



# INTERNATIONAL COTTON ADVISORY COMMITTEE

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## Overview of Worldwide Cotton Production

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### Current Supply Situation

World cotton production in 1998/99 is projected to drop by 1.5 million tons or 7.3% from 1997/98, and is estimated at 18.6 million tons.

The most significant decline in production this season has occurred in the USA where cotton output fell by 1.1 million tons to below 3 million tons as a result of losses in harvested area and poor yields caused by adverse weather. The US government subsidies sustained the US cotton industry in the early 1990s when prices fell below the long run average and production declined only from 17.6 million bales in 1991/92 to 16.2 million in 1992/93. In 1993/94, yields fell due to pests and unfavorable weather and production remained at 16 million bales, even though area actually rose. High prices led to production of nearly 20 million bales in 1994/95, but adverse weather in some states and pests in others lowered yields from 794 kilograms per hectare in 1994/95 to 602 kilograms in 1995/96, and production fell to 17 million bales in 1995/96. Production rose to nearly 19 million bales in 1996/97, despite reduced area because of near record yields. Changes in the subsidy legislation in the USA that took effect in 1996 made cotton production responsive to declining prices. Between 1982/83 and 1995/96, The US government's subsidy payments were linked to planted area through the registration of base acres. However, beginning in 1996/97, US growers have no longer been required to plant cotton in order to receive some subsidies from the government, and production decisions have been based more on expected prices and costs of production of cotton and competitive crops. A significant decline in production occurred in the USA in 1998/99, with output falling by almost five million bales to about 14 million as a result of losses in harvested area and poor yields caused by adverse weather.

Cotton production also suffered cumulative losses of almost 500,000 tons during 1998/99 in China (Mainland), Uzbekistan and Pakistan. In China (Mainland), production fell by 270,000 tons to 4.33 million tons because of poor weather and flooding in Central China. However production in the Xinjiang region rose by 20% compared with 1997/98 and now accounts for 32% of cotton production in China (Mainland). Cotton Production in Uzbekistan declined by 140,000 tons during 1998/99 to 1 million tons as a result of poor weather. The cotton crop in Pakistan in 1998/99 is estimated at 1.5 million tons, a loss of 60,000 tons compared with 1997/98. The decline in world cotton production has been lessened by increased production in India, Turkey and Australia. Production in India and Turkey is projected to increase by a cumulative 70,000 tons. In 1998/99, Australia is projected to produce a third-in-a-row record crop, estimated at 760,000 tons. The twelve countries of Francophone Africa are projected to maintain production close to the record level achieved in 1997/98.

In 1999/00, world cotton production is projected to increase by 3% and to reach 19.2 million tons. World area is not projected to increase in 1999/00 as cotton prices provide little stimulus for the expansion. All of the projected increase in production will likely result from improved yields. Cotton production in the USA in 1999/00 is projected to rise by 700,000 tons to 3.7 million tons as a result of better yields. Cotton production in Uzbekistan is projected to increase by 100,000 tons to 1.1 million tons. A similar increase in Pakistan is expected to result in 1.6 million tons of lint. Production in India, Turkey Francophone Africa and Australia is not expected to change significantly. Changes in government regulations and reduced procurement prices in China (Mainland) could result in lower production next season. The Xinjiang region, however, is not expected to reduce production. World yields are expected to increase from 558 kg/ha in 1998/99 to 576 kg/ha in 1999/00, still 22 kilograms below the record set in 1991/92.

## Demand

In 1997, strong expansion of world textile demand was fostered by world economic performance, which was in its fourth year of above average growth. In fact, world textile consumption at the end-use level increased 5.6% in 1997, the fastest increase since 1986. As world economic conditions deteriorated in 1998, the prospects for continued strong growth of textile consumption greatly diminished. Current estimates suggest that world textile consumption expanded 0.9% in 1998 and will expand 0.2% in 1999. Demand for cotton continues to perform below demand for other fibers and it is estimated that the market share of cotton in 1998 was 42.6%.

