

## Update on Costs of Producing Cotton in the World

M. Rafiq Chaudhry, Ph.D.  
Head, Technical Information Section  
International Cotton Advisory Committee

The International Cotton Advisory Committee (ICAC) has been studying the cost of cotton production since the early 1980s. Survey is undertaken every three years and government agencies in the ICAC member government countries are the primary sources of information from most countries. Thirty-one countries that planted 30.1 million hectares, 88% of world cotton area in 2006/07, participated in the survey published in October 2007. The data from all countries are for the crop season 2006/07.

### World Average

The average of all countries that participated in the survey showed that farmers spent US\$717 to produce one hectare of cotton. This does not include cost of land rent but includes all inputs and operations up to the harvesting of seedcotton. The average cost of producing a kilogram of seedcotton came to US\$0.34, which is only one cent higher than the cost in 2003/04.

The addition of ginning, economic and fixed costs determine the total cost per hectare and per kilogram of lint. The gross cost (including land rent and without excluding seed value) per kilogram of lint in the world averaged US\$1.64 in 2006/07. The value of seed sold after ginning may be significantly lower or higher than the cost of ginning. Thus, a net cost has been calculated excluding land rent and seed value from the total cost. The net cost of producing lint per hectare came to US\$767/ha. The net cost of producing a kilogram of lint averaged US\$1.04 compared to US\$1.01 in 2003/04 and US\$0.83 in 2000/01

### Cost of Production by Region

The thirty-one countries participating in the survey were divided into six groups: North America, South America, Asia, Australia, West Africa and other Africa. The most money was spent in Australia to produce and harvest a hectare of cotton. Three West African countries participated in the survey, and on average, farmers spend US\$391 to produce a hectare of cotton. The expenses of producing one hectare of seedcotton were close to double West African costs in Asia, almost three times in Australia and 12% higher in other African countries. However, the average cost of production of seedcotton among regions was close, except in Australia, and ranged from 29-36 cents/kg of seedcotton. However, the cost of production of lint varied greatly among regions. It was most expensive to produce a kilogram of lint in North America, followed by West Africa in 2006/07. The cost of production per kilogram of lint was the least in other Africa, US\$0.80/kg.

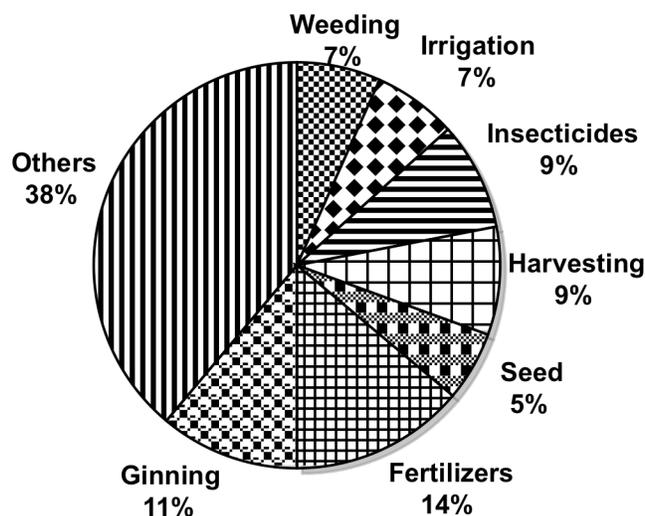
### Cost of production of Cotton by Region (US\$)

Region	Net Cost/kg Seedcotton (Land rent not included)	Net Cost/kg Lint (Land rent & seed value not included)
North America	0.29	1.43
South America	0.31	1.01
Asia	0.36	0.94
West Africa	0.35	1.32
Other Africa	0.32	0.80
Australia	0.19	1.23

