



INTERNATIONAL COTTON ADVISORY COMMITTEE

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COST OF PRODUCTION OF RAW COTTON¹

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The International Cotton Advisory Committee has undertaken surveys on cost of production of raw cotton in the world for thirty years. Initially the data was updated ever 1-2 years but since 1983, reports on cost of production have been published every three years. The latest report will be published in September 2001 and is based on the data for the year 2000/01. Countries may have cost for their growing conditions but the ICAC data is the only source of information on cost of production at the international level.

What is ICAC?

The International Cotton Advisory Committee (ICAC) is an association of governments having an interest in cotton production, consumption, trade and prices. Currently, 43 governments are members of the ICAC. The government of Brazil has been a member of the ICAC since September 1939, 62 years. ICAC has the same age. In Brazil we coordinate through the Ministry of Agriculture. The functions of the International Cotton Advisory Committee are defined in the Rules and Regulations, copies of which are available on request. These are:

- To observe and keep in close touch with developments affecting the world cotton situation.
- To collect and disseminate complete, authentic, and timely statistics on world cotton production, trade, consumption, stocks and prices.
- To suggest, as and when advisable, to the governments represented, any measures the Advisory Committee considers suitable and practicable for the furtherance of international collaboration with due regard to maintaining and developing a sound world cotton economy.
- To be the forum for international discussions on matters related to cotton prices.

The main work of the ICAC is related to statistics, marketing and economics. However, the Technical Information Section deals with production research and is also responsible for information on cost of production.

Methodology to Collect Data

In member countries, governments have nominated an organization that may be a government or a private association to represent with the ICAC. The data from countries that are yet not members of the ICAC has been obtained from government organizations. Thus, the information comes from official statistics. Participation in the ICAC survey is voluntary and not all countries decided to participate in the 2001 survey. Data are available for 28 countries. Some countries provided information for more than one set of production conditions thus raising the total number of responses to 52.

The ICAC just compiles the data and present it in various forms for easy understanding. For the sake of consistency, since 1992, the same questionnaire has been used to collect information from various countries. The questionnaire covers all inputs and operations, from presowing to harvesting and ginning. It also includes economic and fixed costs.

¹ Presented at the III Brazilian Cotton Congress, Campo Grande, Brazil on August 31, 2001.

Pre Sowing

Land rent for cotton
 Land revenue/tax
 Pre-sowing irrigation
 Ploughing
 Planking
 Other

Sowing

Soaking irrigation
 Land Preparation
 Seed
 Seed treatment
 Herbicides (Pre)
 Fertilizer
 Drilling
 Other

Growing

Thinning
 Weeding
 Hoeing
 Herbicides (Post)
 Fertilizer
 Insecticides
 Defoliation
 Other

Harvesting

Hand picking
 Machine picking
 Stick cutting
 Other

Ginning

Transportation
 Ginning
 Classing
 Other

Economic

Management
 Interest
 All repairs
 Overheads
 Other

Fixed

Power supply
 Irrigation system
 Tractors
 Spray machinery
 Farm implements
 Other

It is very important that complete information on all major and minor inputs is collected for better comparisons. Below is how the questionnaire looks like when it is sent to producing countries.

Operation/Item	Unit	Quantity per ha.	Cost or price per unit	Cost in local currency	Cost in US\$
1. PRE-SOWING					
Land rent for cotton					
Sub-total					
2. SOWING					
Soaking irrigation					

Limitations to Inter Country Comparisons

Because of a number of limitations, it is not advisable to compare the cost of production among several countries at the same time. Therefore, the cost of individual inputs is more reliable to be compared. Some possible limitations are as follows:

- There are various inputs in different countries that are either provided free or they are heavily subsidized. If there is no cost for these inputs and in others they are expensive, inter country comparisons become invalid.
- In most countries farmers sell seedcotton and seedcotton price determines their income out of cotton production. In other countries farmers gin their seedcotton as their own property and sell lint and seed.
- Economic and fixed costs are not determined in most developing countries.
- Opportunity cost is not determined in some countries.