As a result of lower economic growth associated with the current financial crisis, world mill consumption of cotton is expected to decline to 19 million tons in 1998/99, 300,000 tons less than in 1997/98 and 400,000 tons less than in 1996/97. Such a level of consumption is in line with the declines that have occurred in the countries in crisis and the declines in textile activity that are being registered in other countries as a result of the increased exports of cotton textile manufactures from East Asia. Mill consumption of cotton in East Asia declined by 140,000 tons in 1997/98, and the level of consumption during the second half of 1998 was maintained, suggesting that economic activity in the textile industry, as is the case for the overall economy of the region, has stabilized. In Russia, another country affected by the financial crisis, mill consumption is expected to decline by 18% to 183,000 tons in 1998/99. Finally, in Brazil, the latest casualty of the financial crisis, mill consumption is expected to decline to 700,000 tons in 1998/99, 50,000 tons less than in 1997/98 and 130,000 tons less than in 1996/97.

The government of China (Mainland) has announced a policy of reducing spinning capacity and limiting cotton consumption in all sectors to a total of 4.5 million tons per year, with textile-fiber needs being met by expanded production and use of chemical fibers, mostly polyester. The policy of restricted cotton consumption is consistent with the newly announced production policy of reduced prices to farmers. A new organization called the State Textile Industry Bureau was created last year to enforce central-government policies, and China (Mainland) has been reaching its goals for destruction of spindles.

Consumption in India is estimated at 2.7 million tons this season, little changed from 2.68 million tons last season. Mill use of cotton in Turkey is estimated at 1.2 million tons in 1997/98, based on the difference between production plus imports less exports, but consumption this season is estimated at 1.05 million tons based on reports of heightened competition from East Asian textile exports. Cotton use in Central Europe is falling an estimated 15,000 tons to 260,000 tons in 1998/99, and cotton use in the EU, Norway and Switzerland is falling about 10,000 tons to an estimated 1.19 million tons.

Mill use in the USA is estimated at 2.25 million tons this season, down 9% because of surging textile imports and a shortage of quality cotton at competitive prices. The US mill consumption of cotton increased at an average annual rate of 3.1% between 1980 and 1990, and then rose at an annual rate of 4.1% between 1990 and 1995. By 1994/95, US mill use had reached 11.2 million bales. During 1995/96 and 1996/97, US mill use did not rise because of limited supplies and lower economic growth, but with greater production and lower prices, 1997/98 mill use was 11.35 million bales. The rise in cotton use during the 1980s and early 1990s was partly a result of increased textile industry investment. However, strengthening US consumer preferences for cotton were the more important factor raising domestic mill use. ICAC estimates indicate that the USA was the only country where cotton's market share was not greatly affected by the high prices of cotton between 1994 and 1996. While cotton promotion programs in other countries were greatly reduced or discontinued after 1990, expenditures on cotton promotion in the USA more than doubled.

However, the US cotton textile industry may have entered a period of decline because of increased imports. US cotton consumption at the retail level rose by an extraordinary 8% in 1998, but imports of textiles and apparel rose by more than 20%, resulting in lower mill use. The greatest growth in textile imports between 1995 and 1997 was in products from Mexico and Canada, but supplies from East Asia increased rapidly in 1998.

US textile and apparel exports have partially offset increased imports. Between 1995 and 1998, exports of cotton textiles rose at an average annual rate of 15% and reached the equivalent of 4.1 million bales. Still,

because of the surge in imports, coupled with a shortage of some qualities of cotton this season, 1998/99 US mill use is estimated at 10.3 million bales, down 9%.

Mill use in Mexico is rising by an estimated 50,000 tons to 500,000 tons, and use in Canada and Central America will be no less than last season. Consumption in East Asia and Australia fell by 7% in 1997/98 to 1.94 million tons but is estimated unchanged at 1.95 million tons in 1998/99.

Monthly data on mill use in Pakistan confirm that there was no decline in 1997/98, and recent reports suggest a small increase is possible this season. Economic recession is leading to reduced consumption in Brazil. Consumption in Russia and other CIS countries is estimated at 430,000 tons this season, versus 450,000 last season. The Government of Egypt is disposing of excess stocks this season, with a policy similar to the one used in the USA in 1986/87, and Egyptian mill use is estimated at 240,000 tons, an increase of 30,000 tons. Mill use is also rising in Nigeria because of changes in currency values and in Syria because of government investments in the textile industry.

