed by Dr. B.A. Khalmanov); and (3) development of cotton varieties tolerant to drought and salinity (headed by Prof. S.S. Alikhodjaeva).

Main achievements and key contributions to the cotton sector of the country

The work of the cotton researchers of CBSPARI has resulted in a shortening of the maturity period by almost 45-50 days, and the fibre length of G. hirsutum cultivars has been significantly increased. A range of cultivars created by the scientists of the CBSPARI has been commercialised for growing in specific regions.

International collaboration and ties

Uzbek cotton researchers of the Institute have established international collaboration with the USDA-ARS, CRDF/USA, IAEA/Vienna/Austria, and ICARDA/CGIAR. In 2012, a Memorandum of Understanding was signed by the CBSPARI and Laboratory of Androgenize, University of Picardie Jules Verne/Amiens, France. Since the end of 2015, Shinjan Uygur Agriculture Academy has been collaborating with the CBSPARI. Within these collaborations, active scientific visits and exchange programmes are being performed annually.

Prospects and targeted goals

As the main cotton research body in Uzbekistan, the CBSPARI will continue its research projects on novel variety, agrotechnology, and agriculture machine development using the latest advancements made in world cotton science. Utilisation of sequenced cotton genomes and application of novel genomics and MAS technologies will be prioritised in the Institute.

The CBSPARI will specifically target the preparation of a new generation of cotton scientists, and promote scientific cooperation with international research centres.

Institute of Genetics and Plant Experimental Biology (*IGPEB*)

IGPEB was established in 1997 by merging the *Institute of Plant Experimental Biology* (est. 1948) and the *Institute of Genetics* (est. 1992). Currently, the organisation has more than 235 employees, comprising 36 scientific researchers, a number of graduate students, lab and field technicians.

Missions and goals

The Institute`s main focus is on the following areas: (1) conservation, enrichment, maintenance, comprehensive studying and effective utilisation of plant genetic resources; (2) genetic, morphological, molecular, physiological and biochemical evaluation of cotton germplasm collection in association with valuable agronomic traits; (3) studying genetic patterns of inheritance and variability of quantitative and qualitative traits on the basis of the global biological and genetic diversity of germplasm collections (cotton, wheat, soybean etc.); (4) development of new crop varieties with valuable agronomic traits using conventional and marker assisted selection approaches; (5) development of modern biotechnology approaches and their application in agriculture and medicine; (6) studying the physiological and biochemical mechanisms of resistance to adverse environmental factors and their impact on human, animal and micro-organism genomes; and (7) studying and utilisation of plant pathogens to identify resistant plant varieties.

Structure

There are several laboratories and experimental field stations conducting research in:

1. Wilt resistance genetics and comprehensive trials of new cotton varieties. The laboratory focuses on the development of new cotton varieties with complex agronomic traits, resistant to diseases and pests, as well as being adapted to extreme environmental conditions.
2. Biochemical genetics. The laboratory focuses on the identification of protein and isozyme markers, specific to different cotton species, varieties and lines, and is studying the correlation and inheritance of these markers with valuable traits.
3. Cotton immunity. The laboratory focuses on the study of molecular mechanisms of cotton immunity to the plant diseases.
4. Plant productivity and adaptability genetics. The laboratory has been studying interspecific and intraspecific patterns of inheritance of quantitative and qualitative traits and development of new cotton varieties.
5. Crop genetics. Main research focuses on studying the genetic basis of rust resistance in bread wheat, and development of varieties with improved bread-baking properties.
6. Applied biochemistry of plants. The laboratory mainly studies the plant physiology, biochemistry, and biotechnology in the populations of disease resistant plants.
7. Cotton systematics and introduction. Continuing research aimed at preserving, enriching and utilising the global cotton germplasm collection; studying the cotton gene pools and elucidating the fundamental questions of evolution and phylogeny of *Gossypium* genus, as well as identifying species and their genotypic forms with valuable traits in order to

develop effective strategy for genetic-breeding programs.

8. Genetic toxicology. The laboratory deals with soil ecology, environmental protection and development of biological products of microbial origin.

9. Classical and applied plant genetics. There are two research topics of the laboratory – genetics and breeding of cotton, and soybean. In the laboratory, for the first time, cotton lines with determinate growth state have been developed and studied.

10. Embryogenetics. The laboratory works on chasmogamous and cleistogamous types of cotton flower using modern breeding and genetics approaches.

11. Ecological genetics. The laboratory conducts research on cotton drought tolerance and genetic patterns of "genotype-environment" interaction.

There are four scientific experimental field stations of *IGPEB*:

Dormon. The field station is located on the institute`s territory near Dormon village of Kibray district (2 km away from Tashkent) on an area of 10.2 hectares, for experimental field trials of cotton, wheat, soybean, corn and other crops in relation to genetics, breeding, as well as seed microbiology, physiology and biochemistry in the frames of basic and applied innovation research projects.

12. Zangi Ota experimental field stations in Zangi Ota district of Tashkent region (60 km from the main Institute location) on about 40 hectares, of which 25 are occupied by cotton and five by wheat. The remaining area is devoted to other experimental crops and station facilities. The focus is on genetics, breeding, seed production, physiology, biochemistry of cotton, development and evaluations of new cotton varieties. Moreover, here, 500 cotton accessions from cotton germplasm collection are subjected to evaluation and seed renewal each year.

13. Piskent field station, Tashkent region, is about 80 km away from the main Institute location and covers 16 hectares, of which ten and six hectares are allocated for cotton and wheat experiments, respectively. The field station serves as an elite nursery for wheat and cottonseed multiplication and propagation.

14. Fergana field station in the Baghdad district of Fergana valley (270 km away from the main Institute location) has an area of about 20 hectares, of which 20 are allocated for cotton, nine for wheat, and one for other crops. Researchers conduct experiments on evaluations of cotton and wheat varieties performance in Fergana valley conditions.

Main achievements and key contributions to the domestic and global cotton sectors

The *IGPEB* has won wide international recognition in such areas as genetic research, biochemistry, and physiology of plants, biotechnology, molecular breeding, and others. A worldwide cotton germplasm collection is maintained, updated and examined in the Institute (Acad. A.A. Abdullaev`s group) and serves as a genetic source for the development of new cotton varieties with valuable agronomic traits.

The activities of the Institute have resulted in the development and production of wilt-resistant cotton and wheat varieties with valuable agronomic traits. For example, successful utilisation of wild and exotic germplasm resources brought the development of wilt resistant cultivars of the *Tashkent* series (*Tashkent* 1, 2, 3 and 6), which were grown on more than 1.5 million hectares

in the Central Asian countries and Kazakhstan during the 1970s. Another high-yielding, drought- and salt-tolerant cotton cultivar, *AN-Bayaut*-2, developed in the 1980-1990s, has occupied significant cotton growing areas in the country. In the 1990-2000s, two cultivars (*Yulduz* and *Mehnat*) became widely commercialized. Recently, on the basis of interspecific hybridisation with wild cotton species, a number of prospective lines and new commercial varieties have been developed and released for farmers.

The Institute regularly organises methodical seminars and workshops for farmers to help them obtain better yields with high quality. Evidence-based guidelines and technologies, developed by the Institute's scientists, for pre-sowing treatments, mineral nutrition and deflation, are widely applied in several cotton-growing areas of the country.

Researchers have revealed the trigger mechanisms of pathogen resistance, which are used as immunological markers for rapid evaluation of cotton varieties resistance to *Verticillium* wilt, and have also developed a test system for detecting the immunity of cotton to various diseases.

Other work has included the application of molecular markers to study phylogenetic relationships among diploid and amphidiploid species, which revealed a need to revise the existing concept of the origin of modern cotton.

Implementation of international projects of the Institute`s scientists in collaboration with USDA's Agricultural Research Service (ARS) have included work associated with fibre elongation, natural leaf defoliation, Fusarium wilt resistance, and detailed analysis of the worldwide collection of *G. hirsutum* and *G. barbadense* germplasms with molecular markers. According to the results, *G. hirsutum* variety germplasm has a narrow genetic base, but sufficiently wider diversity exists in the exotic germplasm at a molecular level.

International collaborations and ties

Besides working with ARS, the *IGPEB* has developed scientific collaboration and ties *IGPEB* with the International Cotton Researchers Association, Texas A&M University, Plant Stress & Germplasm Development Research, Bioversity International (former IPGRI), International Centre for Agricultural Research in Dry Areas (ICARDA), Institute of Cotton Research of the Chinese Academy of Agricultural Sciences (CAS), Xinjiang Institute of Ecology and Geography of the CAS, Xinjiang Technical Institute of Physics & Chemistry of the CAS, Biotechnology Research Institute, Xinjiang Academy of Agricultural and Reclamation Science, Mississippi State University, Agricultural University of Akola and Vienna Biocenter of Vienna University.

