

It has been over ten years now since genetically modified Bt cotton was first commercialised. Since then it has been introduced or tested in more than twenty countries. The crop is a clear success for Monsanto, the leading Bt cotton company. But what has it meant for farmers? Today, a more complete picture is finally emerging of what is happening on the farm in many countries throughout the world.

Bt cotton

the facts behind the hype

GRAIN



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At the beginning of November 2006, Burkina Faso's national agricultural research institute invited a group of journalists, scientists and farmers to a Bt cotton test site in the town of Boni. They were shown two small parcels of land on a farm belonging to SOFITEX, the country's largest cotton company. One was planted with genetically modified Bt cotton and the other with a conventional variety. It wasn't hard to see the difference: the Bt cotton field had better yields and had sustained less damage from pests, even though, according to the researchers, the Bt cotton had

been sprayed only twice with pesticides, while the conventional crop had been sprayed six times.

The display was enough to convince many of the visiting farmers. "I believe that we can now go ahead with the cultivation of GM cotton, given the results of the experiments in Boni," said Sessouma Amadou, a cotton farmer from the region of Kéné Dougou. "Now my concern is only with how to acquire the seeds and how to get them at a good price." The early results from the small field trials were also proof enough for Burkina's government, which took the opportunity to tell

the press that it intended to push forward with the commercialisation of Bt cotton for the following season, two years before its biosafety research was scheduled for completion.¹

A month earlier, in another part of the country, the cotton fields of a very different project – to reduce the use of pesticides – were also on display, albeit with less attention from the government and the media. Here, farmers showed the results of the second year of an integrated pest management project, based on a farmer field-school model, where farmers develop pest management practices by sharing knowledge and using local resources. In this case, the farmers had completely eliminated the use of chemical pesticides on their cotton fields without reducing their yields.² Farmers in neighbouring Mali have had similar successes, where their project, known as *Projet de Gestion Intégrée de la Production et des Déprédateurs* (Integrated Pest and Production Management – GIPD), is now in its fourth year. In the 2006 season, 1,140 cotton farmers participated in the programme. Their average yield was significantly higher than that of the farmers in the same areas using conventional pesticide methods (1,240 kilograms per hectare as opposed to 1,020 kg/ha), even though the GIPD farmers did not use chemical pesticides.³ One agronomist from Benin visiting GIPD fields in Mali during the 2005–6 season remarked: “It is almost impossible to believe what we saw. Fields that were unscathed by pests and with cotton plants full of undamaged bolls; you would have thought we were in fields sprayed with pesticides.”

One big advantage of the GIPD programme over Bt cotton is that it does not depend on expensive technologies from transnational corporations like Monsanto or Syngenta. Another plus, which is becoming increasingly important, is that its viability is proven in farmers’ fields, whereas the Bt cotton tests are handled exclusively by scientists in the artificial environment of research stations. Today, ten years after Bt cotton was first introduced, it is becoming painfully evident that there can be a dramatic difference between what these scientists report and what actually happens on the farm, especially over the long term. In countries where Bt cotton has been growing for several years, the transnationals’ great hype over their new wonder crop is drowning in a sea of farmers’ debt and pest and disease problems.

These bolls are half-empty

In 2000, with a fanfare comparable to that in Burkina Faso today, Monsanto and its Indian



Cotton bolls ready for harvest

subsidiary, Mahyco, were in their first year of country-wide field tests of Bt cotton in India. The results from the field trials, which would form the basis of the commercial approval of Bt cotton in India, showed a major decrease in the use of pesticides and an increase in yields, as compared to non-Bt varieties.⁴

India was certainly ripe for such a product. The introduction of the hybrids and pesticides of the Green Revolution of the 1960s and 1970s had set the country’s 17 million cotton farmers on a vicious treadmill. Yields had at times increased, but so too had the susceptibility of their cotton crops to pests and diseases, which evolved faster than scientists could churn out new products to combat them. In the face of growing pest problems, farmers, who had become completely dependent on the advice and technologies of outside “experts”, had been encouraged to spray more often, with increasingly toxic pesticide mixtures. It was not uncommon for cotton farmers in India to spray their fields up to 30 times in a single season. The escalating use of pesticides had driven up production costs which, combined with the falling price for raw cotton, had generated severe debt and the annual suicide of hundreds if not thousands of Indian cotton farmers.⁵ India’s cotton farmers were thus desperate for a new techno-fix and, if one believed the results from the field trials, Monsanto’s Bt cotton appeared to be just the thing.