## **Price**

World cotton prices, as measured by the Cotlook A Index, have fluctuated this crop year between 68 and 55 cents per pound and have been between 55 and 56 cents per pound since the third week of November 1998, compared with the long term average of 73 cents. World cotton production is estimated at 18.6 million tons in 1998/99, about 400,000 tons less than world consumption. As a consequence, world stocks are expected to decline from 9.8 million tons in August 1, 1998 to 9.4 million on July 31 1999. With a decline in production relative to consumption of the size that is being registered this season, prices would generally be expected to rise.

The stagnant behavior of cotton demand, caused by the rapid deceleration of world economic growth in 1998, and the sudden change of China's (Mainland) trade position from net importer to net exporter of cotton, are two reasons that explain the downward pressures on cotton prices this season. Nonetheless, expectations about the impact of these two events on prices seem to be playing a greater-than-normal role in keeping prices below what the fundamentals of the market would suggest.

Some events might, however, bring expectations more in line with market fundamentals, creating upward pressures on cotton prices in the coming months. Such events include the recognition by the market that it has overestimated the impact of the financial crisis on cotton imports and mill consumption in several countries and exports by China (Mainland); another is the physical and psychological impact of having the United States importing cotton once again. The estimate for 1998/99 of 64 cents per pound is based on the season-to-date average of 61 cents per pound and an expectation that prices will move higher during the remainder of the season.

## **Yields**

Yields play a role in maintaining stability in the world cotton market as they have an effect upon cost per unit of production. Average world cotton yields have not increased above record levels (598 kg/ha) since 1991/92, the first period of more than four years since the 1940s in which a new record has not been achieved. 1994/95 was a good year for yields but average world yield was still 10 kg/ha lower than 1991/92. In 1996/97, yields remained 22 kilograms below record levels. Yields increased in 1997/98 to 592 kilograms, still 6 kilograms less than historic records. The fact that yields failed during the 1990s to maintain their long term pace of increase made cotton production less profitable in many regions of the world and, despite relatively high prices, area declined.

In the largest producing countries resistance to pesticides and diseases has been identified as affecting cotton yields during the 1990s. In addition, difficulties in providing inputs to producers persist in some countries. But, the most important observation is that given the limitations in various countries, agronomic management of the cotton plant is near optimization. The nature of limitations to higher productivity is different in different countries but it seems that the available recoverable potential under most production conditions has been utilized. Thus, the world cotton industry has not benefited from increases in yields during 1990's.

How yields can be improved? The answer to this question seems to be very simple: eliminate limitations and yields will automatically increase. As estimated by the ICAC, about 55% of the world area dedicated to cotton is currently irrigated. In areas where shortage of irrigation water is a limitation, supply in the irrigation water can improve yields. But, for significant and sustained improvement in yields across countries and regions, there is need to bring in new technologies. One of the new technologies is development of transgenic cottons.

### **Transgenic Cotton**

Development of transgenic cotton and other transgenic crops has opened an entirely new era in crop breeding. Now techniques are available to isolate non-cotton genes and induct them into the cotton plant for specific objectives. Currently, two such cottons are grown, Bt cotton resistant to insects and transgenic cotton resistant to herbicides. The United States is the first country to adopt transgenic cotton on commercial scale from 1996/97 and it is estimated that 45% of the total area was planted to transgenic varieties. In addition to the USA, Argentina, Australia, China, Mexico and South Africa also have gone into commercial production of Bt cotton. Spain may be planting during 1999. Colombia, Bolivia, Brazil, El Salvador, Greece, India, Israel, Paraguay, Thailand and Zimbabwe are in the process of testing Bt cotton.

Some countries still do not have an access to the technology. But, it is believed that either through collaboration with multinationals or development of their own capabilities, technology will be available to all countries. It may not be only Bt, BXN or Roundup Ready genes. The International Cotton Advisory Committee is sponsoring a project in Pakistan, UK and the USA to develop a transgenic genotype which will not accept a virus responsible for causing leaf curl disease. Since 1992/93 Pakistan has lost millions of bales of cotton ever year due to this disease and now India has the same problem in the North Region. Colored cotton, fiber quality and there are so many other fronts open to work and some work somewhere is going on. But, Technology Protection System (TPS) and VIP3 of the Novartis may become available sooner than others may.

