

The experience of family farmers from Tauá, Brazil

Organic cotton

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For more than two decades now, the so-called 'cotton crisis' strikes in the semi-arid Northeastern region of Brazil. This crisis has touched many sectors of the region's economy, but the burden lies mostly with the family farmers who usually plant cotton as their most important market crop. Since 1986, when the boll weevil (*Anthonomus grandis* Boheman) spread throughout the region, the crisis became even worse. The boll weevil was neither the only nor the main cause of the crisis, but it made the cultivation of traditional cotton crops (mocó, perennial cotton (*Gossypium birsutum* L. r. *marie galante* Hutch) almost impossible.

In 1990, a local NGO, ESPLAR, began researching and developing agroecological alternatives for cotton cultivation in the semi-arid region. This was before the first demands for organic cotton in Brazil emerged. The initiative was a response to the demand of family farmers from two municipalities of the Ceara interior, in the Northeast of Brazil.

First steps

Between 1990 and 1996, ESPLAR carried out a Research & Development project titled "Ecological management of perennial cotton". Family farmers from different municipalities of Ceara took part in the discussions on what strategies for agroecological management to adopt and how to carry out the experiments. The management alternatives consisted of intercropping the perennial cotton, planting of an early maturing variety, removal of affected flower buds, and soil conservation measures.

The chosen alternatives found many barriers during experimentation. Farmers did not adopt all the recommended technologies, especially the removal of flower buds, which is crucial to the control of boll weevils. A long tradition of relatively extensive cultivation of perennial cotton made it difficult to cater to the additional labour needed.

However, in 1994, on the basis of the first results, diffusion of the proposed technologies took place. It was supported by a loan of US\$150/ha. 130 farmers cultivated almost 250 ha of crops. Although they did not reach the expected cotton production levels, the alternative management system resulted, in many cases, in the restoration of soil fertility, and in the continued maize and beans intercropping. Besides, substantial increases in the intercropping of

Leucaena (*Leucaena leucocephala*) and the making of contour lines were observed (Souza, 1999). It was the start of a gradual change of mind and an inversion of the predominant logic of many farmer-researchers.

Despite the limitations in production, the merit of this initiative was the exposure of ESPLAR and the farmers' organization of Tauá (ADEC) to the emerging market for organic cotton. Thus, in 1993 and 1994, ADEC sold 10.5 tons of cotton fibre, produced without any chemical input, for the production of organic cotton T-shirts for Greenpeace Brazil.

A new R & D project

In 1997, ESPLAR started a new project to develop cropping systems of both perennial (mocó) and herbaceous cotton on an agroecological basis. At that time there was deep discouragement amongst the farmers to continue growing cotton, due to consecutive crop losses.

The new practices to be tested included planting of annual, herbaceous cotton at the beginning of the wet season, always in association with maize, beans and/or sesame, besides legumes such as *Leucaena* and/or *Cajanus cajan*. Cotton is planted in strips of 5 or 6 lines, alternated by strips of the other crops. Contour lines and other soil conservation practices are adopted where necessary. Fertilization is done with farmyard manure, depending on the quantity available to each grower, as well as with biofertilization of the leaves with fermented fresh manure mixed with other

mineral, vegetal and animal components that are found locally. Pest management is based on the removal of flower buds affected by the boll weevil and on monitoring of the boll weevil population by means of pheromone traps. Moreover, farmers make use of *Trichogramma* spp. to biologically control *Alabama argilacea* and other harmful insects. Sprayings with Neem (*Azadirachta indica*) leaf extract are also used to control worms and as a repellent for the white fly. After harvesting, cattle graze on the crop residues in the fields. During the wet season the pruning of *Leucaena* is recommended for use as mulch.

In order to stimulate the farmer-researchers to apply most of the practices, ESPLAR has established a "risk contract", which gives each of them R\$150 on a loan basis. After harvesting, the cotton goes to ADEC to be ginned and accounts are settled. The surplus is paid to the grower, but when the production value is lower than the debt, ESPLAR bears the loss.

Participatory research and extension: its results

Despite 3 consecutive years of drought, from 1997 to 1999, the number of growers using soil conservation practices, associated crops and ecological pest management in cotton production has increased considerably, from 4 to 154 in the year 2000. Some of them have been certified as organic cotton growers. All of them received technical support from ESPLAR. In the same period, the cultivated area increased



Photo: Bert Lof

from 2 ha to almost 180 ha, as is shown in Table 1. This indicates that the research strategy of associating participatory experimentation with the extension of the agroecological practices was successful.