Bt cotton was actually already on the Indian market as early as 1998, well before it was approved for commercial introduction in March 2002. In a story reminiscent of GM contamination scandals in other countries, Monsanto’s Bt gene somehow escaped from the company’s “contained” field-trials

1 V La CV-OGM/BF, “Vulgarisation du coton biologique, le Burkina respecte-t-il le principe de précaution?” Sidwaya (Ouagadougou), 23 November 2006:

<http://tinyurl.com/t8axl>

2 Personal communication from Souleymane Nacro, Director of GIPD programme Burkina Faso, 30 November 2006.

3 Personal communication from Souleymane Coulibaly, Director of GIPD programme Mali, 18 December 2006.

4 R. Ramachandran, “Green signal for Bt-cotton,” *Frontline*, 18:8, 13–26 April 2002: <http://tinyurl.com/w379h>

5 Esha Shah, “Local and Global Elites Join Hands: Development and Diffusion of Bt Cotton Technology in Gujarat,” *Economic and Political Weekly*, 22 October 2005: <http://tinyurl.com/wxreec>



and ended up in a cotton variety known as N-151, which was sold in the state of Gujarat by the Indian seed company Navbharat. Monsanto took samples of the N-151 crop in 2001 after reports that the variety had withstood a major bollworm outbreak in Gujarat that year.⁶ When the tests showed the presence of Monsanto's Bt gene, the company immediately went public with the information and pressed charges against Navbharat. Confusion ensued: the Indian government threatened to destroy and confiscate the entire "illegal" N-151 crop, an impossible task given that the seeds had already spread from farmer to farmer throughout the state and the country; and Gujarat's cotton farmers took to the streets to defend their right to grow the miracle cotton. In the melee, Navbharat was forced to stop producing its N-151 variety, due to supposed biosafety concerns, while Monsanto's three Bt varieties were hurried through a spectacularly incompetent regulatory process and approved for commercial cultivation for the following season.⁷

It was a great public relations coup for Monsanto. In its first year of sales in 2002, Mahyco–Monsanto sold its entire seed stock, with Bt cotton planted on nearly 45,000 hectares. By 2005, on the back of an aggressive marketing campaign, Bt cotton hybrids were planted on more than 500,000 hectares.⁸ Not surprisingly, proponents of Bt cotton have seized upon these figures to tout Bt cotton's success in India, but the real story unfolding on the ground is very different.

In Gujarat, home of the N-151 variety, Mahyco–Monsanto's Bt varieties performed miserably during the first year of planting. An official monitoring committee set up by the state government reported that farmers in Gujarat "suffered a huge economic loss in the cultivation of Bt cotton" during the 2002 season, which the committee attributed to the crop's susceptibility to wilt and sucking pests. These observations were echoed by the state-level monitoring committees set up that year in other Bt cotton producing states, such as Andhra Pradesh, Karnataka, Madhya Pradesh and Maharashtra.⁹ Although some dismissed these initial difficulties as a problem with the quality of the varieties that had been modified, not with the Bt technology itself, the headaches with Bt cotton have not gone away, even though new varieties have since entered the market.

Scientists Abdul Qayum and Kiran Sakhari have studied farmer experiences with Bt cotton in Andhra Pradesh since these hybrids were introduced in 2002. In their assessment of Bt cotton's first three

years in the state, they found that, on average, non-Bt farmers earned 60 per cent more than Bt farmers. Contrary to Monsanto's advertisements and the results from its field trials, Qayum and Sakhari report that farmers growing Bt hybrids were unable to reduce their use of pesticides or increase yields. In the subsequent season, 2005–6, following a ban on the Monsanto–Mahyco Bt hybrids, Qayum and Sakhari returned to the fields to see how farmers were faring with other, new Bt cotton hybrids. Once again, they found that the pest management costs were higher for Bt than for non-Bt cotton farmers, largely because of growing problems with secondary pests.

