ORGANICALLY GROWN AND NATURALLY COLORED COTTON: A GLOBAL OVERVIEW

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Abstract

A global overview of organically grown and naturally colored cotton is presented. Organic cotton is defined and discussed in the paper, including a list of organic cotton contacts and U.S. agencies that certify organic cotton.

Introduction

Organic cotton production began in the early '90s, partly in response to an emerging eco-fashion trend and chemically sensitive individuals that need pesticide-free products. In 1993-94, this eco-fashion market peaked and by 1995 many major retail divisions using organic cotton withdrew from the market.

The world supply of organic cotton fiber is very limited, which has affected the growth of the organic cotton market. Companies continue to be discouraged by higher organic fiber and processing costs that have led to higher garment prices and consumer resistance. Faced with limited supplies, higher costs and limited consumer demand, major companies are not aggressively building markets for organic cotton products.

Discussion

Organic Cotton

Simply stated, organic cotton is grown without the use of synthetic chemical fertilizers, pesticides, growth regulators or defoliants.

The following definition of "organic" was drafted and passed by the National Organic Standards Board (NOSB) in April 1995. It was developed by a joint NOSB/National Organic Program task force, and incorporates language from the Codex Draft Guidelines for organically produced foods.

> Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony. "Organic" is a labeling term that denotes products produced under the authority of the Organic Foods Production Act. The principal guidelines for organic production are to use materials and practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole.
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> Organic agriculture practices cannot ensure that products are completely free of residues; however, methods are used to minimize pollution from air, soil, and water. Organic food handlers, processors and retailers adhere to standards that maintain the integrity of organic agricultural products. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people.

Certification agencies monitor on-farm cotton production to verify and guarantee that it meets organic certification criteria and government regulations. Upon compliance with organic standards and certification, participants are entitled to label and market their cotton and cotton by-products as certified organic.

Organic certification standards and labeling are regulated by federal law. Thirty states now have laws regulating organic labeling, including all major cotton producing states.

At this point, no single national or international standard for certified organic cotton exists. Although similar, each certification agency maintains its own criteria for organically grown cotton. The Texas Department of Agriculture (TDA) also certifies the handling and processing of organic cotton products.

Transitional Cotton

Transitional cotton is also grown without the use of synthetic chemical fertilizers, pesticides, growth regulators or defoliants. Transitional cotton meets organic certification criteria, but has not completed the three-year transition period required to be certified organic. This transition period is required to allow most pesticide residues in the soil to breakdown.

Transitional cotton can be certified by third-party certification agencies to verify and guarantee that it meets organic certification criteria and government regulations. Certified transitional cotton can be labeled and marketed as "transitional".

Organic certification and labeling in Europe

Organic certification and labeling in the European Economic Community (EEC) has been regulated since 1993 by the Council Regulation (EEC) No. 2092/91, which covers the organic production of organic agricultural products. These regulations also include specific standards for post-harvest processing of certified organic products. These regulations, in large part, were based on standards

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originally created by the European-based International Federation of Organic Agriculture Movements (IFOAM). Access to markets for organic products in the EEC by non-EEC countries is still evolving. This is due to the nature of the documentation and review process required by EEC regulations.

Currently, apparel companies marketing organic cotton products in the EEC use various third-party certification agencies. Most companies use an IFOAM-accredited certification agency because IFOAM has developed the most widely accepted organic certification and labeling standards in Europe. However, it is currently possible to use a U.S.-based certification agency which may or may not be accredited by IFOAM.

World Supply of Organic Cotton

In 1996, approximately 9,028 tons of organic cotton was grown in 17 countries (see Table 1). Thus, organic cotton production has dropped by 30 percent in 1996 from a peak of 12,864 tons in 1995. This, in large part, is due to a 54 percent reduction in U.S. organic cotton production in 1996 (see Figure 1).

The lack of a secure market or a specific buyer was identified as the main reason that U.S. growers did not plant organic cotton in 1996. It should be noted that organic farmers plant cotton as a part of a crop rotation that includes several field crops. When more secure market opportunities develop, growers can then switch back to organic cotton. However, without a secure market for their organic cotton, growers indicate that they are less willing to produce on speculation alone.

Also in 1996, a severe drought throughout Texas reduced the state's entire cotton crop. The Texas Department of Agriculture estimates that the organic cotton yield may be reduced by as much as 50 percent.

Declining U.S. market share

In the early 90s, the U.S. was the dominate producer of organic cotton (see Figure 2). However, in 1996, the U.S. share of the world market in organic cotton has fallen to below 40%. Peru, Turkey, Egypt, India and several African countries are rapidly increasing organic cotton production in response to the growing organic cotton demand in Europe and Japan.

Cost of Organic Cotton

The average price for organic cotton fiber from cotton merchants in the United States is 37 to 65 percent more than conventional fiber. This was calculated by comparing the average costs of organic cotton fiber with conventional fiber for 1995-1996 for six states (See Table 2).