### Cost Structure

The four major inputs are planting seed, irrigation water (if cotton is irrigated), insecticides and fertilizers. On average, farmers spent US\$69 per hectare to purchase planting seed. The cost of planting seed included seed delinting and treatment with fungicides, if any. The average cost of planting seed came to 9 US cents per kilogram of lint. The cost of irrigation was US\$110 per hectare, or 11 cents per kilogram of lint. Insecticides are used in almost every country, and the only exception seems to be Syria. The average cost of insect control was US\$101/ha or 14 cents per kilogram of lint. The cost of fertilizers is on the increase, and in 2006/07 averaged 23 cents per kilogram of lint. The cost of weed control operations, which comprised hoeing, inter-culturing and herbicides, was 11 cents/kilogram of lint. The cost of harvesting averaged 14 cents per kilogram of

### Cost Structure - World



lint. The cost of ginning came to US\$0.11/kilogram of lint. The share of individual inputs/operations in percentage of gross cost under irrigated conditions is given in the chart above. A major portion of 'others' comes from land rent, economic costs and fixed costs.

### Inter-country Comparisons

Although there were not many differences among regions, the cost of producing a kilogram of seedcotton varies greatly among countries within regions. The cost of producing a kilogram of seedcotton was as low as 12 cents/kg in Ethiopia and 14 cents/kg in Tanzania and high as 76 cents/kg in Nigeria. The cost of producing a kilogram of seedcotton was over 55 cents/kg in Israel, Mexico (Sonora), Myanmar, Sudan (irrigated Barakat and Acala) and Turkey (GAP, Ege and Akdeniz).

The data from 12 major cotton producing countries representing various regions and production systems indicated that it was most expensive to produce seedcotton in Turkey followed by Syria, 57 cents/kg and 53 cents/kg respectively. It cost 36 cents, 25 cents and 29 cents to produce a kilogram of seedcotton in China (Mainland), India (North) and Pakistan (Punjab), respectively.

The net cost (total cost less land rent and income from seed sold after ginning) of producing a kilogram of lint also showed differences among countries. It was most expensive to produce a kilogram of lint in Bulgaria. The cost of producing a kilogram of lint was over two US\$ dollars in Bulgaria and Israel (Pima). The net cost per kilogram of lint in the USA was US\$1.42/kg,

US\$1.52/kg in China (Mainland) and US\$1.63 in Turkey (GAP). The net cost/kg was only US\$0.67 in Pakistan. Assuming the ginning cost in India equivalent to the cost in Pakistan, the net cost in the North region of India equated to US\$0.50/kg of lint. Net cost per kilogram of lint was lower in India due to recent increases in yields. The cost of production data from Kazakhstan, Tajikistan and Uzbekistan showed that the cost of producing a kilogram of lint was the lowest in the Central Asian countries as a region in 2006/07.

### **Costs of Individual Inputs**

Experiments have shown that maximum benefits of a good insect control and optimum fertilizer use can best only be achieved if weeds are properly removed from the field. Weeds can be removed manually, mechanically or chemically through use of herbicides. Biological control of weeds has not progressed very well it is yet not popular in any country. Weed control costs per hectare were the highest in Turkey in 2006/07. Higher cost per hectare on weed control could be due to high weed infestation, high cost of labor/mechanical operations and also high cost of herbicides. In Turkey, herbicides are used on over 90% of the cotton area but cost of weed control is not high due to high cost of herbicides but due to high cost for manual/mechanical weed control. Weed control costs were also comparatively high in Uzbekistan where herbicide use is still not popular. Weeds may not be a serious problem in Kazakhstan as least amount of money was spent on weed control. Herbicides are not used in Kazakhstan.