This time Qayum and Sakhari included a comparison with cotton farmers using non-pesticidal methods (NPM) to control pests. These farmers achieved the highest net returns among all of the farmers surveyed, higher than the non-Bt farmers using chemical pesticides and much higher than the farmers growing Bt cotton. Their study also echoed earlier reports, which had found Bt cotton susceptible to wilt, and the researchers warned that its widespread cultivation was setting the stage for an epidemic.¹⁰

Wilt has indeed turned into a devastating problem, and not only in Andhra Pradesh. In October 2005 an 11-member fact-finding team of farmers, social activists and agricultural scientists went to three

6 Douglas McGray, "An agricultural mystery in India has set off concerns over a growing underground trade in genetically engineered seeds," IRP, Spring 2002: <http://tinyurl.com/y48gjk>

7 T.V. Padma, "Indian GM research 'lacks focus and transparency,'" SciDev.Net, 22 June 2005: <http://tinyurl.com/y6ozmt>

8 Greenpeace India and the Centre for Sustainable Agriculture, "Marketing of Bt Cotton in India – Aggressive, Unscrupulous and False", September 2005: <http://tinyurl.com/yxsbhb>; and Ashok Sharma, "It's a blind run for Bt cotton hybrids," Financial Express, 5 June 2006: <http://tinyurl.com/yxa3nv>

9 Bt cotton performance reports: <http://tinyurl.com/y7anj8>

10 Both studies by Abdul Qayum and Kiran Sakhari, "Did Bt cotton fail AP again in 2003–2004? A season-long study of Bt Cotton in Andhra Pradesh" (AP Coalition In Defence of Diversity, 2003); "False hopes, festering failures: Bt cotton in Andhra Pradesh 2005–2006" (AP Coalition In Defence of Diversity, 2006) available at: <http://www.grain.org/research/btcotton.cfm?links>



Empire building

The Monsanto corporation of the United States dominates the global Bt cotton seed market. At least two thirds of the Bt cotton sold in the world is sold under licence to Monsanto or sold directly by Monsanto and its subsidiaries.¹ Monsanto's recent acquisition of Emergent Genetics (which operates the third largest cotton seed companies in the US and India) and Delta and Pine Land (formerly the world's largest cotton seed company and the owner/inventor of the notorious Terminator technology) will, if the Delta and Pine Land buy-out is approved by the US Department of Justice, make Monsanto the world's largest cotton seed company. Moreover, in taking over Delta and Pine Land, Monsanto also acquires the rights to the global cotton germplasm collection of its most important Bt cotton competitor, Syngenta. Beyond Syngenta and DowAgrosciences, the two other transnational corporations that have recently commercialised Bt crops, Monsanto's main competition comes from a Chinese company called Biocentury, which was formed with strong support from the Chinese state and has agreements with companies in India and Vietnam for the development of Bt cotton.² Recently, however, 34 per cent of Biocentury's shares were purchased by Origin Agritech, a company based in the British Virgin Islands that is rapidly building up its position in the Chinese seed market.³

1 ETC Group, "Oligopoly, Inc 2005," 16 December 2005: <http://tinyurl.com/yk3smq>

2 James Keeley, "The biotech developmental state? Investigating the Chinese gene revolution", IDS Working Paper 207, September 2003: <http://tinyurl.com/ybnmbx>

3 For more information on Origin Agritech see the entry for 23 January 2006 in the GRAIN hybrid rice blog at: <http://www.grain.org/research/hybridrice.cfm?blog&row=11>

villages in the Badwani district in the neighbouring state of Madhya Pradesh to investigate the widespread reports of wilt in Bt cotton fields. The team found that damage from wilt was, indeed, pervasive and was much more severe in all the various Bt cotton hybrids than in conventional varieties. The team assessed all the possible variables and concluded that "wilt is a phenomenon affecting Bt cotton" and ruled out the possibility that the wilt was a "result of an abiotic stress or a shortcoming in the farmers' practices with Bt cotton". According to the team, the wilt problems seemed to be "a reflection of the unpredictable results expectable from the transgenic technology used in Bt cotton and the increased vulnerability of transgenic plants to new diseases and pests".