Thus, it is important that the cost of production data be used carefully. However, there are countries that can be compared among themselves with a higher degree of reliability than others.

Countries and Legends

Data are available for 28 countries and 52 sets of production practices. However, data for only 9 countries are presented here. These 9 countries produce about 75% of world total production. Countries and legends used in the charts are as follows:

Country	Legend
Argentina, Santiago del Estero, Irrigated	AR1
Australia, New South Wales, Irrigated	AU1
Brazil, Cerrado	BR1
China (Mainland), Yellow River Valley	CN1
India, South Zone (Hybrids, Irrigated)	IN5
Pakistan, Punjab	PK1
Syria	SY
Turkey, Aegean Region	TR1
USA, National Average	US

Land Rent

Out of nine countries, land rent data are available for only six countries. This does not mean that land is free in other countries but simply that no opportunity cost has been calculated. It is also true that in a few countries there is simply no land renting system and thus there is no opportunity land renting cost for producing cotton. Among six countries, it is most expensive to rent land in Syria followed by Turkey. Land rent for cotton is the lowest in Brazil (Cerrado). Among 28 countries, in Egypt over US\$700 dollars are spent to rent one hectare as against only US\$54, US\$209 and US\$313 in India, Syria and Turkey respectively.

Planting Seed

Planting seed is the basic input that has a most effect on plant stand and ultimately on yield and quality. The cost of planting seed is the highest in Colombia, i.e. US\$102/ha. Colombia is working to establish its own seed production system but so far all cotton planting seed is imported. It is assumed that the cost of planting seed is high in China (Mainland) and the USA because of the cost of Bt technology. The cost of seed is high in India because of hybrid seed and in Pakistan due to high competition among varieties.

Weed Control

Herbicides are used extensively in Colombia, Greece, Israel, Spain, Syria and the USA. Among the five largest cotton producing countries of the world, in China, India and Pakistan, herbicides are still used on less than 10% of the total cotton area, and weeds are removed through cultivation or manually. Data are not available but it is known that herbicide use is also not popular in Uzbekistan. Among nine countries, the cost of weed control operations is the highest in Syria, where a combination of herbicides plus mechanical operations cost US\$135/ha. In India and Pakistan, the cost of weeding is the same because of similar labor costs. In the USA, herbicides are applied on over 90% of the cotton area, but separate data are not available and the cost is included in chemicals under insecticides.

Irrigation

About 55% of world cotton production comes from irrigated land. The remaining 45% is either partially irrigated or depends entirely on rain. Among the 28 countries who participated in the ICAC survey, irrigation is most expensive in Syria where US\$600 are spent on irrigation of cotton. In Syria, cotton is flood (69%) and furrow (25%) irrigated and the amount of water consumed in ten irrigations exceeds 7,500 cubic meters. In Pakistan water is almost free but the

opportunity cost of irrigating one hectare of cotton for 4-5 times is US\$141. The cost of irrigation in the irrigated parts of the USA is US\$114. US\$15 is the average irrigation cost taking into consideration the total cotton area and the total cost of irrigation water for the whole U.S. Water is almost free in Argentina, Australia, and Turkey, also.

Insecticides

Insecticides have become an integral part of cotton production practices throughout the world. But the cost of insect control operations varies according to insect pressure. The need for insecticide use is minimal in Syria as less than 5% of the total area is treated with insecticides. The cost of insect control is low in Argentina because insecticide use is restricted to only a small percentage of the area. Among nine countries, the insect control costs in the Cerrado region of Brazil are only second to Australia. Costs may vary among farmers but the data ICAC received showed that on average US\$219 were spent per hectare on pest control during 2000/01. Countries cannot continue to produce cotton at a high insect control cost for a long period of time. Farmers in the Cerrado region have to find less expensive ways to control insects. It may be economical to produce cotton now but it cannot stay so for a long time.