In addition to higher fiber costs, the cost of using organic cotton is higher because limited supplies hamper commercial-scale manufacturing. Currently, at each stage of organic cotton processing, mills must run at sub-optimum conditions to process small lots. The inefficiency of small production runs progressively increases the processing cost at every stage because:

- separate handling is required for organic cotton;
- runs are smaller and labor costs are proportionately higher per run than conventional cotton;
- spinning lines must be shut down for cleaning to avoid contamination by conventional fiber.

An additional factor operating to influence organic cotton prices is what we call the multiplier effect. At each stage of manufacturing, higher processing costs are passed on to the next stage, progressively increasing the cost of the final garment.

Naturally Colored Cotton

Naturally colored cotton has its roots in the ancient Americas, where weavers cultivated and spun their native green and brown colored cottons since their domestication about 4,500 years ago.. The natural coloration of the cotton fiber is due to the plant's inherent genetic properties. Currently, naturally colored cotton fiber is most available in various shades of green, brown yellow, while brown lint with red, pink, and lavender highlights have been reported by breeders and historians. Most, but not all, of the naturally colored cotton currently available is produced using organic methods.

Historical Background

Over ninety-five percent of all of the naturally pigmented cotton lint grown commercially in the world today has descended from pre-Columbian stocks selected by indigenous peoples of ancient America. Early farming societies independently selected, domesticated and improved two entirely different tropical, perennial species of cotton with relatively sparse, short pigmented lint. The source of these improvements can be traced both cytogenetically and archaeologically back five thousand years to cultural centers of central America and the Andean coast of western South America. Modern cultivars with 'improved' characteristics including high yields, day-length neutrality and annualized regimes with easily ginned, abundant fiber of uniform color now dominate the naturally pigmented cotton picture.

A variety of sources indicate that colored cotton was produced for indigenous and commercial use in Guatemala, Mexico, Colombia, Peru, Haiti, China, Egypt, United States and Russia during the 1800 and 1900's. Some twelve shades of natural brown cotton were identified in northern Peru at the end of the last century, when colored lint was routinely blended with sheep's wool by English manufacturers to lower the costs of producing fine woolen fabrics, reduce shrinkage, increase durability and give better luster and finish, especially in underwear and hosiery (Dabney 1896: 64). In 1905, a variety of cotton landraces

were grown by the USDA in a series of experiments to determine boll weevil resistance (Cook 1906).

Due to petroleum-based dye shortages during World War II, Soviet textile engineers creatively resorted to the use of naturally pigmented fibers to add color to otherwise undyed cotton fabrics. The publicity given to the Soviet brown cotton production in the American press during World War II led to spinning tests on Nankeen brown and Arkansas green. Lint length ranged from 20/32" to slightly over one inch.

In California, Gus Hyer, a USDA cotton geneticist, worked with colored lint lines largely of upland varieties for several decades. According to California planting cotton seed distributors (Oakley, personal communication 1993), it was Hyer's seed stocks that, following his death a decade ago, form the foundation for contemporary brown and green linted commercial fiber production and improvement that began in California in the 1980's. Currently, Sally Fox, a plant breeder in Arizona and California, has developed new naturally colored cotton varieties over the past 14 years, marketed under the trademark name Fox Fibre®.

Since 1982, the Native Cotton Development Project of Peru has recovered a number of landraces of naturally pigmented cotton, now commercially marketed by Pakucho Pax. Pakucho Pax coordinates and markets the naturally colored cotton produced by hundreds of small growers. This native cotton project helps maintain some 75 different landraces of white and naturally pigmented fiber lines, grown experimentally and commercially in dozens of small plots. The estimated 15,000 peasants and Indians who still routinely cultivate one of the four varieties of native, pigmented cotton in Peru constitute by far the largest single group of naturally colored lint producers world-wide. Virtually all use what may be generally termed "organic" methods of cultivation, largely of pre-Colombian origin. Fiber lengths for the perennial tree form range from 12 to 43 mm, and micronaire measurements between 4.5 and 7.2 (Vreeland 1996). Six principal color lines have been recovered and stabilized from dooryard forms by project researchers: cream, tan, medium brown, reddish brown, chocolate brown and mauve. A premium is placed on environmentally and culturally sensitive production techniques by minimizing or eliminating the use of pesticides, fertilizers, while exclusively utilizing hand harvesting methods.

Market Overview

The market for naturally colored cotton emerged in the early 1990s, as producers offered stocks of colored fiber to specialty users. In 1992, an estimated 4,000 acres of naturally colored cotton was produced in the U.S., which has now declined to approximately fifty acres in 1996 due to lower market demand. In the last few years, as the production of naturally colored cotton in the U.S has declined, naturally colored cotton fiber from Peru, Israel, and India have become more available.

Prices for naturally colored cotton are highly variable due to limited supplies. In 1996, world market prices for organic, naturally colored green cotton ranged from $3.79 to $5.00 per pound. World market prices for organic, naturally colored brown cotton ranged from $1.84 to $3.35 per pound. Higher initial costs for naturally colored fiber are offset by avoiding dyeing costs and the fact that naturally colored fiber are often blended with less expensive cotton to achieve desired fabric hues.