The technology is available and it has tremendous applications and hopes. However, currently there are some limitations; development of resistant to Bt cotton, change in the pest complex, too much emphasis on insect control, no work on yield improvement. Some view transgenic cottons as a disposable technology and expendable resource. But the fact is that we are progressing toward a stage of directed breeding and the world cotton community will see drastic changes in the cotton plant planted today.

### **Organic Cotton**

Organic cotton is cotton grown without synthetic inorganic and organic fertilizers, pesticides, growth regulators and defoliant. These chemicals used on cotton in any form degrade in the environment quickly and are carried, if at all, only in very small quantities with the fiber or in the seed. The Fiber Institute of the Bremen Cotton Exchange undertook studies on chemical residues on cotton, including insecticides and defoliant. Cotton samples of diverse origin, collected from many countries, were analyzed in 1991, 1992, 1993, 1996 and 1998. Results indicated that no chemical was above the threshold level during any year.

Organic production of cotton started from 1990/91 in Argentina, Australia, Turkey and the USA. Since then organic production of cotton has also been tried in Benin, Brazil, Egypt, Greece, India, Israel, Mozambique, Nicaragua, Paraguay, Peru, Senegal, Tanzania, Uganda, Zambia and Zimbabwe.

Some of the fundamental requirements of organic production are no chemicals, a transitional period and certification. The certifying companies make sure that prohibited chemicals are not used on cotton. They also have their own specific standards on rotational crops, post-harvest handling procedures, etc. Self-certification has also worked to some extent at least in Egypt and Brazil.

There are many reasons to explain why organic production was started. It can also be claimed that it is a consumer driven initiative. There was a demand for organic cotton so people started producing cotton. In the USA, farmers started growing organic cotton on their own and then certifying companies showed up. An association of small producers in Brazil and a company SEKEM Farms in Egypt also started producing

organic cotton on their own. In most other countries, some international support in the form of a technical advice or compensation was involved. Typically, producers of organic cotton expected

- Lower cost of production mainly due to elimination of insecticides
- Lower yields
- Higher income due to premium price

It was expected that lower costs and premium in price will compensate the loss in yield and ultimately farmers would not suffer economic losses. It was expected that less environmental pollution, long-term viability of farming and safety from insecticide use would be a bonus.

So far, the highest quantity of organic cotton (12,833 tons) was produced in the world during 1995/96. 9,028 and 7,967 tons organic cotton was produced during 1996/97 and 1997/98 respectively. It seems that people are losing their interest in organic production. The International Cotton Advisory Committee has done a number of reports and papers on organic cotton. In the last paper, published in December 1998 issue of *THE ICAC RECORDER*, it was concluded that the following factors are responsible for the decline in organic production.

- No research has been undertaken on organic production. Farmers started producing organic cotton without specific production technology for changed conditions.
- Elimination of insecticides did not reduce the cost. In some cases, particularly under mechanized farming, the cost of producing organic cotton was higher than conventional production due to manual removal of weeds and picking.
- Conventional varieties have been developed for high input conditions, fertilizers and insecticides. They are not suitable for organic conditions.
- Due to high insect pressure, loss in yield was more than expected.
- Organic production required change in the production system that affected cropping intensity and consequently farm income.
- Price premium was not according to expectations.

Organic cotton may continue to be produced, but further growth at significant level is not expected.

### **Cost of Production**

The cost of producing cotton is the most critical factor in deciding the area to be planted to cotton. Experience shows that countries have gone out of production only because it became expensive to produce cotton. In 1980/81, average yields in Guatemala were the 2<sup>nd</sup> highest in the world just behind yields in Israel. Guatemala stopped producing cotton in 1996/97, with cotton yields still 150 kg/ha above the world average and almost comparable to levels in the USA. The ICAC undertakes a survey of the cost of production of cotton in the world and the last report was published in October 1998. The data showed that among major exporting countries, it is most expensive to produce cotton in the USA.