Fertilizers

Among the 28 countries who participated in the ICAC survey, cotton is generally grown without synthetic fertilizers in Argentina, Bolivia, some parts of Brazil, Kenya and Uganda. Among nine countries, fertilizer use is very high in China (Mainland), where on average US\$253/ha are spent on fertilizers. In addition, because of intensive farming and easy availability, farmyard manure is regularly used; overgrowth is avoided through topping. Fertilizer costs are US\$223/ha in the Cerrado region of Brazil. The cost of fertilizers is almost the same in India, Pakistan, Turkey and the USA and close to Australia and Syria.

Harvesting

Among the nine countries, cotton is 95-100% machine picked in Argentina, Australia and the USA. The cost of picking one hectare of cotton varies drastically among countries due to differences in wages and the quantity of seedcotton to be picked. The cost of harvesting one hectare of cotton ranges from US\$63 in Pakistan to US\$433/ha in Syria. In both countries cotton is hand picked. Though the yield in China is more than three times higher than in India, the cost of harvesting one hectare of cotton is higher in India. Turkey is facing serious picking labor shortage and is at the verge of adopting machine picking.

Ginning

In many countries, custom ginning is not available or it's not popular and farmers sell their seedcotton to a middleman or directly to a gin. Differences in the cost of ginning per hectare are significant mainly because of the quantity of seedcotton produced per hectare. Among nine countries, the cost of ginning seedcotton produced/ha is the highest in Syria followed by Turkey and Australia. In the three countries, the average yield is over three tons of seedcotton/ha and ginning costs/ha are one the highest in the world.

The cost of ginning a kilogram of lint in eight out of the nine countries ranged from only 5 U.S. cents/kg in China (Mainland) to 23 U.S. cents/kg in Syria. In Brazil, the ginning cost is only 7 cents/kg of lint.

Total Cost

In the world, it is most expensive to produce one hectare of cotton in Israel where it costs more than US\$3,161 to produce one hectare of upland cotton. Pima is even more expensive to

produce. The cost of producing one hectare is over US\$2,000 in Syria and in the irrigated region of the USA.

Ownership Cost (Total cost excluding land rent) - For comparison purposes, land rent has been excluded from the total cost of producing one hectare of cotton. Among nine countries, the ownership cost of producing one hectare of cotton is US\$1,930 in Syria. The ownership cost per kg of lint is the highest in the USA, i.e US\$1.65/kg as against US\$0.82 in the Cerrado region of Brazil. In Argentina and China (Mainland), it is US\$0.90 and US\$0.72/kg respectively.

Net Cost (Total cost excluding land rent and seed value) - Net cost per hectare is also in the same order as is the ownership cost with the exception of India where net cost is significantly lower due to high seed value. In India, the cost is for the commercial cotton hybrids and F_1 generation seed can still be planted to have F_2 generation and that increases the seed value.

Seedcotton Cost (Excluding land rent) - Data from the nine countries showed that the cost of seedcotton production/ha is the highest in Syria followed by Brazil (Cerrado). The cost of seedcotton production in the Santiago del Estero region of Argentina is only US\$357/ha. Thus in Argentina the cost of seedcotton production per kg of lint is only 18 cents per kg as against 45 cents in India 41 cents in Syria and 25 cents in Pakistan and Turkey.

High Yielding Countries

According to the latest ICAC estimates average world cotton yield during 2001/02 will be 605 kg/ha, the highest ever. Brazil will also set a new record by producing over one ton of lint per hectare. Seven other countries are also expected to have average yield exceeding one ton of lint per hectare. Higher yield also means lower cost per kg of lint. Among high yielding countries of the world average cost per kg of lint is the highest in Israel followed by Syria and the irrigated cotton production areas of the USA. Among high yielding countries, the cost of producing a kilogram of lint is the lowest in China (Mainland) followed by Brazil.

