INTERNATIONAL COTTON ADVISORY COMMITTEE

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New Frontiers in Cotton Production

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Cotton is grown in close to 70 countries in the world. During 2000/01, 89% of 19.2 million tons of cotton will be produced in the Northern Hemisphere and only 11% in the Southern Hemisphere. Cotton is grown as a major crop in many countries but 10 top producing countries share 85% of world production. They are Australia, Brazil, China (Mainland), Greece, India, Pakistan, Syria, Turkey, USA and Uzbekistan. The five largest cotton producing countries, China (Mainland), India, Pakistan, USA and Uzbekistan, will produce 70% of the total crop. The largest cotton producing country is usually China (Mainland) but after almost two decades, the USA will be the largest in 2000/01. India is the number 3 producer and Pakistan is the fourth largest. Uzbekistan is the fifth largest cotton producing country and is expected to produce 1.0 million tons, or 25% of the cotton produced in the USA, during 2000/01.

On average 33-34 million hectares of cotton are planted every year, 89% in the Northern `Hemisphere. The five largest producing countries account for about 70% of world area. The next five other larger cotton growing countries, Australia, Brazil, Mali, Turkey and Turkmenistan, planted 10% of the world area in 2000/01. Greece and Syria which are among the first 10 cotton producing countries are not among the top 10 cotton planting countries because of higher yields. They are replaced by Turkmenistan and Mali. India is the largest cotton growing country in the world with 8.4 million hectares planted to cotton in 2000/01, almost 3 million hectares more than the USA and more than double the cotton area in China (Mainland).

According to the latest ICAC estimates, the average cotton yield during 2000/01 is expected to be 589 kg/ha. There is a wide gap in yield among countries. The ten highest yielding countries in descending order are Israel, Australia, Syria, Turkey, Spain, China (Mainland), Greece, Mexico, Peru and Egypt. The average cotton yield is more than one ton of lint per hectares in only seven countries of the world, Australia, China (Mainland), Greece, Israel, Spain, Syria and Turkey. For almost two decades cotton yields have been the highest either in Australia or Israel. India, the country with the largest area devoted to cotton, is among one of the lowest yielding countries in the world.

The latest ICAC estimates suggest that 19.2 million tons of cotton will be produced in the world during 2000/01, 60,000 tons more than produced in 1999/2000. While production in most countries will be lower, equal to, or slightly higher than in 1999/2000, the US crop is expected to be 11% higher than in 1999/2000. The official estimates issued by the USDA in the 2nd week of every month from August to December declined in September to 4.0 million tons still 300,000 tons greater than the actual crop size in 1999/2000. Production in countries outside the USA is expected to be less that 15.5 million tons for the first time in six years.

Compared with production of 19.2 million tons, consumption is expected to be 20.0 million tons during 2000/01, an increase of 60,000 tons. In 1999/2000, consumption increased by approximately 800,000 tons to a record of 19.8 million tons. Low international prices will continue to play a role, and cotton consumption is expected to continue upward next season. Sharp increases in crude oil prices raised the opportunity cost of chemical fibers for the textile industry. Lower cotton prices relative to chemical fibers and faster world economic growth are boosting cotton consumption in the world.

The cotton planting season for countries in the Southern Hemisphere will start soon. It is estimated that 32.5 million hectares will be planted to cotton in 2000/01. The world average yield will be almost the same as in 1999/2000 at less than 600 kg/ha. The average yields in India and the USA are expected to increase but a decline is expected in China (Mainland). However, the largest drop in average yields is expected to occur in Pakistan.

The average yield at the world level has not increased since 1992/93. In 1991/92, the world yield was 598 kg/ha. Though there is a difference of 8-9 kg/ha, 1999/200 and 2000/01 have been closet to the record set in 1991/92. In the last 50 years, on the average, the world yield rose at a rate of 8 kg/ha per year or 2% per year. Production technology may have improved in the last ten years and technology is being developed with the same efforts as has been in the past but its impact on yields at the world level has not been visible since 1992/93. It is a challenge for everyone working in the field of production research to find ways and means to improve yields. Such efforts have to be different from traditional approaches aimed at developing high yielding varieties, agronomic management practices and insect pest control. Improvements in traditional cultivation practices would affect yields positively, but a sustained increase in yields requires a non-traditional technological innovation. It is a challenge for researchers to develop such a technology.