Prospects and targeted goals

Uzbekistan faces environmental challenges of drought and soil salinity. Up to 53% of irrigated land is exposed to soil salinity, which greatly reduces the productivity of cotton. To overcome this problem, along with management of land resources, there is a huge need for the development and introduction of salt-tolerant and highly productive cotton varieties, which can increase economic benefit to farmers and maintain sustainable farming in these regions. This issue will be among the priorities of the Institute`s research programs.

The Institute has been working to develop varieties suited to machine harvesting and to combat *Fusarium wilt,* and future goals include the development of early-maturing and long-staple varieties. The development of a national database of Uzbek cotton germplasm resources is also an aim.

Centre of Genomics and Bioinformatics (*CGB*)

The *CGB* was established in 2012 with the specific goal of creating a research and educational platform and environment for genomics and

bioinformatics science disciplines in Uzbekistan. The Centre was established as an interagency public research institution under the three major Ministries – the Academy of Sciences, the Ministry of Agriculture and Water Resources, and the former *Uzpakhtasanoat* association of Uzbekistan, which assigned specific tasks and financial aid for the *CGB*. In 2015, the *CGB* was reorganized as a research and public educational institution under the Academy of Sciences of Uzbekistan.

Mission and goal of the *CGB*

The *CGB* is fully concentrated on conducting research and education in modern 'omics' sciences and targets to develop and coordinate 'omics' research and education efforts in Uzbekistan and neighbouring Central Asian countries. Specific and main activities include (but are not limited to): (1) conducting basic, applied and innovative investigations and integrated analysis for priority genomes and genetic diversities; (2) exploring the structure and activity of valuable genes, proteins and metabolites of agricultural crops, medicinal and industrial plants, microorganisms, animals, humans, and other biological objects using modern methods of genomics and bioinformatics; (3) developing modern breeding programmes such as gene and cell engineering, marker-assisted and genomic selections, and virtual breeding; (4) developing environmentally safe, superior quality, productive, early-maturing and pest-and disease-resistant "genetically enriched" MAS and "biotech" crop varieties and animal breeds, adapted to the different soil and climatic conditions; (5) organising primary field trials and seed production systems for genetically engineered/MAS cultivars, and other "omic's" technologies, and their commercialization in the region and beyond; (6) testing and certification of genetically modified organisms and their products imported or exported to/from the country for bearing genetic constructs, and coordinating the activities of GMO-testing laboratories in the country; (7) developing educational programmes and scientific degree curricula on modern genomics and bioinformatics scientific fields, and preparing highly-qualified scientific cadre for these directions in both national and regional levels; (8) promoting international scientific cooperation in genomics and bioinformatics.

Structure of the *CGB*

The Centre has more than 120 personnel, including 45 researchers working in six modern research laboratories and three research units. Research laboratories include *Transgenomics and Tissue Culture*, *Structural and Functional Genomics*, *Bioinformatics", "Plant Resistance Genomics", "Proteomics* and Metabolomics" and "Marker-Assisted Selection". There are three research Units, which include "Special Field Trial and Seed Production Station", "Training Unit on Genomic Technologies" and "Certification and Testing Unit for Genetically Modified Organisms and Their Products".

Major scientific achievements of the *CGB*

Concentrating mainly on cotton research, scientists of the *CGB* have accomplished several key results in cotton genomics and biotechnology over the past decade.

Projects and international collaboration

During the period from 2002-2013, ten large cotton genome investigation projects were funded by the government of Uzbekistan that resulted in advances in cotton genomics and biotechnology research. Additionally, six mutually beneficial bilateral cooperative projects of *CGB* were funded through the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) and Texas A&M University Systems, with support from the U.S. State Department. These were the most successful of all US Government supported programmes in Uzbekistan, since their activities were of global importance and of mutual benefit. 16 young Uzbek scientists were trained in US laboratories; a number of scientific achievements were made (resulting in more than 100 scientific papers and book chapters in internationally peer-reviewed and local journals) and a number of patents established, and conferences as well as workshops held.

Future targets and research at the *CGB*

Genetic mapping, identification and sequencing of genes responsible for pest and disease resistance, drought and salt resistance, early maturity, fibre yield and quality are being pursued in the Centre. Genomics and bioinformatics approaches will also be applied to other priority crops. Novel genome technologies are in prospect, together with new genetic engineering technologies. Extensive field trials and further commercialization of RNA interference and MAS varieties will be carried out.

To ensure competitiveness of scientific development, specific attention will be given to increase mutually beneficial international collaboration, as well as to the continuous training of young scientists and students in Uzbekistan and elsewhere. The Centre will carry out a wide range of activities with other scientific organizations to assess the risk of biotech crops and their products and develop a legal framework for consumers.

Conclusions

Uzbekistan has a long history of cotton farming and production that has resulted in well-established cotton research institutions, conducting both traditional and modern genetics, genomics, breeding and biotechnological investigations to improve cotton cultivars. There are several cotton institutions responsible for the development of cotton mechanisation, agrotechnologies, cotton processing, ginning, fibre and seed quality testing, as well as seed preparation and its monitoring. These institutions and qualified cotton scientists in each field, supported by government support and by international collaboration, some highlighted in this article, will ensure the sustainability of cotton production in Uzbekistan.

American Cotton Shippers Association

American Cotton Shippers Association

International Cotton Institute | June 11 - July 19, 2018

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Advanced Equipment and Technology of Primary Processing of Cotton and Estimation of its Quality

R.A. Gulyaev, General Director, Doctor of Technical Sciences

JSC Pakhtasanoat Ilmiy Markazi

Scientific and technological progress in the cotton sector is provided by the introduction of new techniques and technology, based on the activities of the JSC *Pakhtasanoat Ilmiy Markazi* (Scientific Research Centre of Cotton Industry), K*B LLC Pakhtagin*, JSC *Uzengilsanoatloyiha*, some institutes of the Academy of Sciences, Tashkent Institute of Textile and Light Industry and other educational and scientific organisations of the republic.

Joint Stock Company *Pakhtasanoat Ilmiy Markazi* is a leading industry research centre for primary processing of seed cotton. It is the assignee of the Central Research Institute of the cotton ginning industry, organized in 1926, and is a part of the *Uzpakhtasanoatexport* Holding Company.

The approval, testing and implementation of new technical solutions in real production conditions are executed in five cotton ginneries, which have the status of experimental enterprises – in Baghdad, Angor, Kushkupir, Asaka and Chinaz.

Scientists and specialists of the Centre have created almost all the domestic equipment for cotton ginneries – production lines, drying-cleaning complexes, gins, linters, lint cleaners, equipment for workshops for the preparation of planting seeds, machines for the mechanisation of labour-intensive processes and transport and devices, devices for the evaluation of all quality characteristics of cotton products.

Over the years of its activity, the Centre's team of scientists has undertaken fundamental research into the processes and operating modes of machines, improving the principles and regimes of their operation. New, high-performance, energy-efficient machines have been developed, and harvesting and primary processing of seed cotton have been improved. Many of the machines, mechanisms and implementation methods for drying, cleaning, humidification and pressing have no equivalents elsewhere.

The Centre carries out the preparation and periodic revision of all industry standards and technical documentation for seed cotton, cotton products and cotton seeds (about 40 titles), and methods of testing, and prepares the appropriate documentation. This year, the Centre, working with Sifat, has prepared a new version of the state standard for cotton fibre and, working with

the Agency of Science and Technology, specialized universities and machine-building enterprises, has developed a comprehensive programme for the primary processing of seed cotton during the period 2017-2025.

Special mention should be made of the contribution made to the improvement of the classification and certification of seed cotton and cotton fibre, using new approaches that take into consideration world practices. In-depth research and analysis of world classification procedures and international trade practices have been conducted jointly with Sifat and experts of the cotton ginning industry.

Uzpakhtasanoatexport pays special attention to the provision of competent personnel, given the deep knowledge required by the industry's employees of modern (including foreign) technology. A special unit has been set up within the structure of the Scientific Centre for the development of skills and retraining of personnel in such areas as compliance with industry regulations, to improve the quality of products and labour productivity, and how to reduce costs. Every year, more than 1,000 industry specialists and middle-level employees improve their qualifications at the Centre.

