monsanto

Somakka, a woman farmer from Andhra Pradesh, India with her failed harvest of Bt cotton.

issue 110

who benefits from gm crops?

monsanto and the corporate-driven genetically modified crop revolution

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friends of the earth Friends of the Earth International is the world's largest grassroots environmental network, uniting 71 diverse national member groups and some 5,000 local activist groups on every continent. With approximately 1.5 million members and supporters around the world, we campaign on today's most urgent social and environmental issues. We challenge the current model of economic and corporate globalization, and promote solutions that will help to create environmentally sustainable and socially just societies.

our vision Our vision is of a peaceful and sustainable world based on societies living in harmony with nature. We envision a society of interdependent people living in dignity, wholeness and fulfilment in which equity and human and peoples' rights are realized.

This will be a society built upon peoples' sovereignty and participation. It will be founded on social, economic, gender and environmental justice and free from all forms of domination and exploitation, such as neoliberalism, corporate globalization, neo-colonialism and militarism.

our mission

1. *To collectively ensure environmental and social justice, human dignity, and respect for human rights and peoples' rights so as to secure sustainable societies.*
2. *To halt and reverse environmental degradation and depletion of natural resources, nurture the earth's ecological and cultural diversity, and secure sustainable livelihoods.*
3. *To secure the empowerment of indigenous peoples, local communities, women, groups and individuals, and to ensure public participation in decision making.*
4. *To bring about transformation towards sustainability and equity between and within societies with creative approaches and solutions.*
5. *To engage in vibrant campaigns, raise awareness, mobilize people and build alliances with diverse movements, linking grassroots, national and global struggles.*
6. *To inspire one another and to harness, strengthen and complement each other's capacities, living the change we wish to see and working together in solidarity.*

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who benefits from gm crops?

monsanto and the corporate-driven genetically modified crop revolution

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Monsanto's Bt cotton in Andhra Pradesh.

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Cotton processing.

executive summary

introduction

This report analyzes the way in which genetically modified (GM) crops have been introduced into our environment between 1996 and 2005. It describes how the rapid penetration of GM crops in a limited number of countries has largely been the result of the aggressive strategies of the biotech industry, particularly pushed by top GM crop leader Monsanto, rather than the consequence of the benefits derived from the use of this technology.

The hype about the advantages that GM crops provide to the environment, consumers, and farmers is also predominantly the result of propaganda by the biotech industry and industry-sponsored organizations including the International Service for the Acquisition of Agri-biotech Applications (ISAAA). ISAAA's annual reports, published at the beginning of every year since the late 1990s, have misrepresented the performance of GM crops. They have lauded the benefits that have accompanied the introduction of GM crops everywhere, and have ignored the negative impacts and other problems. In fact, as this report shows, the reality of GM crops has been strikingly different from Monsanto and ISAAA's claims.

This report illustrates how Monsanto, a multinational corporation and the world's leading producer of GM crops, has managed to attain an unacceptable level of influence over national and international agricultural and food policies in many countries around the world. It describes how Monsanto was in the driver's seat when the United States, Brazil and other governments developed legislation relating to GMOs, resulting in industry-friendly policies. Monsanto has used other improper strategies as well: bribing officials in Indonesia in order to obtain regulatory approval, and running misleading promotion strategies in India and other countries. Monsanto's products have also been found in areas where they were forbidden, including Brazil, Paraguay, and India, paving the way for eventual legal authorization.

Monsanto's influence over governments is so large that many of them, as well as United Nations bodies such as the Food and Agriculture Organization (FAO), have adopted the company's claims that GM products are good for the environment and will contribute to the alleviation of poverty and hunger.

In addition, Monsanto is in the midst of a huge push to introduce new intellectual property rights regimes over its GM seeds in order to enhance its domination over the global seed and food supply.

This report shows that Monsanto's pesticide reduction claims are unfounded, and that in fact GM soy has dramatically increased pesticide use. Claims that GM crops will contribute to poverty reduction have also thus far been unfounded, as have claims that consumers benefit from GM products. Ultimately, it is Monsanto and other GM companies that profit the most from the aggressive promotion of their GM products.

It is time for governments to take responsibility for the unethical behavior of the proponents of GM seeds and food, putting the interests of people and the environment first. Governments must stop giving unacceptable privileges to companies like Monsanto, and stop endorsing the misleading claims of organizations like ISAAA.

This publication is based on numerous reports from scientific-technical bodies, industry, government, and civil society, and is illustrated by fully-referenced national and regional case studies from every continent.

fast and concentrated adoption of gm crops worldwide

In 1994, a genetically modified (GM) crop was commercialized in the United States for the first time. Two years later, the first significant areas of land devoted to GM crops were sown, over 1 million hectares, the vast majority of which were in the United States. Ten years later, there are 80 million hectares of GM crops around the world, primarily in the United States, followed by Argentina and Canada.

Four crops, specifically soybeans, maize, cotton and canola, have been genetically modified and aggressively introduced on the world market. According to industry sources, soybeans, maize, cotton and canola constitute 99% of the world's acreage of GM crops, with soybeans alone covering 60% of the total planted area. In 2004, it was estimated that 56% of the 86 million hectares of soybeans, 28% of the 32 million hectares of cotton, 14% of the 140 million hectares of maize, and 19% of the 23 million hectares of canola planted globally were genetically modified.

