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Status of Organic Cotton Production

Paper presented at the International Workshop on Cotton

Production Prospects for the Next Decade,

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their own certification rules, there is a need to bring some kind of harmony among the existing rules at least within a country.

- Cotton grown without fertilizers and insecticides is named differently by different people. It is called organic, chemical-free, certified organic A, etc. There is a need to put organic cotton under one worldwide acceptable label.
- Maintenance of soil fertility for realization of optimum yield in organic cotton requires cotton growing with other forage and leguminous crops. Crops other than cotton are also to be grown without fertilizers and insecticides. Organic cotton has a market but there is a need to establish a market for other organically produced crops grown in rotation with cotton.
- Organic cotton can successfully be grown in large areas which require machine picking. On the other hand the use of defoliants is prohibited, so there is a need to find harvest aids that would permit picking of cotton without chemical defoliation.
- Standards also need to be established for manufacturing organic textiles. Presently, there are almost no standards for spinning, weaving and processing organic cotton in textiles.

Status of Organic Cotton Production

Paper presented by M. Rafiq Chaudhry, Head, Technical Information Section, ICAC, at the International Workshop on Cotton Production Prospects for the Next Decade, Ismailia, Egypt, November 16, 1994.

Organic cotton in very simple terms is cotton produced without certain "prohibited" agrochemicals commonly used in current cotton production practices. These agrochemicals are said to be not only toxic and dangerous to produce, store and apply but also cause environmental hazards for those not even involved in cotton production. These chemicals include pre- and post-emergence herbicides, fertilizers, insecticides, fungicides used as seed treatment or as a spray, growth regulators, boll openers and defoliants. However, chemicals, which are not life threatening to people and are safe to be produced, stored and applied, and are also environmentally safe, can still be used in organic cotton production. But, who will draw a line between what is allowed and what is not allowed in organic production? This function is performed by the certifying organizations. No organization will certify any produce as organic unless it is produced without prohibited chemicals for three years. The following three conditions seem to be important for organic production.

- No prohibited chemicals
- A period of three years
- Certification by a recognized state or private agency

Cotton production practices in some countries still do not involve fertilizer use and insecticide coverage, not because they are not required but because they are not available to the growers for various reasons. This cotton, however, cannot be called organic cotton because it is not certified and it is not known if the prohibited chemicals were used during the last three years, not only on cotton, but also on other crops grown in rotation with cotton.

Conventional cotton is a cotton grown under normal inputs. Organic cotton has various names like green cotton, organic certified A, environment friendly, etc. Certainly there is something in between organic cotton and conventional cotton—cotton grown without the prohibited chemicals during the first and second year of production before it is certified as organic cotton. It has again various names.

Transitional Cotton:	Texas Department of Agriculture
Certification Pending:	California Certified Organic Farmers
Organic Certified B:	Australia

Production Practices

Organic production possibly requires more technical skill to grow cotton without synthetic fast acting fertilizers and insecticides than conventional production. Seed treatment is not allowed, making it difficult to grow such cotton in areas highly vulnerable to soil-borne diseases. Weeds have to be removed manually or mechanically. Such cropping systems must be followed in agriculture which minimize the spread of weed seeds. There is every likelihood that the weed pattern may change under organic production conditions and new weeds might appear. But, some years after the new weed control system is established, it may be able to hold its own.

Organic fertilizers are allowed to be used in organic production. Soil fertility has to be maintained close to that of conventional production to have a good harvest. Suitable crop rotations, cultivation of leguminous crops, farm yard manures, all kinds of environmentally safe means of fertility enhancing operations are allowed. The same is true for insect control: biological control, bioinsecticides, cultural means, multi-adversity resistance, etc.; all have to be adopted. Growers registered in the certification programs are made aware of what is allowed to be sprayed on the crop. Sex pheromones along with many novel insecticides are permitted to keep the pest pressure below economically harmful levels.