The world average on insect control costs should be viewed in the light of the fact that 36% of the world cotton area was planted to biotech varieties in 2006/07 and most of the biotech area was under varieties with insect resistant gene/genes. Otherwise also, it seems that the insect pressure is decreasing in most countries. India and Pakistan are the only major cotton growing countries where more recently a new pest has been noticed on cotton. The mealy bug is on increase for the last two seasons in Pakistan and has also been noticed to affect significant area in India. The mealy bug is sucking insect that feeds mostly on branches and main stem. The affected plants remain stunted, and the shoot tips develop a bushy appearance. A mealy bug attack results in retarded growth and late opening of bolls, thus, affecting the yield badly. Countries/governments are encouraging non-chemical control measures, which along with better insecticides is reducing the use of insecticides. Insect control costs are the highest in Australia followed by Turkey and Brazil. Among 11 countries discussed extensively with regard to input costs, least amount of money was spent on insect control in Kazakhstan and Uzbekistan. It is long known that cotton growing countries in the Central Asian region have good biological control system and sever winter also helps them to breakdown the insects lifecycle.

Regarding fertilizers, nitrogen is a must and is always applied to cotton, partly before planting but most of the time before and during flowering. Phosphorous is applied before planting and potassium is not applied in all countries. Fertilizer costs were the highest Brazil, China (Mainland) and Turkey where US\$400-450 were spent on fertilizers. Fertilizer costs were lowest in the Northern region of India because of no use/need of potassium in areas where cotton follows wheat and most optimal use of nitrogen fertilizers.

Among major cotton producing countries, irrigation of cotton was most expensive in Turkey and least expensive is Kazakhstan and Uzbekistan. Cost of harvesting was calculated on the basis of per kilogram of seedcotton. It is already known that machine picking is less expensive compared to hand picking. On the average 17 US cents were spent to pick a kilogram of seedcotton in the GAP region of Turkey. Hand picking of cotton in China (Mainland) was as less expensive as machine picking in Brazil. Hand picking is expensive in Egypt but Egypt is not considering moving to machine picking.

The ginning costs included transportation of seedcotton to gin and classing and grading charges. Ginning costs were minimum in China (Mainland) as ginning is subsidized by the government. Ginning costs were equal and the highest in Cameroon and GAP region of Turkey. Otherwise there were lesser differences in ginning costs compared to other inputs and operations.

### **Seed Value After Ginning**

Cotton is grown primarily for lint, but seed also has a value. The ICAC survey on cost of production showed that on average a cotton grower makes US\$237/ha from selling seed after ginning. A kilogram of seed fetched 18 US cents per kg, which is a good income for the grower. The data by region showed that cotton seed has a higher value in Other Africa and Asia where a kilogram was sold at 22 cents/kg and 20 cents/kg respectively. A kilogram of cotton seed after ginning was sold at 13 cents in North America (average of Mexico and USA) and 10 cents/kg in South America (average of Argentina, Brazil and Colombia). Farmers may not be selling seed directly but they share the benefit if it is sold at a higher price. Cottonseed prices are the lowest in West African countries where a kilogram of seed is sold at 7 cents/kg.

On average, a sample of cotton seed yields 16% oil, 27% hull, 46% cottonseed meal, and 8% linters and there is always some trash, which is estimated at 3%. Cotton seed oil makes about one-fifth of total food oil production in the world. Cotton seed oil ranks second among the five major oil seeds, which are soybean, cotton seed, peanut, sunflower and rape seed oil. In some countries like India and Pakistan where soybean yields are not very high, cotton seed is the main source of vegetable oil. Linters, meal and hull have their own multiple uses. Gossypol contents in the seed are injurious for non-ruminants and have limited the use of cotton seed. Now, biotechnology applications have developed a genotype that has gossypols in all plant parts except seed. The technology is not commercially available yet, but the technology has already been patented. It is a great opportunity for West African countries to enhance the use of cotton seed and secure additional income for cotton growers.

### **Data Limitations**

There are a number of caveats that compromise the data on cost of production. The major drawback is that complete data are not available from all countries. There are certain inherent limitations, e.g., seedcotton yield is not estimated in Australia and the USA, inputs may be subsidized, and custom ginning is not available in many countries. Production systems are different and the methods of collecting the data in various countries are not the same. Countries estimate cost of production in local currencies, while ICAC data are compared in US dollars; thus, exchange rates have an impact on cost comparisons. But, ICAC's survey is the only source of cost of production data in the world and provides the best comparisons.