Other conclusions from the last survey of the ICAC on cost of production are

- Input use has been optimized
- Cost/ha will increase at a slower rate
- Increase in input cost will increase cost/kg of lint
- It is expensive to produce rainfed cotton compared to irrigated cotton

### **HVI Use in the World**

One of the recent significant developments in cotton has been the use of High Volume Instrument testing in the world. The objective is to measure fiber characteristics of cotton accurately and quickly so that repeatability of the data is improved. The HVI use is spreading and in the last ten years HVI units in the world have increased by 3 fold. Currently, about 1150 HVI units are in operation in 63 countries of the world.

The important areas of concern in the HVI use are

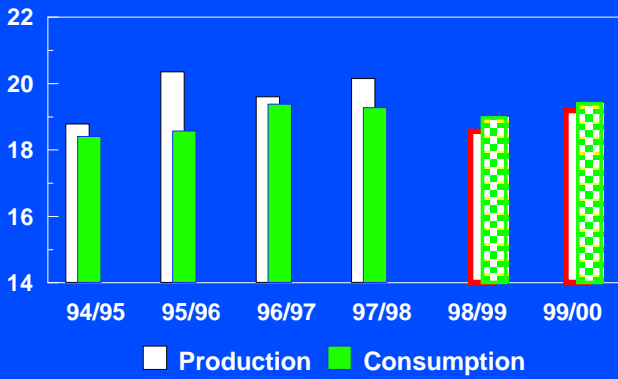
- Different labs in the world continue using two sets of calibration cottons (HVI and ICCS)
- Repeatability of the strength data has improved over the last few years, but there is still a need for further improvement
- There are recommendations, but there are no universally accepted standardized calibration and testing procedures. Uniform set of sample conditioning and atmospheric conditions in the lab could significantly improve interlaboratory consistency
- Improvements in the measurement of characters like trash and short fiber contents.

### **International Collaboration**

Cotton can rightly be called a crop of developing countries, which lacks funding in the furtherance of production in the world. All major food crops like rice, wheat, corn and others including livestock production have international institutes. These institutes have served as international centers and their contributions are acknowledged throughout the world. Unfortunately, there is no international research institute on cotton. The ICAC's Secretariat has tried its best to fulfill the gap by providing updates on production research, supporting regional collaboration and organizing world cotton conferences. It is not enough. There is a need for an international institute on cotton research.