The Centre's work is funded by grants from the Agency for Science and Technology under the Cabinet of Ministers of the Republic of Uzbekistan. Over the past 10 years, more than 60 patents have been received and maintained and more than 30 licensing agreements have been concluded.

The Centre has made a significant contribution to the technical renewal of cotton ginneries. Two major programmes involved the commissioning of specialised workshops for the preparation of planting seed, along with the modernisation and reconstruction of cotton ginneries.

In the former regard, both domestic equipment (bunkers, cleaners, seed sorters, calibrators and the like) and Spanish-made sorting and calibration equipment have been introduced for the preparation of cottonseed (fuzzy and de-linted). Automated control of technological processes has been implemented in five workshops at the Kamashi, Biruniy, Alimkent, Mitan and Uychi ginneries. The most common devices include: pneumatic-mechanical cleaners and sorters of fuzzy planting seeds; two-stage seed delinters; universal seed disinfectants; bare seed calibrators; fuzzy and bare seed bunkers. The new technologies have resulted in a reduction in the amount required per hectare by an average of 20-30%, (amounting to an annual saving of about 50-60 thousand tonnes of seed), a reduction in the cost of producing seed cotton, and an increase in yield and production of cottonseed oil.

The entire complex of equipment for processing seed cotton, from dryers to packaging machinery has been addressed, and modern automated systems implemented. The equipment developed takes account of manual and machine-harvested seed cotton with high humidity and contamination. Modern, simplified probes that give digital readouts have been introduced to measure the temperature of seed cotton in stacks. Working jointly with Sifat, the Centre has developed and organised

the production of a device for monitoring the temperature of the drying agent within dryers, together with a device for estimating the Micronaire Index. Typical equipment also includes a universal heat generator, a fuel heater, and generators of humidifying agent for raw cotton and fibre. The The technique of using natural gas (liquified propane) to dry cotton seed for use as an additional source of fuel has been tested at a number of ginneries in recent years.

New cleaners have been introduced in the pneumatic transport systems at the Baghdad and Jandor cotton ginneries. Replacements for worn components are more cost-effective and reliable. Modernisation of UHK aggregates at cotton ginneries has brought increased productivity and operational reliability, reduced cotton fly waste and improved cleaning effect.

Integrated technology for the humidification of seed cotton and cotton fibre with new, patented devices has also been introduced, with an eye on improving fibre properties and raising demand for Uzbek fibre. The new humidification technology also uses less energy and offers cost savings from pressing, packaging and transportation. Other machinery has been developed to reduce energy consumption and assist in trash removal. Rotary saw-cutting machines, developed in conjunction with the Navoi Mining and Metallurgical Company, have been tested, and equipment developed for fire control.

Overall, savings have been achieved across the spectrum and fibre grade has risen.

New generation equipment is now being developed for the primary processing of cotton, which it is planned will be introduced as part of the modernisation of the Hanka cotton ginnery in Khorezm. Priorities include the cleaning of seed cotton that has high humidity and trash content, resulting from the gradual transition to machine picking. This year, a new, automated gin was planned for design and manufacture.

An automated device for rapid, accurate determination of trash content and recording seed cotton weights at the time of procurement from farmers, developed in cooperation with the Tashkent mechanical plant, is in the process of testing and implementation. An instrument to measure moisture at increased speed that eliminates subjective actions by the operator and that gives improved accuracy is also under development. Another new instrument has been designed for the non-destructive measuring of the fuzziness of seeds. The device is characterised by low power consumption, greater reliability and is environmentally friendly compared with conventional chemical methods.

Devices that are energy efficient, reliable and easy to use require minimal capital expenditure, improve accuracy and efficiency, monitor cotton fibre processing and assist quality management (which is reflected by a reduced number of complaints).

Enterprises that are part of the *Uzpakhtasanoatexport* depend on innovative technologies to achieve a high level of industrialisation. The Scientific Centre is ready to make maximum effort in the field of cotton -processing machinery and technology, which will guarantee the competitiveness of Uzbek cotton.

Challenges in Cotton Research

Keshav Raj Kranthi, Ph.D, Head, Technical Information Section, ICAC

Cotton has always been a challenging crop for researchers. Stagnating yields, recalcitrant pests, rising production costs, input optimization, sustainability and climate change are some of the main research challenges in cotton across the world. Eight countries – India, China, USA, Pakistan, Brazil, Uzbekistan, Australia and Turkey, – contribute 87% of global cotton production. Breakthroughs made in any or all of these eight countries would significantly alter the global cotton canvas.

Researchers have been striving hard to utilize the current state-of-the-art scientific advances, to improve the genetic base and develop new cotton varieties for high yield potential, premium fiber quality, pest resistance and climate resilience. Experience shows that, despite tremendous efforts, the released varieties would still be vulnerable to one or a few biotic or abiotic stress factors. Though cotton is considered to be an environmentally robust species, many cotton varieties are constantly affected by a wide array of biotic factors, such as insects, nematodes, weeds, diseases etc., as well as abiotic factors such as weather and soil. These challenges vary in scale in different parts of the world.

Nevertheless, as a result of constant research efforts, productivity and fiber quality have improved in many parts of the world. However, global yield stagnation over the past 10-12 years has been one of the major concerns for researchers. It would be interesting to envision the nature and extent of the impact that new discoveries and inventions could have on the cotton sector as we move into the future. This article attempts to list the most daunting challenges and the most promising technological advances that could influence cotton production, now and in the near immediate future.

The main research challenges are :

Stagnating yields

Recalcitrant pests

Rising production costs

Input optimization

Climate change and Sustainability

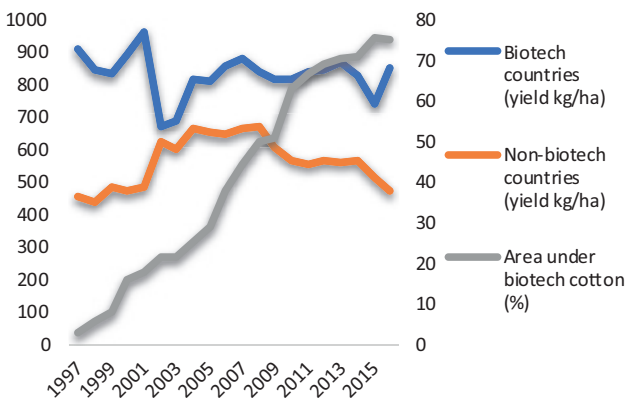
Other challenges such as declining acreage, low mechanization, underutilization of genomics data, cotton traceability and technology transfer are also important in many countries.

The yield challenge

Global average yields during 2004 to 2014 ranged from 748 to 802 kg/ha at an overall eleven-year cumulative average of a record 776 ± 09 kg/ha. New technologies were probably

at their zenith after 2004. Dual-gene Bt-cotton had made its entry during 2004-2006, several new high-yielding varieties and hybrids, and several new generation insecticides with novel modes of action were introduced during 2002-2006. These technologies have been used extensively on cotton across the world over recent years. Several research studies affirmed the positive role of these technologies in facilitating higher productivity. However, yields at 693 Kg/ha during 2015 were lower than those in any of the years in the preceding decade. While the contribution of advanced technologies cannot be undermined, it is intriguing to see that the global average cotton yield was 693 kg/ha in 2015 with 75% of the global area under biotech cotton, which is actually lower than the average of 756 kg/ha in 2004 when the area under biotech cotton was only 25%.

Data show that the trends in global yields appeared to have been unaffected by the extensive use of new pesticides or the increasing trend in adoption and increase in the area under biotech cotton from 25% in 2004 to 75% in 2015.



Area and productivity in the top five cotton growing countries

	Area (mln. ha)		Yields (kg/ha)		
	Area in 2015	% Global area	2007	2015	% change
Brazil	955	3.1	1487	1350	-9.21
USA	3,268	10.7	985	859	-12.79
Pakistan	2,869	9.4	649	528	-18.64
India	11,877	39	554	484	-12.63
China	3,060	10	1282	1553	21.14
World	30,490	100	756	693	-8.33

Out of the 80 cotton growing nations, eight countries, India, China, USA, Pakistan, Brazil, Uzbekistan, Australia and Turkey contribute 87% of the global cotton production. Amongst these, the first five countries account for about three quarters of global cotton acreage and production. Production constraints in these countries clearly impact global production. While yields in China have been on the constant rise over several years, yields in India, Pakistan, USA and Brazil have almost plateaued at least over the past decade. In fact, yields in 2015 in those four countries were 9 to 18% lower, as compared to the yields in 2007. All five countries have access to the best of advanced technologies, including biotech cotton, which has been cultivated over the past 7-21 years. Although biotech cotton is approved for commercial cultivation in 15 countries, about 92% of the biotech cotton area is in the five countries. While yield in non-biotech countries may not come as a surprise, the indifference of yield-trends to enhanced adoption of high profile biotech technologies and new pesticides in biotech countries does need critical examination.

