



Genetically Modified Cotton and its Implications for Africa

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Genetically modified cotton on the increase

Since 1996, genetically modified plants have been grown commercially, and cotton was, with soybeans one of the forerunners. Meanwhile, 9 countries have been cultivating genetically modified cotton commercially, whereby cultivation in Indonesia only took place for one season and then was stopped (see Table 1).

According to data from the ISAAA, an organisation which promotes genetically modified plants, in China already 66%, in the USA and Australia 80%, and in South Africa as much as 85% of the area of cotton cultivated is planted with genetically modified plants. In many other countries commercial use is being prepared in field studies and there is also evidence of illegal cultivation of genetically modified cotton (see Table 2).

Aims of genetic modifications

Genetic modifications carried out on cotton have two different aims:

So-called Bt Cotton has been made resistant to certain pests.

A further version of genetic modification is that plants are made resistant to certain broadband herbicides and some non-selective weed-killers.

Bt cotton is most widespread, of which two varieties are marketed by Monsanto. Other Bt cottons are on offer from Dow Agrosiences and Syngenta.

Promises to farmers

Farmers are usually named three advantages of genetically modified cotton cultivation:

- Reduction of the use of pesticides
- Increase in crop yield
- Increase in income.

A significant reduction in the use of pesticides cannot be expected. Bt cotton is not effective against certain kinds of caterpillars. Bt cotton varieties have proved effective against certain kinds of cotton boll worms which are especially problematic in the USA. In contrast, the main pests in Africa are not affected, or at least only marginally affected by Bt cotton. Even if the worst pests could be effectively controlled, it has been observed in practice that so-called secondary pests have then attacked crops. In addition there are other problems. In South Africa, for example, the American variety Bt cotton is grown which does not have hairs on its leaves like normal cotton plants. This makes the plants more attractive to

Table 1: Worldwide development of commercial cultivation of genetically modified cotton

Country	Area (ha)							
	1997	1998	1999	2000	2001	2002	2003	2004
USA	1,3 Mio.	2,4 Mio.	3,2 Mio.	4,6 Mio.	4,5 Mio.	4,1 Mio.	4,1 Mio.	4,3 Mio.
China	No cult.	34.000	261.000	654.000	1,2 Mio.	2,1 Mio.	2,8 Mio.	3,7 Mio.
India	No cult.	No cult.	No cult.	No cult.	No cult.	40.000	125.000	500.000
Argentina	No cult.	8.000	20.000	30.000	40.000	No stat.	No stat.	25.000
Australia	60.000	80.000	125.000	150.000	200.000	125.000	100.000	250.000
South Africa	No cult.	12.000	25.000	30.000	24.000	No stat.	No stat.	30.000
Indonesia	No cult.	No cult.	No cult.	No cult.	4.000	No cult.	No cult.	No cult.
Columbia	No cult.	No cult.	No cult.	No cult.	No cult.	2.000	5.000	10.000
Mexico	15.000	20.000	20.000	20.000	30.000	No stat.	25.000	No stat.
Global	1,4 Mio.	2,2 Mio.	3,2 Mio.	5,3 Mio.	6,8 Mio.	6,8 Mio.	7,2 Mio.	9,0 Mio.

No cult. = no cultivation, No stat. = no statistics;

Figures are based partly on estimations and unverifiable press reports, missing data does not mean that cultivation of genetically modified cotton has ceased. Sources: Transgen (2005), James C (1997-2004)



Tableau 2: Expansion du coton Bt en Afrique

Country	Filed studies	Commercial cultivation	Evidence of illegal cultivation
Egypt			
Burkina Faso			
Kenya			
Malawi			
Zambia			
Senegal			
Zimbabwe	illegal*		
South Africa			
Swaziland			
Tanzania			
Tunisia			

**The field studies were carried out with any notification; after the Government learned of the studies the fields were burned before blooming.*

Sources: GENET (2005), GRAIN (2004a), GRAIN (2004b), Kuyek (2002)

Monsanto charge for providing the genetically modified seed.

Cost effectiveness?

The international organisation GRAIN has calculated that the Bt cotton which is used in Burkina Faso to carry out field studies will cost the farmers about 50,000 CFA (76 Euro). On average, cotton farmers in West Africa pay 37,000 CFA (56 Euro) for pesticides and the seed is free of charge (respectively coupled with the purchase of pesticides).

The effects of GM cotton

The ecological effects of the cultivation of genetically modified cotton are unclear. Up to now, there have been no studies in any African country sufficiently investigating the effects of genetically modified cotton on the environment. This, despite the fact that in Uganda, Zimbabwe and South Africa a large number of indigenous cotton varieties exist and that there is the danger of cross-pollination and that the genetically cotton modified could become established in wild varieties of cotton.

Contributing to the fight against poverty?

And what about the promise that genetically modified cotton contributes to the fight against poverty? South Africa is the only African country up till now that grows genetically modified cotton commercially. A series of other African countries in which cotton plays a large economic role have started the process of allowing commercial cultivation (See Table 2).

locusts. New pests, for example stink bugs, have also been noted. These examples demonstrate that it is not possible to completely do without insecticides when growing genetically modified plants. A reduction of their use may be possible in the short- or mid-term, but it is disputable to what degree this is possible. While supporters report reductions of 9 sprayings, reality shows that in the fields only a reduction of 5 sprayings is possible. In West Africa, the farmers use broadband insecticides which are effective against the widest possible range of pests. It is unlikely that farmers will be able to do without these broadband products as newer, more selective poisons are usually more expensive to purchase. The introduction of the use of herbicide-tolerant cotton varieties is also question-

able as small farmers in Africa only rarely use weed-killers.