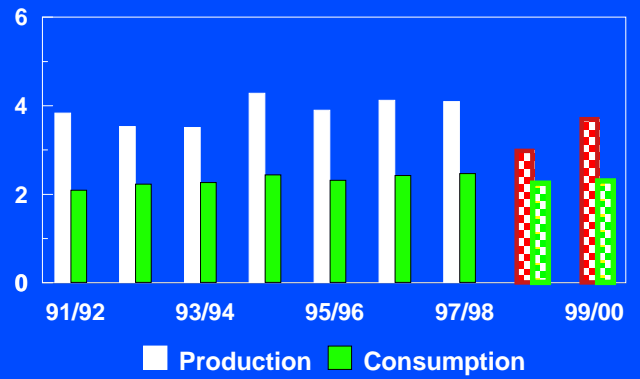
## WORLD COTTON MARKET

Million Tons



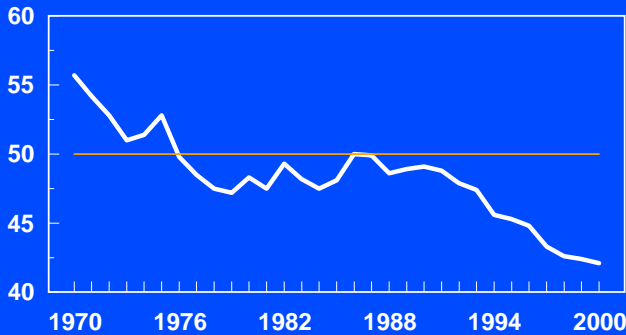
## COTTON MARKET: USA

Million Tons



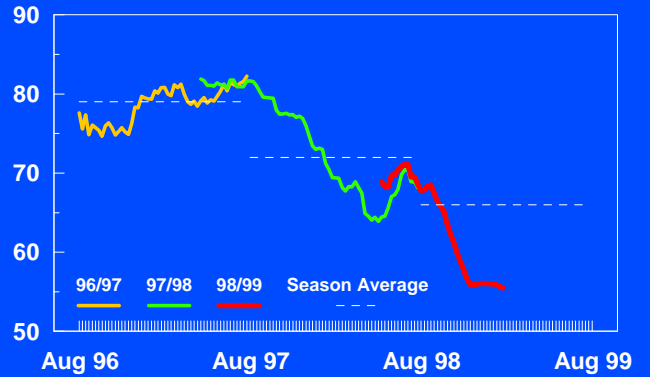
## COTTON'S SHARE OF THE WORLD TEXTILE MARKET