It would be a huge challenge for researchers across the world, firstly to establish the key factors that led to the initial yield enhancement in China, Australia and Brazil, and secondly to unravel the reasons for the subsequent plateauing of average yields in major cotton-growing countries, despite the significant increase in adoption of the new technologies during the eleven-year period from 2004 to 2014.

Research publications indicate that increasing levels of insect resistance to insecticides and Bt-cotton, as well as weed resistance to herbicides, may be key factors that could be gradually diminishing the value of biotech cotton and agrochemicals in cotton production. Pests keep adapting to new technologies and emerge in new forms as new races, biotypes or strains. Thus researchers are confronted time and again with new kinds of pest challenges.

The pest challenge

The cotton crop is regarded as a haven for insects, some of which can cause huge economic losses. Cotton insect pests keep

changing in their order of importance and have always been seen as tough subjects of research. Weather, varieties and agrochemical applications influence both pest control and insect occurrences. Insect resistance to biotech cotton and insecticides complicates and aggravates the pest problems further.

Cotton bollworm, pink bollworm and whitefly are serious problems in the five major cotton-growing countries and in many other parts of the world. Currently, boll weevil is found to be causing serious concerns in Brazil. The leaf curl virus is an intractable problem in India and Pakistan. Pink bollworm, whitefly and boll weevil are being managed very efficiently in the USA, using specific eradication programmes combined with IPM strategies. The bollworms, boll weevil, whitefly and leaf curl virus can cause debilitating effects on cotton production, if not properly addressed by researchers.

The production cost challenge

Cotton was modified into Bt-cotton to kill insects and into herbicide tolerant HT-cotton to tolerate herbicides. The emergence of Bt-resistant bollworms and herbicide resistant weeds have posed new challenges to research. Pink bollworms in India were found to have developed high levels of resistance to Bollgard-II (Cry1Ac+Cry2Ab). This is an issue that can have serious consequences for cotton production. Though pink bollworm resistance to Bt-cotton has been reported from China and Pakistan, the problem is not as severe as it is in India. Whitefly has developed high levels of resistance to insecticides in many parts of the world. In India and Pakistan, insecticide-resistant whitefly not only causes severe crop damage, but also transmits the dreaded and incurable cotton leaf curl virus.

The problems of bollworm, boll weevil, whitefly and leaf curl virus are known to spring back time and again when producers, technologists and production systems become complacent or over-confident because of high profile technologies such as new varieties, biotech cotton and new pesticides. With increasing pest problems, pesticide use increases concomitantly.

The cost of seeds, agrochemicals, labor and transport are ever increasing. In the small-scale farming systems of Asia and Africa, input management is a big challenge, especially when technologies are not properly disseminated. ICAC data show that the global average production cost of seedcotton and lint doubled in the 12 years after 2001. Fertilizer costs doubled and weeding costs increased three-fold. Fortunately, cotton prices increased after 2009 and remained reasonably high to offset the increased costs of production. However, there is no guarantee that cotton prices will always remain high enough to sustain cotton production at high costs.

Seed costs are high in India due to hybrid cotton, the seeds of which are produced in a labor-intensive manner. Soils are becoming degraded and depleted of nutrients in many countries; they need to be fortified with huge quantities of organic manure or chemical fertilizers to harvest high yields. Major insect pests have developed resistance to recommended insecticides and Bt-cotton, thereby necessitating repeated insecticide use. Labor shortages have increased in many countries due to increased labor wages and employment-guarantee schemes in some countries. The cost of transport has also increased significantly over the years. All these factors have resulted in enhanced costs of production.

Researchers must focus on reducing production costs by developing efficient seed production technologies, and reducing input costs by

enhancing nutrient use efficiency, water use efficiency and precision use of pesticides. Nanotechnology applications can improve precision targeting and input use efficiency. Small-scale mechanization can circumvent the problem of labor shortages. Researchers must aim to achieve a breakthrough in reducing overall costs of production to make cotton more competitive with synthetic fibers.

The input challenge

Input optimization is one of the biggest challenges in cotton. Fertilizers and pesticides are used indiscriminately in some parts of the world. A fine balance of pest-tolerant varieties, optimum fertilizers, appropriate pesticides in a favourable season can result in high yields. However, despite the best climate, a pest-susceptible variety or indiscriminate use of fertilizers or pesticides can cause complications leading to poor yields. Under organic systems, the variety plays the most crucial role in deciding organic inputs for high yields. Pest-resistant and climate-resilient varieties are more important for organic farming compared to agrochemical-oriented farms. Nevertheless, input optimization will still be a big challenge under all situations.

In the quest for high yields, the use of agrochemicals has almost doubled in China, India, Pakistan and Brazil over the past ten years, despite cultivating bollworm-resistant Bt-cotton. Insecticide usage has been increasing constantly over the past 10 years in India, Pakistan, China and USA for the control of thrips, whitefly, mealybugs, pink bollworms and recently also for the American bollworm. Insecticide use for boll weevil control is a major concern in Brazil and Latin American countries. Herbicides are used in HT crops to control weeds. Since only a particular herbicide can be used for a specific HT crop, repeated application of the same herbicide led to the emergence of herbicide-resistant weeds. Herbicide use increased over a period of time. Enhanced use of herbicides to control resistant weeds in the USA and Brazil is an emerging concern. Thus, there has been a rising trend in the usage of insecticides and herbicides in all the top five cotton-growing countries over the past 10 years. Indiscriminate use of pesticides complicates the pest scenario to cause serious production problems.

Cotton is mainly grown for its fiber and is thus considered as a non-edible crop. This consideration, coupled with the high commercial value of the fiber, entices producers to use fertilizers and pesticides liberally in anticipation of higher returns for investment. Chemical usage prompts a series of reactions. Many varieties respond well to nitrogenous fertilizers. Higher nitrogenous fertilizers render the crop conducive to many species of insects. Insecticides are used to control insects. With repeated insecticide applications, insects develop resistance to insecticides, thereby warranting more insecticide use. Similarly, weeds develop resistance to herbicides. This problem becomes more acute with HT cotton, because of repeated application of only a single herbicide to which the HT crop is resistant. This eventually aggravates pest resistance to pesticides, pest resurgence and a recurrent need for excessive pesticide use. Indiscriminate use of pesticides leads to environmental problems,

higher production costs and unsustainability. Thus, yield stagnation, pest resistance and sustainability are challenges that are related to each other.

Climate change and the sustainability challenge

It is paradoxical that natural resources are self-replenishing and abundant in nature yet become constrictingly limited when they are used in agriculture. Climate, ecosystems, soil and water are dynamic in nature. They keep changing all the time. Although inherently resilient to drought and climate change, cotton yields can be severely affected by weather factors, mostly depending on the relative sturdiness of the variety. Human interventions cause perturbances to ecology and soil. This eventually affects the sustainability of agriculture. Many times, agrochemical applications and agronomic operations result in varied physiological responses from the crop, leading to very beneficial or disastrous implications. The biggest challenge to researchers across the world is to harness natural resources for crop production in a sustainable manner without disrupting the delicate ecological balance that sustains agriculture and the naturally-occurring trophic levels. In addition to human interventions, climate change can seriously affect ecological balance and sustainability. New insects, weeds and pathogens arise due to production practices and climate change, thereby complicating the already complex biotic stress factors in the cotton ecosystem. Thus, researchers have a huge challenge at hand, not only to develop strategies to ensure sustainable cotton production, but also to combat the effects of climate change.

Integrated pest management and integrated nutrient management together can play a significant role in orienting cotton production systems towards sustainability.

Other challenges

Declining area: Cotton area has decreased in some major cotton-growing countries over the recent past, as in the USA, China and Brazil. The reduction has been to the extent of 80 to 90% in the past few decades in Mexico, Egypt, Uganda, Sudan, Paraguay, Uruguay and Colombia. Insect pests, diseases, labour issues and economic vulnerability are believed to have been a few of the major factors that have influenced the decline in acreage. If researchers succeed in finding elegant and viable solutions to these problems, it is possible that the area would increase again.

Low mechanization in Latin America, Asia and Africa: In many countries, area has declined in recent years, mainly due to labour shortages and high wages. Mechanization, especially for smaller land holdings, may revive area in Latin America, Africa and Asia.