Exporting Countries

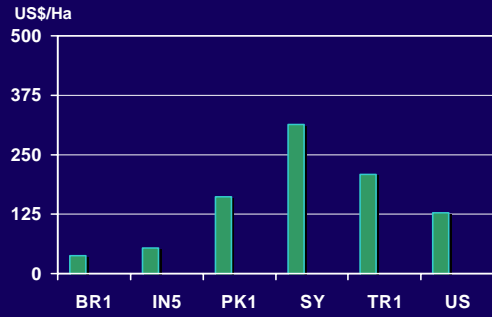
More recently, cotton production has increased significantly in Brazil and the ICAC forecast suggest that production is going to increase in Brazil for more years. Brazil is expected to emerge as a significant exporter of cotton in the next few years. Among significant exporting countries, it is most expensive to produce a kilogram of cotton in the USA followed by Syria and Australia. In Brazil, the net cost of producing a kg of lint is lower than Argentina, Australia, Pakistan, Syria, the USA and Zimbabwe.

Long Term Conclusions

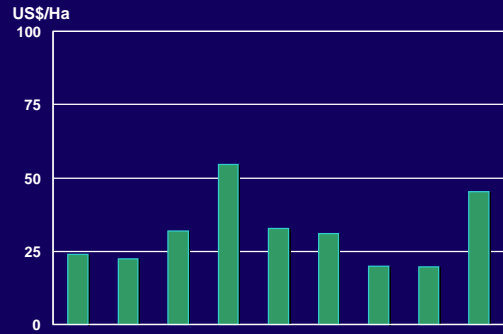
Important conclusions based on the recent data are as follows:

- There are limitations to yield improvement in all countries but the nature of limitations vary among countries. Given the limitations in various countries, input use on cotton has been optimized in most countries. Consequently, the cost/ha will increase at a slower rate compared to the last 2-3 decades.
- In the past 2-3 decades, the increases in the cost of production have been compensated through increases in yields. The current trend of no increases or low increases in average yields in many countries indicates that any increase in individual inputs will be reflected on cost/kg of lint.
- Not low yields but high cost has pushed many countries out of production.
- It is expensive to produce a kilogram of cotton under rainfed conditions compared to irrigated conditions.