Percent



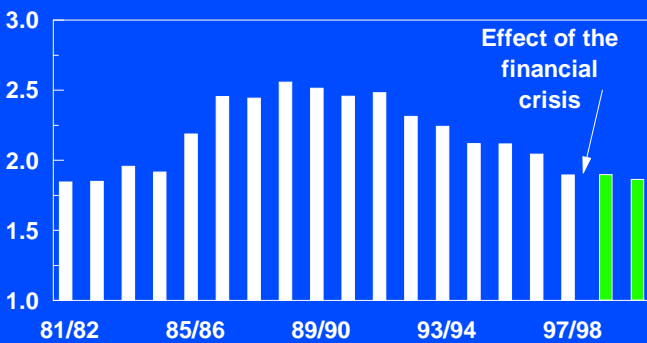
## COTLOOK A INDEX

US Cents per Pound



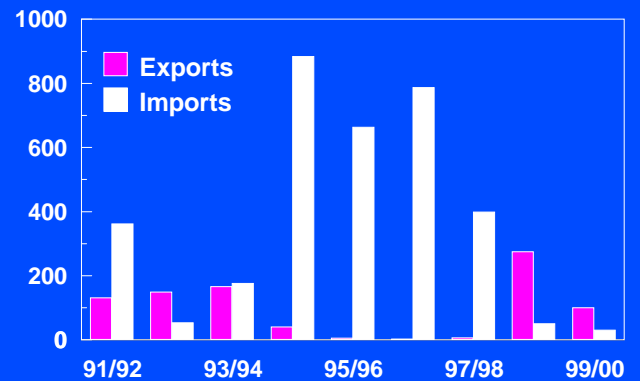
## COTTON CONSUMPTION: EAST ASIA

Million Tons



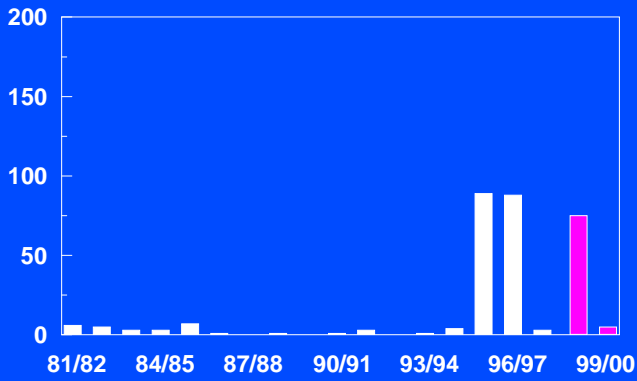
## CHINA (MAINLAND) TRADE

Thousand Tons



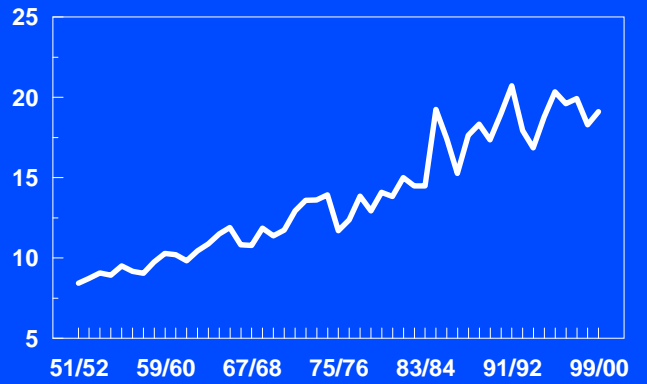
## COTTON IMPORTS: USA

Thousand Tons



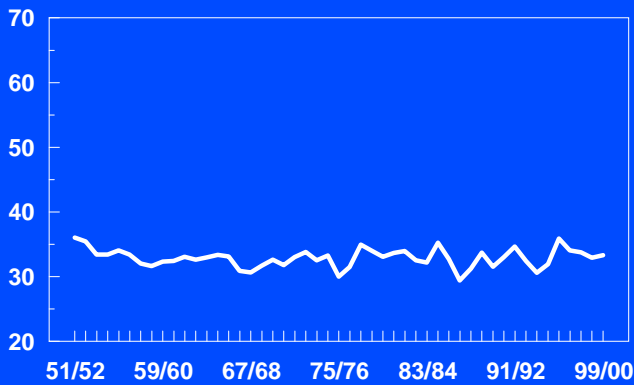
## WORLD COTTON PRODUCTION

Million Tons



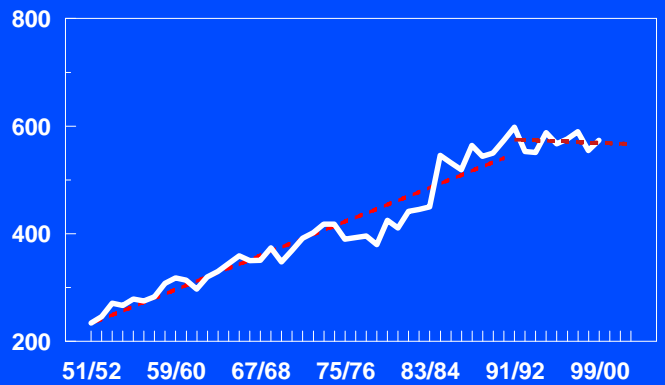
## WORLD COTTON AREA

Million hectares



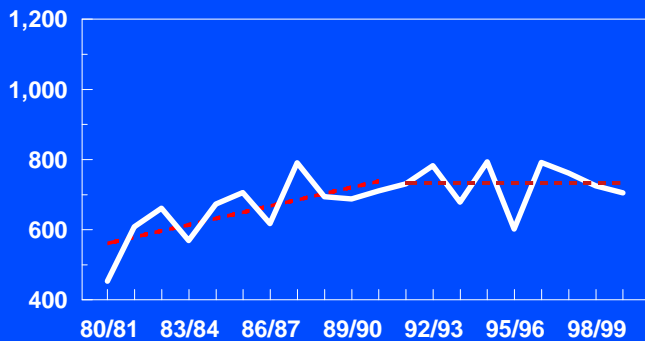
## WORLD COTTON YIELDS

Kilograms per hectare



## COTTON YIELDS UNITED STATES

Kilograms per hectare