Need to utilize genomics data: The cotton genome has recently been decoded. The genomes of *Gossypium raimondii*, *Gossypium arboreum* and *Gossypium hirsutum* have been sequenced and made available in public databases. This is a huge advance in science. However, the gains from this massive exercise have yet to be made by cotton researchers across the world. While genome sequencing was supposed to have accelerated varietal improvement through precision breeding, data show that many of the plant breeding efforts, especially in developing countries, appear to be continuing in the same old conventional manner, independent of the latest genomics data. There is an urgent need to revamp plant breeding systems that fully utilize the precious genomics information.

Traceability and credibility: Cotton in its multitude forms of fiber is nature's gift to

mankind. Many misleading claims of premium quality fabrics have recently caused concerns with regard to the credibility of genuine producers. Cotton traceability technologies, to ascertain the credibility of claims, have emerged as recent topics of research. Molecular biology and nanotechnology have added new dimensions to the science of traceability that could provide reliable tools with which to certify authenticity and textiles that are genuine as per label claims.

New directions in cotton research

Crop production research can benefit immensely from the impressive scientific advances made in basic sciences such as molecular biology, nanotechnology, electronics and communication.

The tremendous improvements made in nanotechnology, molecular-biology, electronics, lasers, remote-sensing and wi-fi communication should be integrated into cotton research programmes to develop simple and sensitive diagnostic tools to detect crop stress for 'precision usage' of chemicals, water and energy. These techniques can also be used for cotton traceability.

Algorithms, models, Apps on yields, pests, diseases and markets will benefit producers and planners.

Research on signal-transduction pathways in plants and volatile-chemical spectrum in cotton ecosystems of tri-tropic inter-insect, inter-plant communication and plant response to stress will enable development of robust approaches to mitigate crop stress.

Climate-resilient, multi-adversity-resistant varieties must be developed by integrating phenomics, genomics and metabolomics to tag and assemble important traits in elite varieties.

Fine-tuning and integration of input management to harmonize interactions between pesticides, fertilizers, water, soil health and crop ecology and non-target organisms, through conservation agriculture, crop residue management and 'cotton-legume' cropping systems, can enhance soil health and improve carbon-sequestration.

The future of biotech cotton

Over the past 20 years, insect-resistant and herbicide-tolerant biotech cottons have delivered impressive benefits.

There is a need to source valuable genes from gene banks, discover new genes and tag genes for economic traits from cotton genomic data for the development of new biotech cotton through genetic engineering and marker assisted breeding.

The next generation of biotech cotton needs to be strengthened for resistance to biotic and abiotic stress using RNA interference (RNAi) along with novel genes for sustainable control of bollworms, boll weevils, sap-sucking insects, cotton leaf curl virus disease, wilts and bacterial blight, while adding new traits for nitrogen use efficiency, drought-tolerance, water use efficiency, climate resilience and premium fiber qualities.

Trans-gene pyramiding at a single desired locus through the recently developed CRISPR-CAS9 technology by genome edited locus-specific site directed integration will immensely accelerate introgression of the multiple traits into native varieties of new biotech cotton.

The future of conventional breeding

The ever-changing market demands for specific fiber qualities will determine the dynamics of conventional breeding. While biotech cotton is based on the introduction of only a few genes, these traits are only superimposed over desirable traits in local, high-yielding, adaptable elite varieties through conventional breeding. Thus, the future of cotton would certainly hinge on breeding. Genotyping and phenotyping of germplasm-gene-pools, enhancement of genetic-diversity, development of pre-breeding lines, introgression of rare-valuable genes from wild species and utilization of genetics, genomics and molecular markers will form the core of conventional cotton breeding in the near immediate future. The draft genomes of *Gossypium hirsutum, G. herbaceum,* and *G. longicalyx* in conjunction with the compact genome of *G.raimondii* as reference genome with QTL maps can be utilized through Marker-Assisted-Breeding to develop climate-resilient, stress-resistant, high-yielding varieties or parents for hybrid development with desired traits of superior agronomic performance and improved spinning performance for premium quality yarn.

Transfer of technology

Technology transfer from 'lab to land' and 'lab to marketable products' has always been the greatest challenge in agriculture, especially in small-scale production systems and developing countries. But, with rapid strides made in 'information technology', cotton cultivators and entrepreneurs now are more techno-savvy than ever before. Mobile phone and internet connectivity have ushered in a revolution in communication and technology transfer. It is now relatively easy for researchers to identify entrepreneurs through internet to transfer innovations; to exchange information through a web-forum like ICRA; and for extension workers to transmit technology-advisories periodically through voice mails, SMS, web-portals, e-mails, mobile-apps, audio and video conferencing and television. However, cultivators are inundated with huge amounts of information from multiple sources. Extension agencies need to develop interactive apps with advisories on market demand, credit, prices, and optimized crop-production practices with details of cost-effective, eco-friendly inputs, customized for specific locations based on soil type, climate, ecology and markets.

Conclusion

Cotton is a cash crop. As a commercial commodity, cotton sustains the livelihood of farmers and the businesses of traders and the textile industry. Cotton is a money-spinner for those who can exploit it well; it can pose a risk to those who cannot handle either the crop or its products. A good harvest depends on the interplay between a variety, soil suitability, water use, weather impact, biotic stress factors such as insects and diseases and management practices. If mismanaged, cotton can be a nightmare; If handled properly, it can be a farmer's booty, industry's treasure trove and a researcher's delight.

Cotton researchers face tough challenges all the time to develop strategies and technoligies that ensure profit for farmers and high-quality raw material for industry. The challenges are multifold because the production of high yields of quality fiber, is expected to be ecologically sustainable, environmentaly compatible and economically viable. To enable them to deal with such daunting tasks, cotton researchers need support. The future of cotton will eventually depend on how cotton research shapes up in the future, and how researchers prioritize current challenges and impending problems, especially in the major cotton-growing countries.

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The European Union and ICAC

By Roberto Ridolfi, Director, European Commission, Directorate General for International Cooperation, Planet and Prosperity

I am delighted that the European Union has become a full member of the International Cotton Advisory Committee. It sets the scene for continued improvement in our relations, and will strengthen the status of ICAC as an International Commodity Board.

The cotton sector matters, for both the EU and for our partner countries. For the EU, this membership reflects the importance of cotton to its economy. The EU is a producer of cotton and has evolved from a net cotton importer to a net exporter since 2009. The EU textiles and clothing industry is a major buyer of cotton cloth. But the cotton sector also plays a long-standing role in our development assistance and the EU remains the main donor to the African cotton sector.

In our partner countries cotton is an important source of employment and income for millions of people. There are approximately three million producers in Africa. In West and Central Africa alone, more than 15 million people depend on this crop for their livelihood. Many economies, export earnings and national budgets are dependent on this commodity.

The EU accession to ICAC clearly signals the interest this sector – and the work of the Committee – holds for the EU and its Member States. The European Commission coordinates the EU membership at the request of its Member States (expressed in the Council of the European Union). Since the EU has acceded to ICAC, all individual EU Member States have duly notified their withdrawal (in full respect of ICAC's rules and regulations,[1] of course).

This EU membership will allow the EU to play a more effective role, expressing its views on cotton with a single voice. It ensures access to reliable information on cotton, strengthening our monitoring of market trends and improving our policy engagement. It facilitates strong linkages and partnerships between the EU private sector (cotton and textiles), cotton producers and consumers (from the EU and from developing countries), and public authorities.

The EU accession to ICAC is in line with the cornerstones of EU development policy. The recently-adopted European Consensus on Development encourages the EU to act in a united way to achieve its common objective (the eradication of poverty). This is a good example of the EU and its Member States committing to work together, looking for greater coherence, taking into account their respective comparative

[1] See ICAC official website: https://www.icac.org/about-International-Cotton-Advisory-Committee/rules

advantages. Our accession to ICAC is also in line with the 2030 Agenda for Sustainable Development adopted by the United Nations in September 2015, which calls for inclusive partnerships among governments, private sector and civil society, building upon principles and values.

We have very much appreciated the welcome that the ICAC Secretariat has provided to the EU's membership. Our membership will build upon the existing approaches and initiatives.

The EU and its Member States promote redistributive public policies that pay due attention to sharing the benefits of growth, creation of wealth and decent jobs. They will assess the determinants of economic and social inequality and their trends, and will strengthen tools to more effectively address inequality.