The story of the first four years of Bt cotton farming in India was neatly summarised by P.V. Satheesh, Convenor of the Andhra Pradesh Coalition in Defence of Diversity:

"In the first year (2002), Bt cotton was a disaster, yielding 35 per cent less than the non-Bt cotton, even while costing four times more than the non-Bt cotton. In the third year, new diseases spread through the soils and the plant. Cattle which grazed Bt cotton plants started dying. And this year [2006], Bt plants have started wilting, forcing farmers to harden their hearts and uproot them. In the village of Mustyalapally, in the Bhongir mandal of Nalgonda, farmers have uprooted Bt cotton from 41 out of the 51 acres planted. The disease has spread to nearby villages, spreading panic among farmers. Farmers complain that the plants are slowly dying one after another because the root system is severely decomposed, without

*any secondary and tertiary roots on the main root system. Even the bolls formed on these wilted plants did not bear any seeds."*¹¹

Some farmers responded in anger with violent street protests and the burning of seed outlets. In one instance, farmers seeking compensation took a Mahyco–Monsanto representative hostage. Many others, however, have left their farms or taken their own lives. In the cotton belt of Vidarbha, where Bt cotton is widespread, the suicide rate among cotton farmers is spiralling out of control, with reports of more than 100 cotton farmers a month committing suicide in 2006.¹²

There are signs that even more severe problems lie ahead. Reports are coming in that bollworms, the main target pests of Bt cotton, are already developing resistance to Bt cotton. "Pockets near Vadodara (Gujarat) are the cause of immediate concern," said Dr K R Kranthi from the Nagpur-based Central Institute of Cotton Research. "As for the rest of the country, it's only a question of time."¹³ More than 55 per cent of all pesticides used in India are now used in cotton production, even though the crop occupies only 5 per cent of the country's agricultural land.

Spinning the cotton treadmill

"Through the development of GM cotton, we can reduce the use of pesticides by more than 80 per cent ... and can reduce pesticide poisoning cases by 90 per cent."

Professor Guo Sandui, Chinese Academy of Sciences and inventor of Chinese GM cotton.¹⁴



11 Press release of the AP Coalition In Defence of Diversity, 8 September 2006: <http://tinyurl.com/ymtwb5>

12 "A hundred farm suicides a month in Vidarbha", RxPG News Service, 29 November 2006: <http://tinyurl.com/yynywrg>

13 Kalyan Ray, "Bt cotton bubble set to burst," Deccan Herald, 14 November 2006: <http://tinyurl.com/ylejmn>

14 "Bt cotton bubble set to burst", Deccan Herald, 14 November 2006: <http://tinyurl.com/yamxu5>

India is not the first country to experience problems with Bt cotton. In Indonesia, during an initial planting in 2001, crops of Monsanto's Bollgard cotton were devastated by pests, while other cotton crops suffered insignificant damage. Angry Indonesian cotton farmers, who had paid big money for the Bt seeds, burned their fields in protest and forced Monsanto to withdraw Bt cotton from the country after only two seasons on the market.¹⁵

In China and the US, two countries with a long experience of growing the crop, Bt cotton initially brought down the use of pesticides. But before long, pests not controlled by the Bt plants, which had once been of minor importance, started to cause serious crop damage, and farmers were soon back to their former levels of pesticide use. In a recent study of 481 cotton farmers in five provinces of China, researchers from Cornell University found that the early income gains that Chinese cotton farmers had achieved with Bt cotton during the 2000–2001 season had completely disappeared three years later. What had happened was that, in the initial years, with Bt cotton controlling bollworms, the area's major pest, farmers cut back on their use of broad-spectrum pesticides, thereby reducing their costs and improving their incomes. But with the Bt cotton providing no control over secondary pests, these soon took the place of bollworms. According to the Cornell researchers, "a majority of the Bt cotton farmers cited the fact that they must spray 15–20 times more than previously to kill secondary pests, Mirids, which did not require any pesticide in the early years of Bt adoption." In fact, by 2004, Bt cotton farmers were spending as much on pesticides as non-Bt farmers ... and at least 2–3 times more on seeds.¹⁶