An increase in the crop of Bt cotton can also not be expected. Genetic modification aims to reduce resistance to pests or to weeds-killers and is not aimed at increasing the crop. In the 2002 season in India there was even a lower crop of Bt cotton in comparison to conventionally grown cotton. Conventional varieties produced bigger cotton bolls and performed a better fibre quality.

The promise of higher incomes for farmers is unlikely to be fulfilled, as the cost of pesticides is hardly reduced, if at all, and the promised increase in the crop yield is questionable. There are, in addition, the "licence fees" which companies such as



The example of South Africa

The example of South Africa is often cited as "proof" of the socio-economic success of genetically modified cotton. However, if one considers that in South Africa cotton only plays a minor role in the economy and that the causes of poverty in rural South Africa are not to be found in the agricultural production of the country, then this "proof" is questionable. Purely the fact that local varieties are not among those offered on the market in South Africa demonstrates how little the needs of (small-scale) farmers are taken into consideration.

With regard to economic aspects, there are clear indications that genetically modified cotton puts farmers at considerable economic risk. The farmers must pay twice as much for the seed as for conventional seed, but they do not save to the same extent on pesticide costs and other inputs. Therefore production investment costs rise. If world market prices fall or there are harvest losses, due for example to climatic conditions, the risk of incurring debt is very high.

In the year 2000, huge rainfalls, which caused drastic flooding in Mozambique, hit South Africa and left cotton farmers in the Makhathini region with debts of 1,2 million dollars. In 2002, the late onset of the rains led to further cotton crop losses, which extended and worsened the debt problem.

Problems for other farmers

The political influence of the farmers' organisation which represents genetically modified cotton growers has increased enormously in South Africa. They were able to get a dam opened some weeks earlier than normal because the Bt cotton has a shorter ripening period than conventional cotton. Due to the opening of the dam, farmers who grow maize and bean as food crops suffered enormous losses to their harvest. This clearly shows that the success of Bt cotton does not necessarily mean a positive development for the region as a whole.

Is it really successful?

If one considers the above mentioned scenario regarding the economic effects of GM cotton cultivation, one wonders why the GM variation is so successful with regard to the area under cultivation in South Africa (area cultivated 85%)? This results mainly from the intensive advertising and marketing of the GM cotton by Vunisa, the only retailer and purchaser of cotton and at the same time the only source of credit. Political support for GM cotton is also immense.

Conclusion

The promises which are made to the farmers do not seem realistic. Simultaneously, there are ecological dangers and above all, economic risks coupled with the cultivation of GM cotton. Particularly marginalised small-scale farmers are depen-

dent on support when growing the cash crop. They are not in a situation to run a great risk growing cotton. This makes it clear that GM cotton does not fulfil the criteria of sustainability for African (and also other) small-scale farmers.



Literature

Apps P. (2005): South Africa leads on GMO, other African states wary, quoted from GENET News, 28.02.2005

deGrassi A. (2003) Genetically modified crops and sustainable poverty alleviation in Sub-Saharan Africa – An Assessment of Current Evidence, Third World Network Africa

GENET (2005): Tanzania to conduct field trials of GM cotton, quoted from GENET News, 04.04.2005

GRAIN (2004a): Information and awareness raising workshop GMOs and the rights of local communities in Burkina Faso – GMO workshop statement

GRAIN (2004b): GM cotton set to invade West-Africa – Time to act

James C. (2004): Executive Summary: Preview: Global Status of Commercialized Transgenic Crops: 2004, ISAAA Briefs No. 32, ISAAA, Ithaca, NY

James C. (2003): Executive Summary: Preview: Global Status of Commercialized Transgenic Crops: 2003, ISAAA Briefs No. 30, ISAAA, Ithaca, NY

James C. (2002): Preview: Global Status of Commercialized Transgenic Crops: 2002, ISAAA Briefs No. 27, ISAAA, Ithaca, NY

James C. (2001): Preview: Global Review of Commercialized Transgenic Crops: 2001, ISAAA Briefs No. 24, ISAAA, Ithaca, NY

James C. (2000): Preview: Global Review of Commercialized Transgenic Crops: 2000, ISAAA Briefs No. 21, ISAAA, Ithaca, NY

James C. (1999): Preview: Global Review of Commercialized Transgenic Crops: 1999, ISAAA Briefs No. 12, ISAAA, Ithaca, NY

James C. (1998): Global Review of Commercialized Transgenic Crops: 1998, ISAAA Briefs No. 8, ISAAA, Ithaca, NY

James C. (1997): Global Review of Commercialized Transgenic Crops in 1997, ISAAA, Briefs No. 5, ISAAA, Ithaca, NY

Kuyek D. (2002): Genetically modified crops in Africa: Implications for small farmers, GRAIN

Transgen (2005): Gentechnisch veränderte Pflanzen: Anbauflächen weltweit – Baumwolle, in Internet under www.transgen.de/gentechnik/pflanzenbau/193.doku.html, quote from 08.03.2005



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