The producer countries are often affected by declining prices and by price volatility. In cotton markets, prices have undergone important fluctuations since the 1970s, although 2010 was an exception with an unprecedented 65% increase. Prices now average around US$2/kg and are expected to remain at this level (projection until 2030).[2]

In 2004, the European Commission adopted a strategy on agricultural commodities outlined in the Commission Communication[3] on Agricultural Commodity Chains, Dependence and Poverty. This aimed at mitigating the effects of declining and volatile prices that were directly affecting farm incomes, agricultural wages and rural employment.

The strategy was complemented by the Commission Communication[4] on the Proposal for an EU-Africa partnership in support of cotton sector development. Given the vital importance of cotton production in a number of African countries, this EU-Africa partnership was set up with two main objectives: to obtain more equitable trading conditions on the international market, and to support the African cotton growing regions through diversification.

Based on this Communication, a joint EU-ACP steering group was created, the Cos Coton, with the task of implementing the EU-Africa Cotton Plan. Between 2004 and 2009, EUR 170 million were allocated to African producing countries, again reflecting the EU role in this sector. Despite these efforts, cotton production and exports have decreased, and cotton production has increasingly become a "safety net" for large parts of rural populations.[5]

The EU is seeking to achieve concrete results from its ICAC membership. It wants to support developing countries, address the challenges of the sector and identify appropriate responses. The approach to promoting agricultural commodities is currently being renewed in the Directorate General for International Cooperation and Development; this reflection and its implementation will be carried out in collaboration with the International Commodity Boards.

The renewed approach is aligned with the EU External Investment Plan, and follows a value chain logic, in order to enhance policy analysis on the one hand, and promote investments on the other. Sound analysis of policies and dialogue are the essential underpinning for making the right policy choices, and support will be provided to developing countries to review and update agricultural policies, with the aim of shaping policy actions and reforms. On this basis, we will also help to promote private investment, possibly through a specific initiative seeking to boost Fair and Ethical Trade.

The EU and its Member States will continue to work closely with all the ICAC members, strengthening ICAC's position as a forum for fruitful discussion and joint action in a collaborative way. We very much look forward to working together over the coming years.

[2] Commodity Markets Outlook January 2017 World Bank.

[3] COM(2004)89 from the Commission to the Council and the European Parliament

[4] COM(2004)87: Communication from the Commission to the Council and the European Parliament

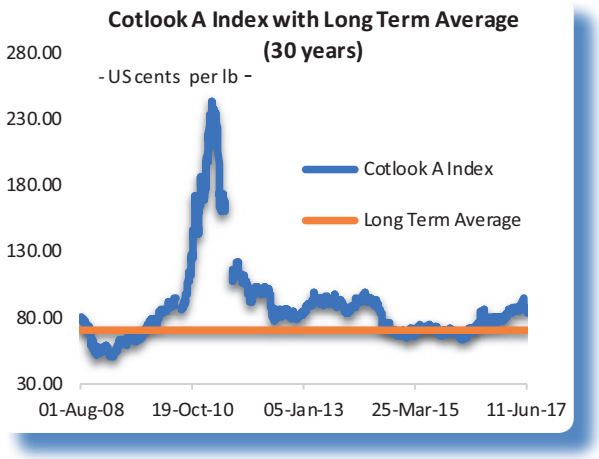
[5] Cotton is actually a main source of cash income for farmers and facilitates access to inputs for other crops.

From Islamabad to Tashkent

Mike Edwards, Editor
Cotlook Ltd

World prices firm, but forward supply concerns loom

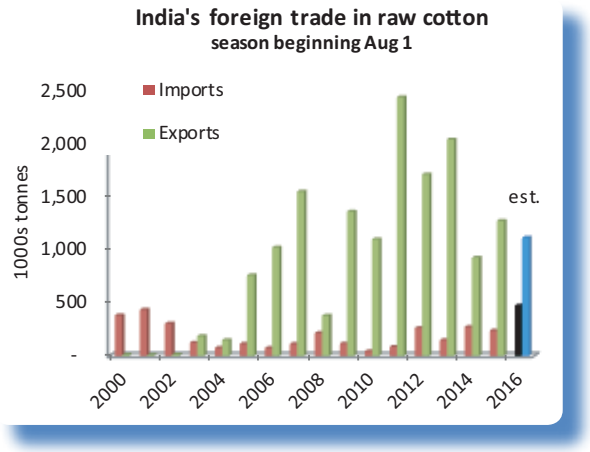
As delegates attended ICAC's 2016 Plenary Meeting in Islamabad, the Cotlook A Index – the barometer of the international cotton market – was hovering in the mid- to high-70s cents per lb, comfortably above its nominal, long-term average, though far below the peak attained in the exceptional 2010/11 season.



As the Plenary took place in early November, market sentiment inclined to the bear side. As harvest pressures increased, offers of Indian cotton had begun to assume an increasingly competitive appearance. The statistical position was less than reassuring, as world stocks outside China were perceived to be rising.

The downward pressure that had begun to be exerted on world values by India, however, was abruptly stemmed, owing to the impact of the Union government's entirely unheralded 'demonetisation' policy.

The sudden withdrawal from circulation of certain denominations of cash had repercussions across the economy, and an immediate impact on the flow of seed cotton arrivals. As the latter were interrupted, prices for both seed cotton and cotton lint began to rise sharply. Over time, the market gradually absorbed the financial shock, and the supply position eased. Local prices, however, remained above a level that would allow Indian cotton to be sold freely on the wider international market, a relationship that would persist for most of the season.



A steady flow of business was nonetheless sustained with buyers in neighbouring markets. Customs data for the August/May period show Bangladesh as the destination for over 40 percent of Indian exports, with Pakistan accounting for a further 15 percent. Outside the subcontinent, China was the principal market, absorbing 16 percent of exports during the ten-month period.

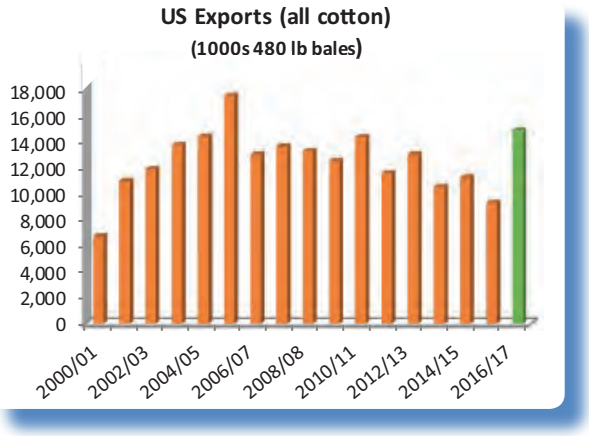
Moreover, price and quality considerations dictated that India was intermittently a significant import market, to the extent that during the first ten months of the international season, imports exceeded 450,000 tonnes, almost half the volume of exports during the same period. For a second successive season, therefore, India export prices failed to exert any significant downward pressure on the international market.

Mill demand exceeds expectations

Following the turn of the year, market sentiment began to shift in a more positive direction, primarily influenced by a much stronger than expected mill demand. A spike in futures in mid-May saw the Cotlook A Index rise to 94.90 cents per lb, which would prove to be its high point for the season.

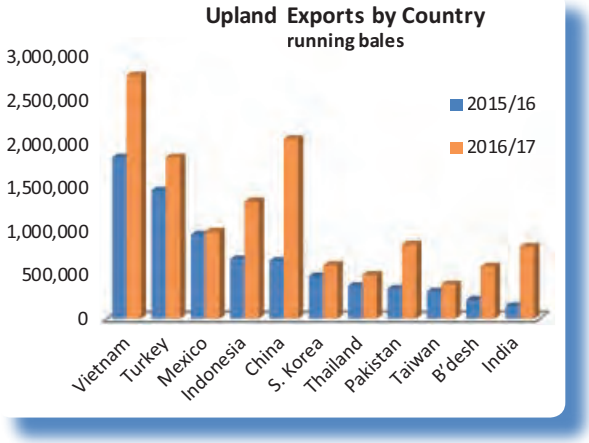
The average for the season was 82.77 cents per lb – still well above its longer-term (30-year) average, which is just below 73.00 cents per lb – twelve cents higher than the corresponding averages for the previous two seasons. The low point was touched just one month into the campaign, at the beginning of September.

While India's influence on the international market was limited, spinners' increased appetite for raw cotton was manifested in particular in a strong demand for US cotton, for which asking prices were deemed to be attractive



in comparison to competing growths. Weekly export reports reflected the sustained demand, which persisted virtually until the end of the season. The final export figure was equivalent to about 14.92 million statistical bales (480 lbs), no less than 4.4 million more than USDA had initially forecast, and the second highest export total on record.