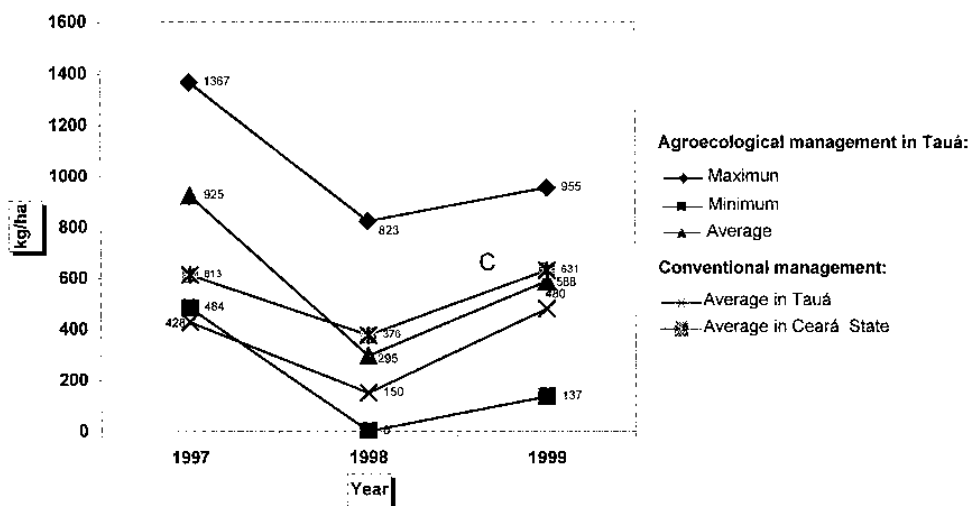
The results obtained with the 4 original farmer-researchers in 1997, positively influenced dozens of other farmers. These farmers decided, often after years of abandonment, to start growing cotton again. In addition, the price for certified organic cotton, which reached a premium of 30% above the price of conventional cotton, was an extra incentive. Around 70% of the farmers indicated that they had been directly influenced by the 4 original farmer-researchers.

The average yields of the ecologically grown cotton in the experimental areas, during the 1997-1999 period, were always higher than the average yields obtained in Tauá for conventional cotton in monoculture (Figure 1). When compared with the yields of Ceará state, the experimental fields in Tauá were yielding higher in 1997, whereas the Ceará average surpassed the experiments in the two following years. It should be noted that due to intercropping, it was possible to harvest additional crops such as maize, beans, sesame and *Cajanus cajan*. They are, despite their small quantities, important contributions to the food needs of the farmer families.

In this organic cotton production system, boll weevil control is still a bottleneck, as there are no specific techniques on how to grow cotton together with the pest. Thus, in the dry years, 1997 to 1999, the recommended practices showed a relatively easy control of the insect. In a wet year with a much higher incidence, as in 2000, the control becomes more difficult.

Until now, the volume of organic cotton harvested has been relatively small, but has good market prospects with organic textile factories, both national and international. Several textile companies, from Brazil and abroad, have contacted ESPLAR for buying organic cotton. However, the current supply in Tauá is not enough to meet all the demands. Even if the potential to increase production in Tauá is considered, it will hardly exceed some tons of fibres

Figure 1 – Yield of herbaceous cotton with agroecological management in the experiments in Tauá and with conventional management in both Tauá and Ceará state, 1997-99.



per year. Nevertheless, Tauá is gradually becoming a reference point for organic cotton production in the semi-arid region of Ceará and the Northeast of Brazil. In 1999 ADEC made one more step ahead in aggregating value to the organic cotton, when it contracted the spinning of 3 tons of organic fibre.

Another relevant result of the research is related to the ecological control of the white fly (*Bemisia* spp.). The farmer-researchers are encouraged to carefully observe the interaction between insects, spontaneous and cultivated plants. In 1998 it was observed that the white fly strongly prefers sesame (*Sesamum indicum*). The infestation levels in sesame in 7 systematically monitored intercrops were 6 to 20 times higher than in cotton. It was also verified that two spontaneous plants with fuzzy branches and leaves, known as "gervão" or "rabo de raposa" (*Stachytarpheta cayenensis*) and "pega-pega" or "amor de velho" (*Mentzelia fragilis*), attract and kill adult white flies. This opens up possibilities to effectively control this cotton pest by incorporating these plants in crop associations.

Progress, limitations and prospects

Research to design, test and diffuse agroecological alternatives for organic cotton

growing, with the direct participation of family farmers in the semi-arid region of Ceará has faced serious difficulties. They are inherent to the environmental conditions of the region, to the poverty situation that excludes most of the population from formal credit, and to the unsustainable practice of traditional cotton production.

10 years later, it is observed that an increasing number of farmers are gradually adopting the agroecological practices. They are driven by the need to preserve the scarce natural resources and stimulated by the possibilities of an emerging organic market, offering higher prices.

Presentation of the results through the media and at several technical and scientific events, in and outside Ceará, roused the interest of many technicians, cotton growers, municipalities, NGOs and even the regional bank, in the organic cotton experience. This opened up the prospect of expansion to other states in the Northeast of Brazil. Furthermore, partnerships with official education and research and development institutions were established.

Table 1: Evolution of the number of family farmers adopting agroecological management with cotton consortia, according to certification results, Tauá - CE, 1997-2000.

Year	No of Farmers			Area (ha)		
	Total	Organic	In conversion	Total	Organic	In conversion
1997	4	4	0	2	2	0
1998	69	18	51	103	27	76
1999	104	42	62	144	57	87
2000	154	*	*	182	*	*

*Numbers not available yet, until the certification by the IBD - Instituto Biodinâmico, from Botucatu, São Paulo.

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References

- Lima, P.J.B.F. *Algodão orgânico: bases técnicas da produção, certificação, industrialização e mercado*. In: Reunião Nacional do Algodão, 8. Londrina. 1995. 19 p.
- Myers, D. & Stolton, S. (eds.). *Organic cotton: from field to final product*. Intermediate Technology Publications, UK. 1999. 267p.
- Sousa, I.S. *Manejo agroecológico do solo e do algodoeiro mocó por agricultores familiares do município de Tauá, Ceará*. Fortaleza, UFC, 1999. 104p. (Dissertação de Mestrado)