Everywhere organic cotton is grown, presently recommended commercial varieties have been put into organic production, and they are recommended as suitable for organic production. I have

a different view about varieties suitable for organic production. I think that the presently grown commercial varieties are not suitable for organic production for the following reasons:

1. During the process of variety development, F_1, all subsequent segregating generations, progeny rows and early stage yield trials are conducted under high fertilizer conditions. So, at all stages, selections have been made for such genotypes which can express maximum potential only under high doses of inorganic fertilizers. And, I do not think that a plant type which gives optimum yield under high fertilizer doses will necessarily give high yield in the absence of inorganic fertilizers.

2. The same is true for insecticides. Yielding ability of the presently recommended varieties was tested under stringent plant protection measures. Elimination of highly effective insecticides from production practices is going to have a big impact on the behavior of the plant and its yielding ability.

3. For years breeders have been breeding for short stature and short duration varieties, and they have been successful to a great extent. It is well established that the fertilizer requirements of dwarf genotypes are absolutely different from conventional type tall-growing varieties. Short stature genotypes will fail to express their optimum potential in the absence of fertilizers and insecticides. They are destined to remain substandard and yield comparatively lower.

What Kind of Varieties Could Be Suitable for Organic Production?

Varieties that could be more suitable for organic production conditions need to be found. Probably the best guess could be something closer to the obsolete variety types which were grown when synthetic fertilizers and insecticides had not been adopted in the production system. The varieties for organic production should have the following desirable characters:

1. Organic production cannot give yield equivalent to conventional production for obvious reasons. The varieties for organic production must be more tolerant to insect pests and diseases. Non-conventional pest control methods cannot provide the same effective control as conventional insecticides. Greater tolerance to insect pests should be acceptable even at the cost of a slightly lower yield potential.

2. Varieties for organic production should not require high doses of nitrogenous fertilizers. Such varieties can certainly be developed.

3. Fertilizer requirements of new varieties, particularly nitrogen, should be more steady. The nitrogen need of the plant should be in proportion to what a plant can take up from the soil during the vegetative as well as fruit formation stages. If the crop goes into nitrogen stress, particularly at the vegetative stage, it will have a serious effect on yield.

4. Fiber characteristics should not be affected by the elimination of fertilizers and insecticides.

Organic Cotton Programs in Various Countries

The current crop season is almost at the fourth year of its production. It is a consumer-driven initiative fulfilled by producers not for the sake of better income but for the sake of environment and novelty. In almost four years, organic production has been introduced in many countries at a comparatively faster speed. It is believed that organic cotton is produced at least in some quantity in Argentina, Australia, Brazil, Egypt, Greece, India, Paraguay, Peru, Turkey and the USA. In the last two years the ICAC has prepared a number of reports on organic production and has brought up some important issues for consideration of researchers. The current situation in some countries is as follows:

Argentina

Organic cotton is produced in the private sector. Local certification is not currently available. Unofficial and partial information available show that it is all Pima and the average lint yield is about 300 kg/ha. Yield is expected to increase in the current season. Area has been as follows:

1992/93	270 ha
1993/94	60 ha
1994/95	400 ha (est.)

No reliable information on the cost of production is available, but it certainly costs more to produce organic cotton than conventional cotton. The cost of organic production is expected to be lower in the years to come, if it is still produced. In the last three years the premium for organic cotton varied greatly and ranged from 20% to 100% over conventional produce.

Australia

Local certification rules are available and cotton is certified as "Organic Certified A" equivalent to organic cotton in other countries. National Standards for Organic and Bio-dynamic Production were released by the government in early 1992. Presently, there are three registered certifiers, but so far most of the cotton is certified by Biological Farmers of Australia. Usually a levy of 0.5% on income from organic cotton is charged by the Biological Farmers of Australia in lieu of certification services. Total area during 1993/94 was approximately 700 ha. Organic cotton was grown under irrigated conditions at a higher cost but with a low yield level of 685 kg/ha. Yield was low mainly due to high insect damage and such a low yield level is not economically sustainable under the highly mechanized and expensive production system in Australia.