Similar reports are coming in from the US, where damage from secondary pests, such as stink bugs and plant bugs, has increased dramatically since the introduction of Bt cotton, known as Bollgard.¹⁷ As in China, the costs of pesticides to control these secondary pests can add up to more than what US farmers typically spend on pesticides for conventional varieties, particularly if you factor in the high costs of the Bt seeds. "Secondary pests – plant bugs and stink bugs – are eating our lunch," says Bruce Bond, a cotton farmer from Arkansas. "I probably have \$90 an acre in insecticide costs on Bt cotton. I think that's too much, especially when I pay \$32 right up front. Next year, I'd like to bump the non-Bt cotton acreage up a bit. I planted my refuge cotton [non-Bt cotton] on the worst ground I have, and one 23-acre field of it was some of the best cotton I picked this year."¹⁸

An added financial limitation that US cotton farmers are finding with Bt cotton is that they cannot vary the application rate of the toxin according to the level of pest pressure. They have to pay the full price for the Bt seeds whether or not bollworms end up being a serious problem on their fields. In some parts of Arkansas, for instance, farmers are protesting against a state measure forcing them to grow Bt cotton as part of a state-wide boll weevil eradication programme. They say that the level of boll weevil pressure on their farms is too low to justify the costs of the Bt seeds.¹⁹ Moreover, the US experience shows that, when bollworm pressure is high, Bt cotton does not always maintain its resistance and farmers end up using pesticides anyway. "There are now pockets in the Southeast, including 100,000-plus acres [40,000 hectares] in Georgia, where bollworms could not be controlled by over-spraying Bt cotton," says entomologist Smith. "If you get enough escapes, they can do a lot of damage. They were getting up to 15-plus per cent boll damage in Bollgard cotton in Georgia due to sheer numbers. Three pyrethroid sprays in five days didn't do the job."²⁰ To resolve these growing pest problems, Monsanto and Syngenta have introduced new Bt cotton varieties in the US and elsewhere that are supposed to provide enhanced pest resistance – at a higher price, of course. In India, where Monsanto's Bollgard now sells for around US\$17 per 450g pack of seeds, seeds of the company's new Bollgard II variety will sell for around US\$30 per 450g pack in the 2006–7 season.²¹ And so the treadmill continues.

No magic bullet

For Monsanto and other transnational pesticide companies, Bt crops are essentially an ingenious way to expand their profits in the face of increasing competition from generic producers of off-patent insecticides. Instead of selling a chemical pesticide that farmers spray, Monsanto sells the pesticide by way of the seeds. And there is another advantage for the companies: farmers growing Bt crops still rely on pesticides, and, when the costs of the Bt technology fees are factored in, they generally end up spending more overall to manage pests – which is good for the pesticide makers' bottom line.

In India, with cotton farmers killing themselves or leaving their farms in record numbers to escape financial ruin, Monsanto made over US\$17 million in royalties in the first three years of Bt cotton sales. The situation for farmers was so bad that in April 2006, India's Monopolies and Restrictive Trade Practices Commission stepped in to order Monsanto to charge "reasonable

15 Tan Cheng Li, "Farmer's bane," *The Star*, Malaysia, 2 March 2004: <http://tinyurl.com/w4o3i>; and Pennapa Hongthong, "GMO Crops: A Cautionary Tale," *The Nation* (Jakarta), 27 September 2004: <http://tinyurl.com/yg85pd>

16 Shenghui Wang, David R. Just, and Per Pinstrup-Andersen, "Tarnishing Silver Bullets: Bt Technology Adoption, Bounded Rationality and the Outbreak of Secondary Pest Infestations in China," Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting Long Beach, CA, 22–26 July 2006.