Several customary US export markets showed year-on-year gains, the most spectacular of which concerned China, which during the previous season had been relegated to fifth amongst US export destinations. During 2016/17, in terms of US exports, China was modestly behind Vietnam, which remained the single largest market. Significant increases were recorded for Bangladesh, India and Pakistan.



Tight nearby supply

Other major export origins shared in the unanticipated strength of mill demand. For a second consecutive season, cotton from the African Franc Zone crops was all but sold out from first hands by the end of the marketing year. A significant trade flow over the past season or two has seen cotton from the origins in question shipped in increasing volume to Bangladesh - today the world's largest import market.

India was the single largest supplier to Bangladesh in during the 2016/17 season, accounting for 28 percent of imports. Taken as a whole, the African Franc Zone producers contributed a further 22 percent, while Uzbekistan' share of imports was 16 percent.

Increasing domestic consumption in Central Asia's largest cotton-producing country, Uzbekistan, has steadily eroded the surplus available for export. During the season just ended, domestic mill use is estimated to have

exceeded exports for the first time. The trend is forecast to continue, as the government has prioritised the development of the domestic spinning and downstream textile sectors over the next few years.

At the same time, what had a few months earlier appeared a dauntingly large Australian crop had similarly become well committed, both from origin and from trade holdings.

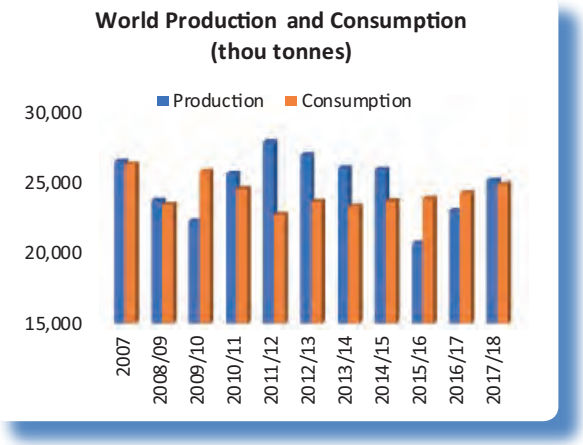
In addition to developments in the physical market, the behaviour of participants in the ICE futures contract had a bearing on price sentiment during the second half of the season. A major preoccupation was the tension created by exceptionally large speculative long and trade short positions, which at times threatened to result in extreme volatility. As the March, May and July contracts in turn approached their expiry, the size of spinners' unfixed 'on-call' purchases (and the related potential for extreme movements in the maturing futures contract) were a recurrent cause for concern.

Open interest had risen to over 288,000 contracts (a near-record level) in early February, and remained high over the next few months, only receding when speculators withdrew from the market as the July contract approached maturity. In the event, their departure allowed for a fairly orderly resolution of the aforementioned tensions, but precipitated a sharp decline of the market. Over ten sessions in June, the December contract declined by 636 cent points, (nearly 9 percent of its value), before establishing a new trading range that remains intact at the time of writing.

Bearish statistical outlook for 2017/18

The associated downturn in offering prices was consistent with the mounting evidence that a combination of firm prices and, in several producing countries, favourable yields had enthused Northern Hemisphere producers to plant more cotton to the 2017/18 crops. Prominent in that category are farmers in the United States and India, respectively the first and second most important exporters to the world market.

Although the production outlook in the United States had for some time appeared optimistic, the Department of Agriculture's August



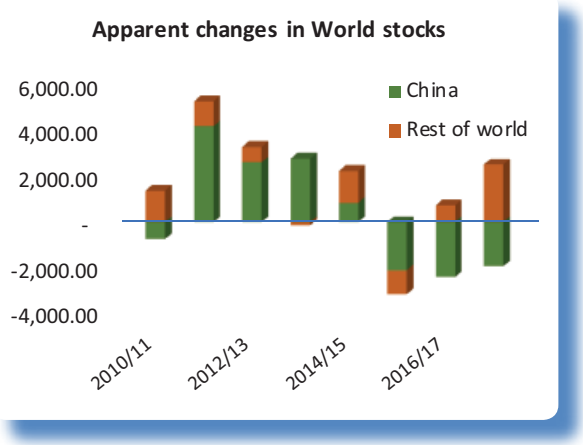
production forecast – the first of the season based on objective yield surveys – exceeded market expectations. USDA placed output from the 2017/18 crop at 20.5 million bales (480 lbs) or 4.473 million tonnes, which would be the largest US crop for eleven seasons.

In India, by mid-August, cotton plantings were advancing toward twelve million hectares. Despite some local setbacks, associated with an excess of monsoon rains in some states, and their faltering progress in others, a rise in production of at least nine percent was confidently foreseen as sowing approached a conclusion.

Optimism was also apparent in other major producing countries (China, Pakistan, Turkey, amongst others). At close to 25.4 million tonnes, the new season's global output would mark a second successive season of significant growth, and would represent the first addition to world stocks since 2014/15.

Chinese stocks in decline

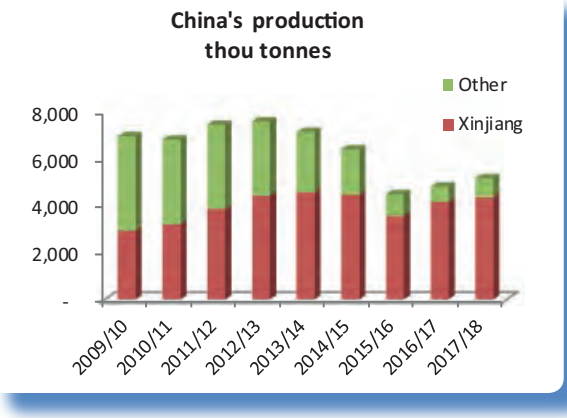
However, an analysis of global supply and demand must, for the time being at least, make a clear distinction between the supply and demand



dynamics within China and those prevailing in the rest of the world. Although forecasts of world production and consumption in 2017/18 indicate a surplus in excess of 500,000 tonnes, stocks in China are forecast to decline by 1.9 million tonnes, and those outside that country to rise by almost 2.5 million.

The spectre of the huge stocks accumulated in China between the 2011/12 and 2013/14 seasons had haunted the market in recent years. However, the disposal during the 2016 auction series of no less than 2.6 million tonnes from the State Reserve marked a turning point. Against many expectations, spinners displayed a strong appetite for cotton that had previously been characterised as undesirable from a quality point of view, in part owing to its age. Another series of State Reserve auctions began on March 6, 2017, and again attracted a sustained demand from the local mill sector.

In truth, domestic spinners have had little option but to avail themselves of the state reserve stocks. From 2015, no import quotas have been established beyond the WTO-mandated annual quota of 894,000 tonnes, whereas the country's deficit has grown to approximately three million, mainly on account of the decline of output outside Xinjiang.



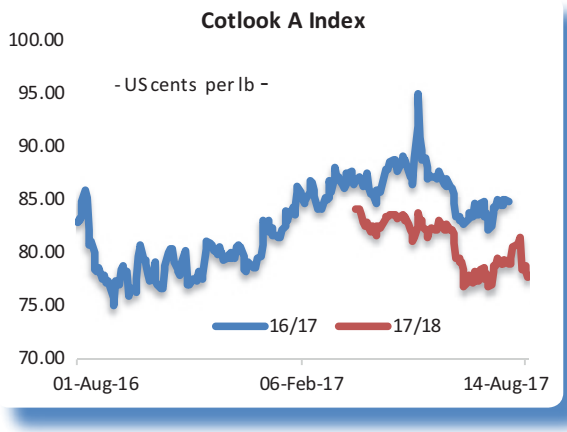
In early August, by which time cumulative sales had comfortably crossed the threshold of two million tonnes, it was confirmed that the auction series would again be extended until the end of September. The prospect of a reduction of stocks to below six million tonnes by that point was thus enhanced.

From an international perspective, the significance of China's destocking process is difficult to overstate. The point at which State Reserve stocks will be deemed by the government to have declined to manageable proportions is a matter for conjecture. However, once that juncture is reached, China should return as a buyer from the world market on a substantially increased scale – closer to the three million tonnes referred to above, than to the 894,000 tonnes envisaged annually by the WTO-mandated quota.

Although the prospect of a step change in Chinese import demand appears to send an unambiguously bullish signal, the timing of the anticipated shift in the dynamics represents one of the major uncertainties affecting price discovery.