Egypt

In Egypt, SEKEM Farms is involved in organic production. Certification is available from the Center of Organic Agriculture

in Egypt. In 1994/95, there is some organic cotton in Fayom Governorate and some other governorates both in Upper and Lower Egypt. Spiny bollworm is mainly responsible for losses in organic production. Egypt also had the privilege of hosting the first International Conference on Organic Cotton, held in September 1993. Last year, the Center of Organic Agriculture of Egypt of the SEKEM Farms accepted the responsibility to serve as an international platform for communication on organic cotton production. In the last year, the Center has regularly issued newsletters mostly restricted to local growing conditions. Lately the Center has announced two short-term training courses during 1995 on Principles of Organic Farming with Special Reference to Organic Cotton and an Advanced Course on Organic Cotton. During 1994, the area and production estimates for organic cotton are as follows:

Area	607 ha
Expected organic yield	986 kg (-12%)
Expected conventional yield	1,102 kg
Cost of production	+ 8 %

Greece

Organic cotton was grown in Greece during 1993/94 and 1994/95. Area and production was as follows:

Year	Area	Production
1993/94	2.5 ha	2.0 tons
1994/95	2.5 ha	
1994/95 (Transitional)	470.0 ha	333.0 tons (est.)

India

In India, organic cotton is produced with the help and cooperation of the Gujarat State Cooperative Cotton Federation Ltd. 1994/95 is the second year of production. Area and yield has remained as follows:

Year	Area (ha)	Average Yield (kgs/ha)
1993/94	687	141
1994/95	687	371 (expected)

Organic cotton has been grown under an agreement with Bo Weevil of Holland but certified by a different certifying company. Organic cotton has been sold at an average price of 22% higher than conventional cotton during 1993/94.

Turkey

Bo Weevil is said to have two programs on organic production in Turkey. During 1993/94, 100 ha of cotton were grown without prohibited chemicals. Local certification is not available yet. Information for 1994/95 is not available yet.

USA

Organic cotton production started in the USA and it has now the largest area under organic cotton. Organic cotton is mainly grown in the states of Arizona, California and Texas. There is some organic cotton in Tennessee and Missouri, too. Certification facilities are offered by many organizations, some of them are as follows:

California Certified Organic Farmers
Texas Department of Agriculture
Organic Crop Improvement Association International
TN Land Stewardship Association
Arizona Certification Board

Though organic cotton is mainly grown in Arizona and California, the program of the Texas Department of Agriculture is well established and more popular. Organic area during different years has been as follows:

1990/91	60 ha
1991/92	121 ha
1992/93	1,549 ha
1993/94	4,418 ha
1994/95	3,869 ha

The available data show that organic production gives on the average about 20-25% lower yield. The premium for organic produce varies greatly and ranged from almost nothing to 50% over the conventional produce. The US Department of Agriculture constituted a National Organic Standard Board to develop national standards and bring some kind of harmony among standards and nomenclature. National standards are expected to be available sometime during 1995.

Peru and Paraguay also have small scale organic cotton production projects. Brazil has a potential to grow organic cotton in the Northeast.

Colored Organic Cotton

Colored cotton is grown in many countries but with aggressive campaigning by Israel. Colored organic cotton is grown in the USA mainly by two companies, Natural Cotton Colours, Inc,. and BC Cotton, Inc. However, Natural Cotton Colours, Inc. has undertaken successful promotional campaigns at many international forums to promote its cotton under the trademark FoxFibre. Colored cotton still exists only in its two natural cotton colors, i.e., brown and green, though brown is available in various shades. Fiber characteristics are said to have been improved through breeding in about the last 8-10 years. Total area under organically grown colored cotton is estimated to be between 2,500-2,800 ha during 1994/95.