17 Paul L. Hollis, "Stink bugs continue to dominate in Southeast cotton," *Southeast Farm Press*, 13 March 2006.

18 Bruce Bond: High Cotton Winner (Elton Robinson, *Delta Farm Press*, January 2005): <http://tinyurl.com/y9a97g>

19 Pat Ivey, "Farmers lash out at 'half truths'," *Blytheville Courier News*, 30 July 2004 <http://tinyurl.com/y3n1x4>

20 Paul L. Hollis, "Stink bugs continue to dominate in Southeast cotton," *Southeast Farm Press*, 13 March 2006.

21 K.V. Kurmanath, "AP puts on hold nod for sale of Bollgard-II," *The Hindu*, 8 November 2006: <http://tinyurl.com/yzwemd>



Table: Bt cotton takes root across the world

Argentina	Approved in 2001. By 2005–6 sown on around 13% of the total cotton area.
Australia	Introduced in 1996. By 2002–3 accounts for around 30% of total cotton crop. This increases to 80% in 2004–5 with the release of Monsanto's Bollgard II variety.
Brazil	Field trials approved in March 2005. Smuggling of Bt cotton seeds from Argentina and Paraguay is widespread. At least 5% of the 1.3 million tons produced in the 2005–6 season comes from "black market" Bt varieties.
Burkina Faso	Field trials begin in 2003. Commercial release expected in 2007.
China	Released in 1997. Now planted on well over half of the national cotton area.
Colombia	Imported by Monsanto in 2002, without environmental clearance. Legal action results in the suspension of the authorisation.
Costa Rica	Monsanto began field trials without regulatory oversight in 1992. By 2004, 638 ha were planted, mainly for the export of seeds.
Egypt	Commercial introduction approved in 2006.
Guatemala	Field trials.
India	Commercial introduction in 2002. In 2006–7, Monsanto begins sales of Bollgard II.
Indonesia	Introduced in South Sulawesi province in 2001. Two years later it is withdrawn after its failure to perform triggers farmer protests.
Kenya	Field trials.
Mexico	Approved in 1996.
Pakistan	In May 2005 the Pakistan Atomic Energy Commission provides 40,000 kg of Bt cotton seed to farmers in the Punjab.
Paraguay	Approved in 2005.
Philippines	Field trials.
Senegal	Irregular field trials later abandoned.
South Africa	Approved in 1997.
Thailand	Field tests in 1997. Abandoned after mass protests.
USA	Approved in 1996. Currently covers about 40% of the cotton area.
Vietnam	Field trials.
Zimbabwe	Planted by Monsanto in 1998 without official permission. Crop was burnt when discovered by authorities.

For more information, visit <http://grain.org/go/btcotton>, a resource centre on Bt cotton around the world, providing relevant news, links and documents.

prices" for Bt cotton seeds. Monsanto responded by lowering its technology fee by an insignificant 20 rupees, making no major impact on Bt cotton seed prices, which continued to be sold by the company and its licensees for between Rs1,200 to Rs1,300 per 450g pack. The state governments of Andhra Pradesh, Tamil Nadu, and Karnataka then filed suits at the Supreme Court demanding that the price of Bt cotton seeds be reduced to at least Rs750 per 450g pack.²² Under pressure from these state governments and with new, much cheaper Bt cotton hybrids using Bt technology from the Chinese company Biocentury entering the market, Monsanto and its licensees slashed their Bt cotton seed prices by upwards of 70 per cent in the 2006–7 season and launched a full-out marketing blitz. The area under Bt cotton cultivation surged

across India. Even in the Warangal district of Andhra Pradesh, where the failure of Bt cotton in the initial years was so well documented, the area planted to Bt hybrids shot up to more than 80 per cent of the total cotton area. Of course, the same problems persist – wilt, secondary pests, bollworm resistance, farmer debt – only now on a larger scale. None of this is of too much concern to Monsanto. The company has a ready-made market for its next techno-fix: its Bollgard II cotton, which will be sold at twice the price.