## COTTON YIELDS INDIA

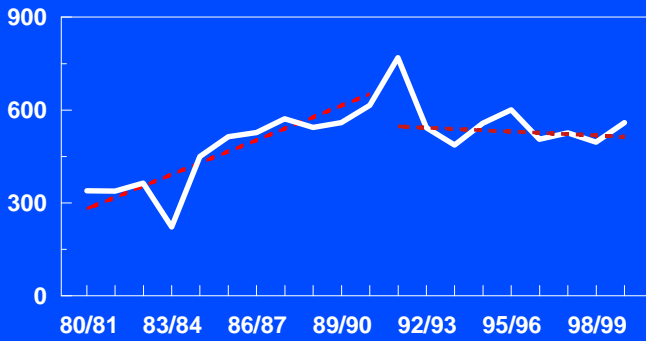
Kilograms per hectare





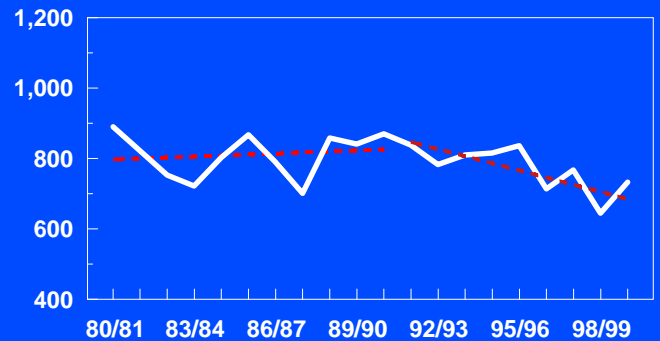
## COTTON YIELDS PAKISTAN

Kilograms per hectare



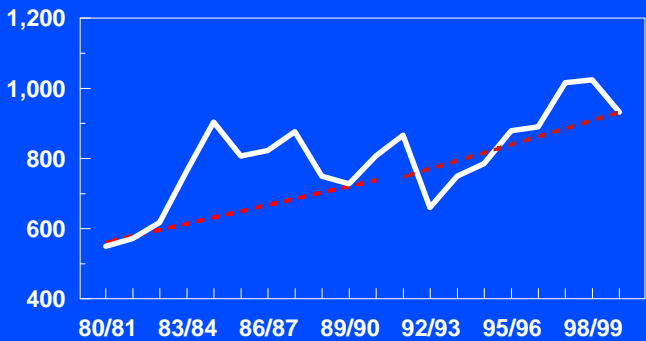
## COTTON YIELDS UZBEKISTAN

Kilograms per hectare



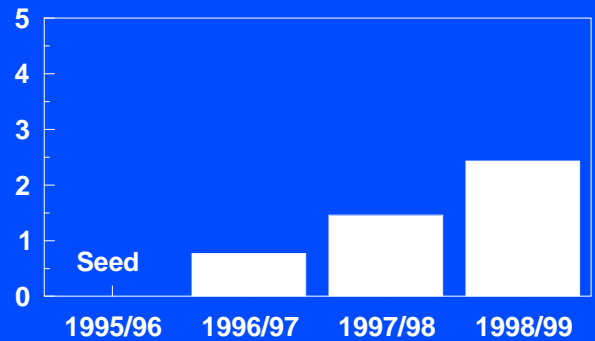
## COTTON YIELDS CHINA (MAINLAND)

Kilograms per hectare



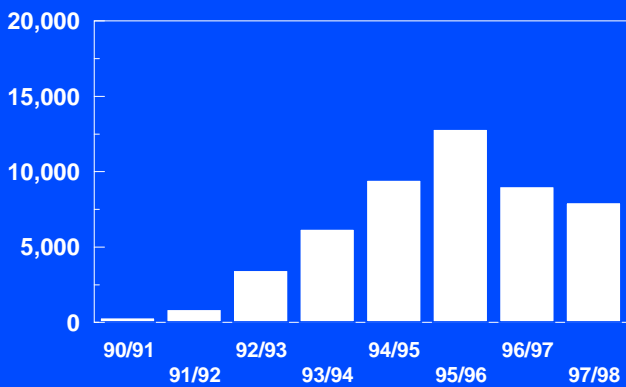
## TRANSGENIC COTTON IN THE USA

Million Ha



## ORGANIC COTTON

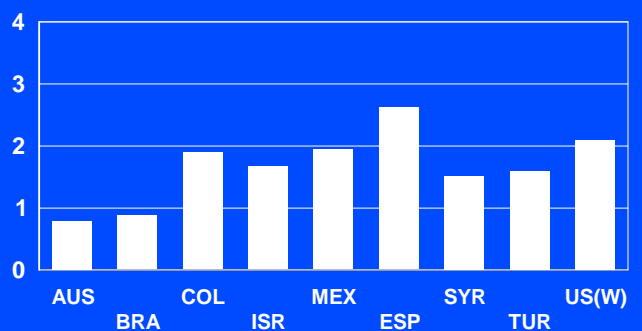
Tons



## COST OF PRODUCTION

(HIGH YIELDING COUNTRIES OVER 1,000 Kg/HA LINT)

US\$/Kg



# COST OF PRODUCTION (EXPORTING COUNTRIES)

US\$/Kg