While the transition from the 2016/17 to the 2017/18 season has been characterised by a tight supply situation and firm prices, the outlook for the later months of the current campaign appears to herald oversupply – always assuming that current production forecasts prove to be close to the mark. The 2016/17 Cotlook A Index, reflecting offers for shipment no later than August/September, expired on July 31 at 84.90 cents per lb, a premium approaching 600 cent points over the 2017/18 Index (shipments no earlier than October/November).

At the time of writing, the progress of crops in the Northern Hemisphere is being closely monitored, amid apprehension that the weight of new crop supply will at some point bring further downward pressure to bear on the international market. That bearish outlook is tempered, however, by the knowledge that forward commitments from important export origins such as the United States and African Franc Zone are already substantial. More fundamentally, the prospect of a strong expansion of import demand from China, however uncertain its timing, would seem before too long to herald a more bullish phase in the evolution of the world cotton market.



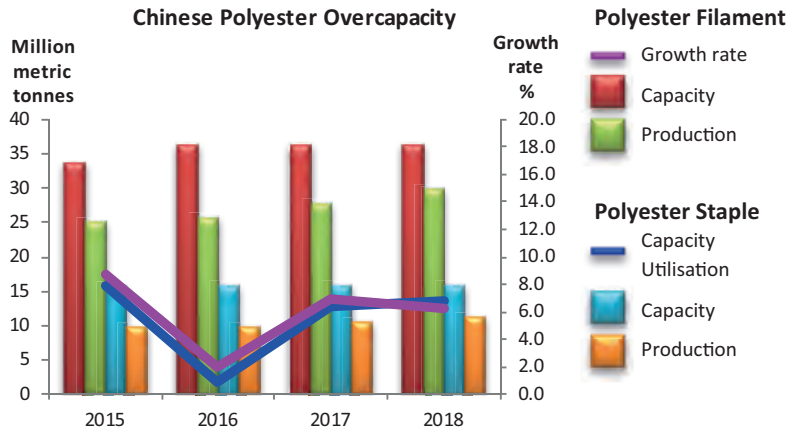
Polyester Growth Slows, Extending Capacity Overhang

Darrel Collier, Business Manager (Synthetic Fibres),
Tecnon Orbichem

Global polyester fibre production growth continued to trend lower in 2016. Polyester filament and staple production for the year reached 50 million tonnes. Production for all polyester fibres increased 2.2% for 2016 when compared to the previous year. This below trend growth continues a-pattern started in 2014, following several years of healthy year-over-year increases immediately after the 2008/09 global recession.

Why include polyester filament in an article for a cotton-focused audience? Historically, cotton market participants have focused on polyester staple to better understand the market dynamics most impacting cotton due to direct competition in spun yarn applications. However, in the last four to six years, final textile markets have changed, with distinctions between traditional spun yarn and filament applications blurring. Sectors once reserved for cotton or cotton/polyester spun yarns, like underwear, active wear and top-weight knits are experiencing increasing penetration by polyester filament, often combined with spandex. Filament replacement of spun yarns has confined to not just been traditional cotton markets but has also occurred in sectors like carpeting, where polyester BCF (Bulk Continuous Filament) yarns, along with nylon BCF, have almost completely replaced nylon and polyester spun yarns traditionally used in carpet surfaces. It does appear, however, that trends to filament processing have begun to moderate in the last year or two.

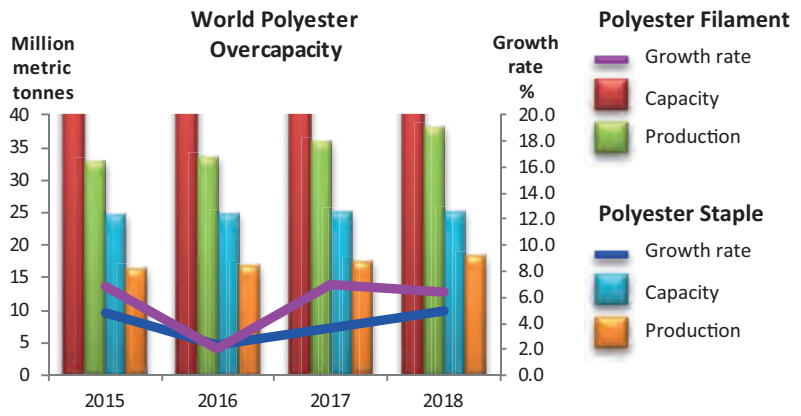
Chart 1.



Polyester filament production in 2016 was 33.3 million tonnes, or about 35% of all fibre

production. Production growth for filament in 2016 was well below trend at 2.1%. Muted filament growth was attributed to slowing Chinese GDP and weak consumption in European and US markets. Because Chinese-made polyester-filament-making currently accounts for 78% of global filament production, slowing Chinese consumption certainly played a significant role in weak 2016 statistics. In addition, ageing demographics in Europe and the US are tempering historical correlations between textile consumption and GDP in those important regions for Chinese exports.

Chart 2.



Polyester staple production reached 16.7 million tonnes in 2016, achieving 2.4% growth. This was the first year in more than a decade in which staple production growth exceeded filament and provides additional evidence that textile processing trends to filament are moderating. Staple demand was likely helped by crude oil values ranging from the low 40s to mid 50s over the last year, keeping polyester staple pricing relatively steady in its lowest third percentile of the last 20 years. In contrast, 2016 cotton prices ranged above their mean of the last two decades. As predicted last year, these respective cost differences led to modest polyester substitution, particularly in Chinese yarn production. Chinese production of polyester staple was 10 million tonnes in 2016, or roughly 60% of world staple production.

Because polyester has become the dominant fibre in textile production, slowing final consumption differentially impacts polyester and provides an explanation for the rather dramatic growth rate decline last year. Cotton, due to its size and position as the second most important fibre for textile applications, has also been negatively impacted.

Slowing growth for polyester is extending the capacity overhang in China. Chart 1 illustrates polyester fibre, both filament and staple, overcapacity in China. In 2016, China had capacity to produce an additional 6 million tonnes of polyester staple, more than it actually produced to meet market demand. This extra capacity was available after Chinese producers had directly exported 1 million tonnes of polyester staple, or 10% of its total production for the year. This does not account for significant indirect export quantities of yarn, fabric and textile articles made from Chinese polyester staple production.

Below-trend growth, like that experienced in 2016, will exaggerate the negative impacts of overcapacity. Although we believe that production growth rates will improve in 2017/18;,levels are not expected to reach historical rates of 7-10%, which formed the basis for much of the existing capacity investment. If our assumptions are wrong and growth over the next two years is more like 2016 than 2015, recovery from overcapacity will be extended yet another year or two.

A view of global polyester overcapacity is similar, due to the signficant portion of polyester production in China. Chart 2 reviews global capacity and production through 2018. Despite reasonably balanced polyester supply in the US and Europe, Chinese overcapacity overwhelms the global view.

Based on early 2017 production statistics, downside risks exist for our production forecasts in the near term. In addition to weakening GDP in China and poor consumption rates in the US and Europe, there is evidence of supply chain destocking in much of the world. In the US and Europe, brick and mortar retail outlets are closing and being replaced by internet retailers like Amazon. This process effectively reduces

inventory in supply chains and retail outlets, replacing it with more efficient distribution. An example of supply chain destocking is illustrated by a Haines/Amazon underwear programme that fulfils Amazon consumer orders via direct shipment from Haines's distribution facilities. Although production ultimately will equal consumption on a global basis, short-term destocking appears to be augmenting weaker consumption.

Why is the Chinese polyester capacity overhang so important to cotton and other synthetic fibre production around the world? China's dominance in polyester production is self-evident. Because Chinese polyester producers export significant quantities of polyester fibre, yarn, fabric and final articles, they set pricing and resulting margins. Although cotton, and other synthetics, are priced based on many other factors, ultimately, they gain or lose share based on their "value-comparison" against Chinese-based polyester, regardless of markets and where the competing products are sold.

China's polyester capacity overhang is effectively squeezing out most, if not all, margin at the fibre production step. In addition, overcapacity exists in China at every other petrochemical intermediate step to produce the polyester molecule. In some cases (for example PTA) there is even greater overcapacity than at fibre extrusion. This has resulted in a collective absence of margin for Chinese polyester producers throughout the value chain. Although there are protections for other fibres produced in different regions that comprise the "value-comparison", including freight, duties, subsidies and end-use suitability, over time these safeguards are generally diminishing. For these reasons, slowing Chinese polyester growth is bad news for cotton and other synthetics.

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7 000 TONS	Terry fabrics for towels and garments
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