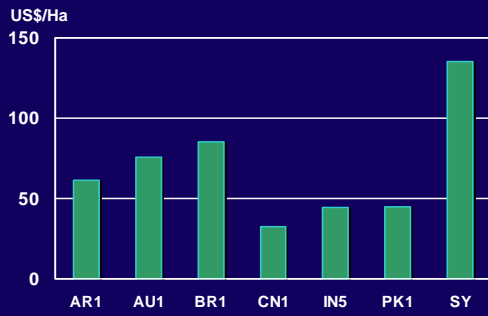
LAND RENT



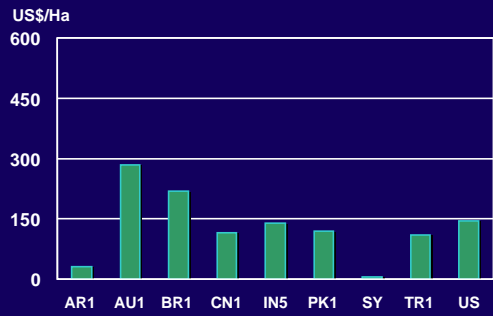
PLANTING SEED



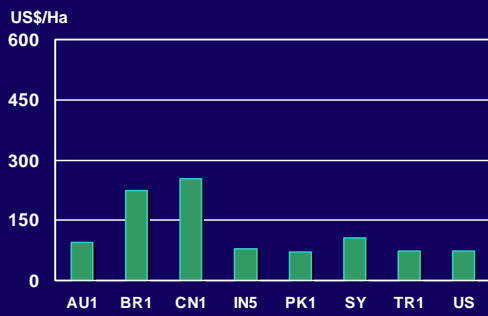
WEED CONTROL



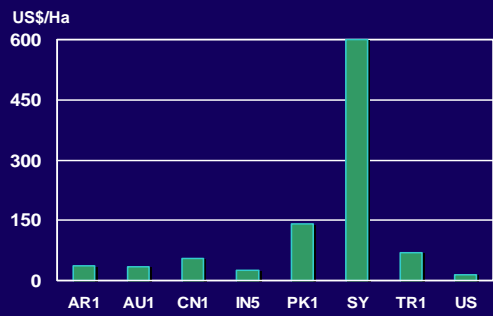
INSECT CONTROL



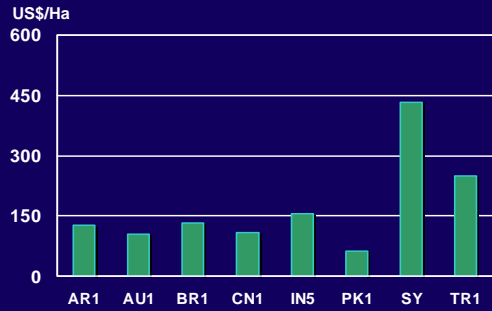
FERTILIZER COSTS



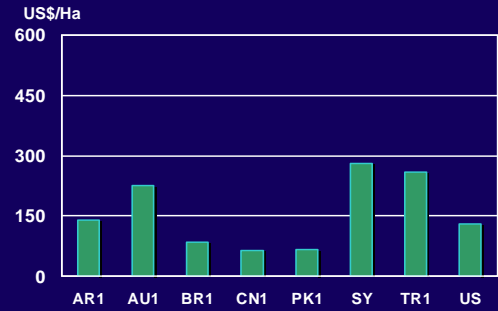
IRRIGATION COSTS



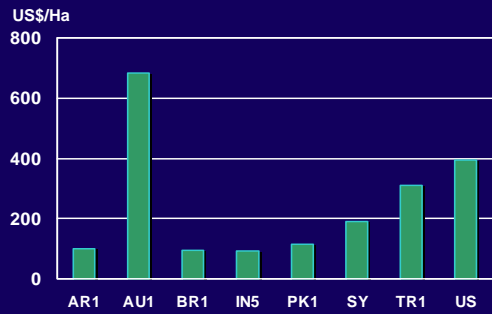
HARVESTING COSTS



GINNING COSTS

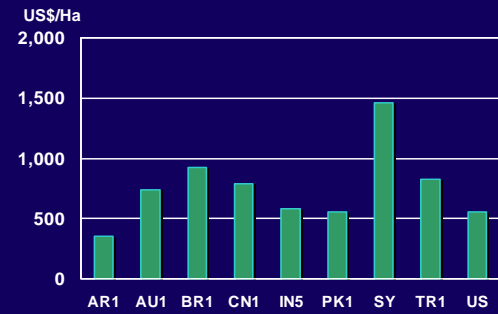


ECONOMIC COSTS



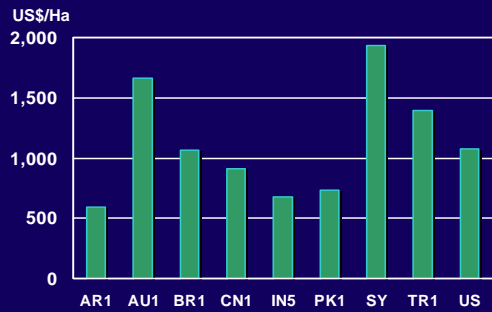
SEEDCOTTON COST

(Excluding Land Rent)



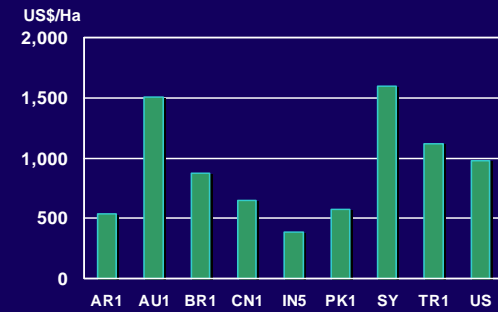
OWNERSHIP COST

(Excluding Land Rent)