Cotton researchers throughout the world are working to find such an innovative technology, but it looks like we are still many years away from such an achievement. Lately, breeders, with the help of biotechnologists, have acquired a technology that can be employed towards productivity improvement in addition to agronomic features of the plant.

The cotton plant has the genetic potential to produce much more than we actually recover now. Therefore there is no need to improve genetic potential, rather we need to enhance the recoverable potential of the plant. Additional tools in the hands of breeders to bring directed changes in the cotton genomic structure have the potential to narrow the gap between genetic and recoverable potential. In the same context, the long-standing physiological challenge to convert cotton into a C4 plant still stands.

Currently, genetically engineered cotton is either resistant to specific herbicides or resistant to bollworms. A combination of both features is also available for commercial cultivation. The area under GE crops is increasing. It is estimated that GE varieties of various crops were grown on 40 million hectares in the world in 1999 as against 1.6 million hectares in 1996. The most popular GE crops are soybean (54%) and corn/maize (28%); cotton formed only 9% of the total GE crop area in the world during 1999/2000. GE cotton varieties were planted on 3.7 million hectares in five countries; Argentina, Australia, Mexico, South Africa and the USA, 12% of the area planted to cotton in the world in 1999/2000.

The U.S. is the largest producer of GE crops and GE cotton. During 2000/01, cotton was planted on 5.93 million hectares in the USA and 72.1% of the total upland area was under transgenic GE varieties, compared with 60% in 1999/2000. China (Mainland) has a huge potential to expand area under GE cotton. The adoption rate for GE technology is the highest for any new technology in the agriculture industry. But, the technology is still new and implications are not fully understood. The technology must be used without compromising the environment, sustainability, farmers' interest and mishandling of the cotton genome. The challenges of GE technology include acceptability to the public, employment of the technology for creating non-existing combinations and improving yield.

The cost of production has increased to unacceptable levels in many countries thus threatening the economics of cotton production. Countries have gone out of cotton production because of high costs. There cannot be one threshold cost of producing a kilogram of cotton but if the increase in the cost of production is not arrested, more countries may not find cotton feasible to grow. For a long period of time, increases in the cost of production were offset through increases in yields. Now, when yields are not increasing, reducing the cost of production has become even more important. The latest ICAC studies show that the cost of production ranges from less than 50 cents to over US$2.5/kg lint. Such a variation shows that production costs can be decreased and it is a great challenge for researchers to do so. Farmers are willing to accept the current yield level if the cost of production can be reduced. We must find less expensive ways to grow cotton.

One of the other significant challenges in cotton production is to control insects with a minimum use of pesticides. There are more concerns about insecticides than other pesticides and cotton producing countries throughout the world wish to get away from pesticide-intensive production practices. One of the reasons is of course the high cost of pesticides but it is not the only reason. Researchers and farmers are now more conscious about the long-term impact of pesticides on production practices, the environment, sustainability and the pest complex. But, farmers cannot quit using pesticides until they have alternate pest control methods. It is a great challenge for researchers to develop pesticides free of pest control technology.

Integrated pest management has been talked about a lot but its implementation has been very low. Recently, the Food and Agriculture Organization, with financial help from the European Union, has started a five-year project in Bangladesh, China (Mainland), India, Pakistan, Philippines and Vietnam. Through the farmer field school system, the project is devoted to implementation of an IPM strategy. This project, if successful, could serve as a model for many other countries in the world. The ICAC with the financial help from the Common Fund for Commodities is also implementing similar projects on a smaller scale. Now it is a challenge for researchers, extension workers and farmers to popularize the implementation of IPM and expand its adoption.

Well-focused research is going on in the field of measuring fiber quality characteristics. But, still we have to go a long way to assess the true value of this natural fiber. Requirements of the textile industry for fiber quality have improved. It is a challenge for producers to meet the quality needs of the industry and to improve raw the material's qualitative value. Methods to measure short fiber contents must be improved so that the repeatability of the data among labs can be improved. Similarly, efficient methods to measure stickiness have to be found.