Naturally Colored Cotton Yields

Yields of naturally colored cotton tend to be 50 to 70 percent lower than yields of conventionally grown white cotton varieties under similar conditions. This lower yielding tendency is a result of historical breeding that selected primarily for fiber color characteristics not yield-related qualities. Cotton breeders working with colored cotton have been addressing this problem, and yield characteristics of color cottons have been steadily improving and will continue to do so.

Organic Cotton Contacts

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Dabney, Charles W. 1896. The cotton plant, its history, botany, chemistry, culture, enemies and uses. USDA Bulletin no. 33. Washington D.C: Office of the Experiment Stations.

Vreeland, James M. 1996. Organic and naturally coloured native cotton from Peru, South America. Proceedings, Bremer baumwollborse, 23rd International Cotton Conference, Faserinstitut, Bremen, H. Harig and S. Heap, editors, pp. 129-140.

Table 1.World Organic Cotton Production 1993-1996 (Fiber only, in tons)

Country	1993	1994	1995	1996*
Argentina	2	120	126	132
Australia	500	750	400	500
Brazil	2	9	1	5
Egypt	141	598	600	650
Greece		450	500	475
India	268	398	929	900
Israel			100	100
Mozambique			90	90
Nicaragua		16	20	20
Paraguay	100	75	50	50
Peru	700	924	1,516	1,500
Senegal			2	30
Turkey	198	610	720	750
Tanzania		33	100	100
Uganda	16	150	250	300
United States	4,274	5,365	7,425	3,396
Zambia			35	30
TOTAL	**6,201**	**9,498**	**12,864**	**9,028**

* Estimated production

Table 2.US Organic Cotton Fiber Prices / lb. Compared to Conventional (1995—96 averages)

	Conv. Fiber Cost	Organic Fiber Cost	Organic Premium
AZ	$.77	$1.18	53% more
CA	$.85	$1.35	59% more
TN / MO	$.75	$1.15	53% more
TX	$.76	$1.25	65% more
NM (Pima)	$1.15	$1.58	37% more

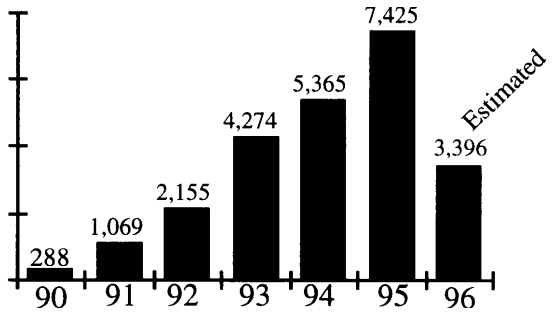

Figure 1. U.S. White Organic Cotton Production 1990-1996 (fiber only, in tons) Source: Agricola Partners' *Eco-Fiber Index*™, 1996

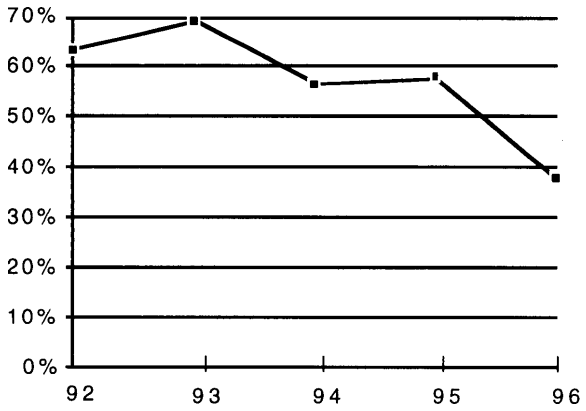

Figure 2Declining U.S. Market Share of World Organic Cotton Fiber Production Source: Agricola Partners' *Eco-Fiber Index*™, 1996

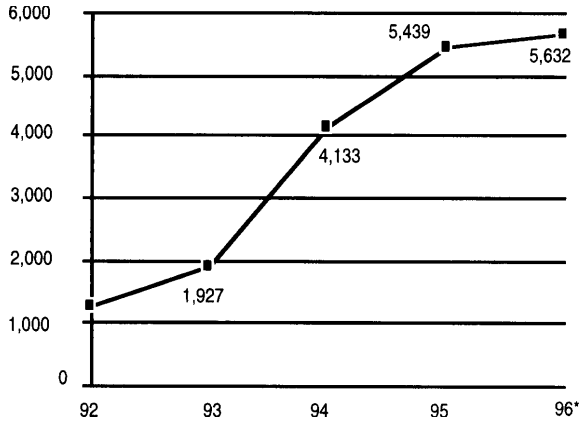

Figure 3. All Non-U.S. Organic Cotton Production 1992-1996 (fiber only, in tons) Source: Agricola Partners' *Eco-Fiber Index*™, 1996 Estimated production.