Debt and dependency

The Bt cotton experience has been particularly hard on small farmers. With the global price for raw cotton at historic lows, the general situation for

²² "Andhra Pradesh files case against Bt cotton in MRTPC," *WebIndia* 123, 2 January 2006: grain.org/bio-ipr/?id=462



small cotton farmers in the South is one of debt and dependency. They are thus extremely vulnerable to the promises of outside technologies to resolve the fundamental problems that they face, which are largely political. In South Africa, for instance, Bt cotton was taken up by small farmers in KwaZulu Natal's Makhathini Flats, one of the poorest areas of the country and a last refuge for small-scale cotton production. A recent study of Bt cotton adoption in the area, based on comprehensive interviews with local farmers, dismissed agronomic factors like yield increases or reductions in the use of pesticides as factors explaining the adoption of Bt cotton. The researchers found that most farmers in the area started growing Bt cotton in 1998 because of the lack of alternatives:

"In a context in which many farmers feel abandoned by the provincial department of agriculture and by government extension services and credit services, it is only through cotton that farmers gain access to seed, credit and support. Above all else, and repeatedly throughout our discussions, dryland farmers in the Makhathini area made it clear that they had few alternatives to cotton. The absence of alternatives at a crop level is replicated at the level of seed purchasing or seed supply. Choices are already limited by the fact that Cotton South Africa [the cotton farmers' organisation] puts forward an annual short list of three recommended seed varieties to ensure consistency in the processed fibre. Farmers report and employees at the Makhathini Cotton Company (MCC) confirm that conventionally improved cotton seed is not being grown anywhere on the Makhathini Flats. While Delta Opel, an improved non-GM variety, is available for sale at the official Wenkem outlet situated adjacent to the MCC gin, it is only sold in quantities of 25kg, as opposed to the Bollgard™ NuCOTN 37-B seed which is marketed in an 'Ecombi' 5kg package, an ideal size for the small acreage farmers that prevail within the Flats. Even more prohibitively, the MCC gin only purchases cotton packed in woolsacks that the MCC provides. These woolsacks are allocated to farmers at the beginning of the season based on information derived from lists provided to MCC by Wenkem of those licensed to

*grow Bt seed. Thus, MCC excludes the potential of non-GM growers by only allowing Bt cotton to pass through its gin."*²³

The introduction of Bt cotton in the area immediately exacerbated debt problems for local farmers. Farmers purchased the seeds on credit, and within one year, with revenues from Bt cotton insufficient for farmers to meet their repayment schedules, the local Land Bank was forced to foreclose 1,447 out of the 1,648 loans it had provided. The Land Bank stopped lending in Makhathini in 2004, with over US\$3 million outstanding in defaulted loans. "GM is best understood as the latest in a long series of technocratic interventions that have consistently failed to transform Makhathini into a hotbed of commodity production, but have instead been guided by a technocratic will to make cotton a lucrative cash crop, regardless of local conditions, needs or ecology," concludes the report.²⁴ Makhathini was once the biotech industry's showcase for how GM can help small farmers.

If Bt cotton failed to improve the lives of the small cotton farmers in Makhathini, it is even less likely to help farmers in West Africa, where the industry is now focusing much of its attention. Farmers in West Africa have a long history of cotton production, and one of the lowest rates of pesticide use for cotton in the world. Their woes have little to do with the cotton varieties they use.²⁵ The main problem, as the region's farmers' organisations keep saying time and again, is the structure of the global market and subsidised surplus production in the United States and Europe. The last thing West African farmers need is a new cycle of dependence brought by switching to the high-priced seeds of powerful foreign corporations. Bt cotton in West Africa, as in the rest of the world, will not benefit small farmers. It is merely a device by which corporations can extract more profit in the short term and distract people away from pursuing more promising methods for reducing the use of pesticides. The reality is that only deep structural change can turn cotton into a viable crop for the many millions of small farmers that produce it every year.



23 Harald Witt, Rajeev Patel and Matthew Schnurr, "Can the Poor Help GM Crops? Technology, Representation and Cotton in the Makhathini Flats, South Africa," *Review of African Political Economy* (109), 2006, pp. 497–513.

24 *Ibid.*

25 GRAIN, "GM cotton set to invade West Africa: Time to act!" June 2004. grain.org/briefings/?id=184