Natural Cotton Colours, Inc.	2,000-2,500 ha
BC Cotton, Inc.	About 400 ha

Cost and Profit

An effort has been made to consolidate information on organic cotton area from various sources but most of the information is scattered and not accessible for various reasons. Available information often fails to mention the experiences and problems faced in the production process. Admitted that there is a great variation in cost of organic cotton production vs. conventional

production, no statistics are maintained on cost of production. The available information is not disclosed by the certifiers to honor the confidentiality of the producers. However, the cost of production is at least 10% higher due mainly to manual operations and expensive nonconventional means of insect control.

There is no standard premium on organic produce. It varies greatly from producer to producer and from season to season. It seems that it will not be economical to produce organic cotton unless it gets a 43% higher price over conventional produce.

Conclusions

1. Organic cotton gives low yield and it costs more to produce.

2. No systematic research has been undertaken on organic production technology. Consequently, no pre-tested and authentic guidelines on production technology are available to the producers.

3. Information on economics of organic production is also lacking. Growers entering into organic production programs are usually not aware that either they are going to make money or they are going to lose compared with conventional production.

4. Certification facilities are not available to the growers in many countries. They have to rely not only on certification by outsiders but also on the price premium decided by the certifiers.

5. Cotton grown without chemicals is named differently in different countries. Nomenclature in some countries like environmentally friendly, chemical free, etc., creates a lot of confusion about what is really an organic cotton. There is a need to promote organic cotton under worldwide acceptable labels.

6. No cotton can be certified as organic cotton unless all the crops grown in rotation with cotton on the same land are also grown organically. Thus, the economics of the grower have to be considered taking into account the income from the rotation crops. While there is a need for better marketability of organic cotton, a market also needs to be developed for rotational crops.

7. Many new areas need to be researched in the organic production system. One example could be varieties with natural characteristics to shed leaves at maturity, eliminating the need for defoliation in the case of machine picking.

8. Presently, there are almost no standards for ginning, spinning and weaving of organic cotton. Standards need to be established for the production of organic garments.

Organic Cotton Production - III

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In previous articles published in THE ICAC RECORDER or presented at various international meetings, we have tried to gather statistics on organic cotton area, production and yield, and collect information on certifying organizations. Moreover, we have tried to identify various important issues to be considered by researchers and organic cotton producers. Organic cotton production is not simply an elimination of fertilizers and insecticides but it is a complete production system which requires equally sound knowledge of cotton production practices. With respect to insect control in particular, a thorough knowledge of non-chemical means of insect control is a pre-requisite for organic production. Unfortunately, complete information on many aspects of organic production is not available at one place and even in some cases the concerned authorities are not willing to share information. This article is another effort by the Technical Information Section of ICAC to provide additional information on organic cotton, admitting that it is not complete and that much more could be added.

Organic Cotton Programs in Various Countries

It is estimated that little over 8,000 hectares of organic cotton are grown in various countries, the USA being the largest producer in the world. Organic cotton is also said to be produced in Argentina, Australia, Brazil, Ecuador, Egypt, Greece, India, Nicaragua, Paraguay, Peru, Sénégal, Tanzania, Turkey and Uganda. Attempts have also been made to grow it in Benin. However, organic cotton is produced on a commercial scale only in the USA. In most countries, it is produced in small, supervised projects, most of which get financial, technical or supervisory support from international organizations and companies. Nicaragua has provided some technical help to Ecuador for launching organic cotton production projects since the 1995 crop season. The German Agency for Development Cooperation (GTZ) and Bo Weevil of Holland are involved in many projects in different countries.

A number of national and international meetings have been held to exchange information on organic cotton production, processing and utilization. The International Federation for Organic Agriculture Movement (IFOAM), based in Germany, organized the First International Conference on Organic Cotton in Cairo, Egypt, from September 23-25, 1993, which was centered around issues related to production practices for organic cotton. Now, the IFOAM is planning to have the Second International Conference on Organic Textiles in Bingen, Germany, from September 23-26, 1996. On this occasion, organizers plan to publish