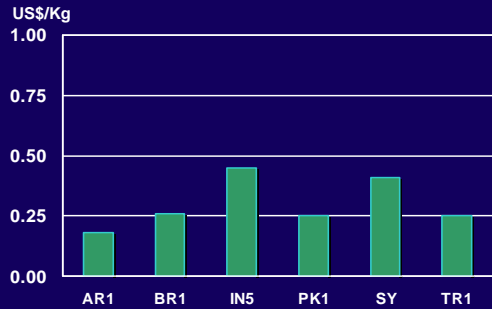
NET COST

(Excluding Land Rent and Seed Value)



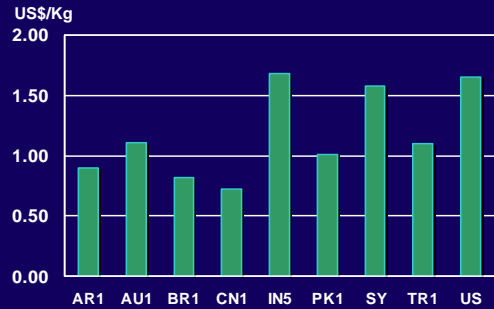
SEEDCOTTON COST

(Excluding Land Rent)



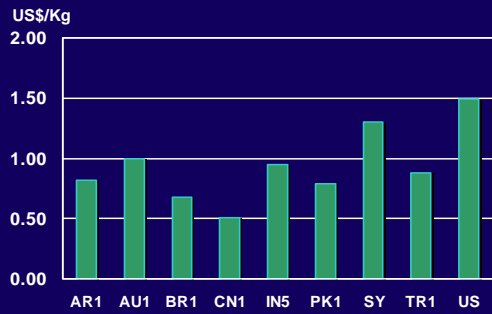
OWNERSHIP COST

(Excluding Land Rent)



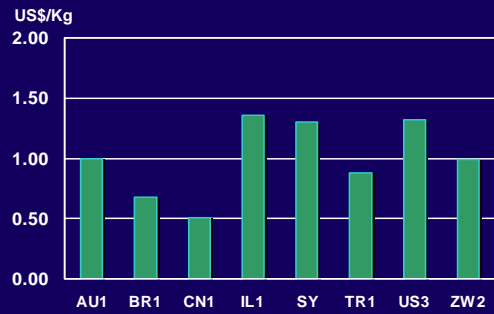
NET COST

(Excluding Land Rent and Seed Value)



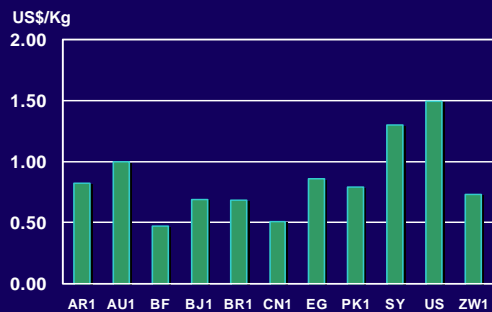
NET COST IN HIGH YIELDING COUNTRIES

(Excluding Land Rent and Seed Value)

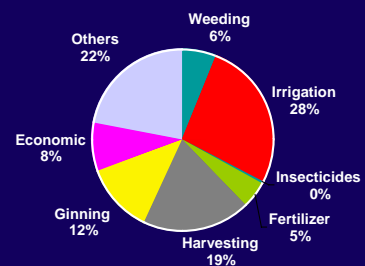


NET COST IN EXPORTING COUNTRIES

(Excluding Land Rent and Seed Value)



COST STRUCTURE IN SYRIA



COST STRUCTURE IN BRAZIL(Cerrado)