Today, most of these GM crops are concentrated in a few countries. During the first seven years of cultivation, between 1996 and 2002, over 90% of the global surface of GM crops was concentrated in just three countries: the United States, Argentina and Canada. In 2004, more than 84% of GM crops were still concentrated in these same three countries, although the areas under cultivation in Brazil, China, and India has grown progressively over the past three years.

The introduction of GM crops has been dominated and promoted by a handful of corporations. Three companies - Monsanto, Syngenta, and Bayer – are responsible for virtually all of the commercially released GM crops in the world today.

Soy in South America.

conflicting views after a decade of experience: a critical analysis of monsanto and isaaa data

The biotech industry and other industry-sponsored organizations like ISAAA claim that the first decade of GM crops has been a clear success for farmers around the world. According to ISAAA, 8.25 million farmers – 90 percent of them in developing countries – have chosen to plant biotech crops, and as a result have reduced pesticide applications, decreased production costs, and enjoyed higher yields and greater profits. In their view, "the experience of the first nine years, 1996 to 2004, during which a cumulative total of over 385 million hectares of biotech crops were planted globally in 22 countries, has met the expectations of millions of large and small farmers in both industrial and developing countries". Monsanto makes similar assertions, claiming that over the past decade, farmers have "increased [the] area planted in genetically modified (GM) crops by more than 10 percent each year," and increased profits as well.

However, criticism of Monsanto's evaluation and the methodology and sources of ISAAA data has been increasing in recent years. ISAAA has not publicly announced the source of its information in any of its annual reports since 1997. In its 1996 report, ISAAA acknowledged that its statistics, particularly for developing countries, are largely gathered "through informal contacts". Hectarage figures are very difficult to estimate accurately without proper official sources, and many governments in developing countries neither keep track of nor monitor the areas planted with GM crops. As a result, verified official statistics cannot be obtained from countries such as South Africa, the Philippines and Brazil.

Analyses by several authors have found ISAAA data on biotech crop area to be vastly inflated. ISAAA's 2002 estimate that South Africa had 100,000 hectares of biotech crops, for example, was 20 times higher than the figure provided by other biotech industry organizations. In the Philippines, ISAAA claimed that it had obtained the figure for the area planted with biotech crops from the government, but the Department of Agriculture there denied that it kept such statistics and one official rejected ISAAA's estimate as superfluous. Even in the United States, it has been reported that ISAAA inflated the figures for GM crop cultivation between 2 and 9% from 2000 to 2004.

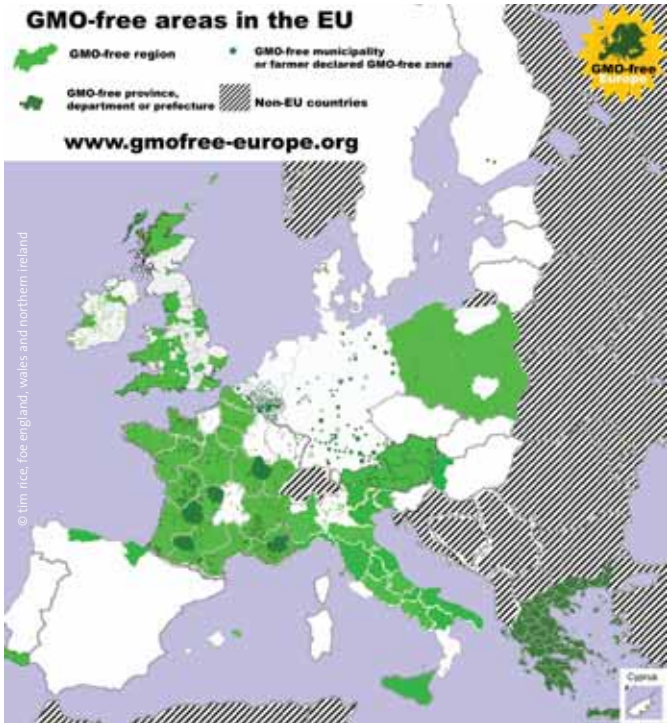
TABLE 1 ESTIMATES OF ACREAGE CULTIVATED WITH GM CROPS IN THE USA, 2000 – 2004

YEAR	USDA (1,000 HA)	ISAAA (1,000 HA)	ISAAA – USDA (1,000 HA)	ISAAA – USDA % OVERESTIMATED
2000	28,157	30,300	2,143	7.6%
2001	32,751	35,700	2,949	9.0%
2002	36,948	39,000	2,052	5.6%
2003	40,781	42,800	2,019	4.9%
2004	45,367	47,600	2,233	4.9%

Sources; *LIS Consult, 31 May 2005. Based on NASS – USDA, Prospective Plantings 2000 – 2004 and ISAAA, Global Review of Commercialized Transgenic Crops 2000 – 2004.*

precaution versus celebration

For ISAAA and corporate leaders such as Monsanto, the experience with GM crops since 1996 has constituted a huge success. ISAAA called for celebrations to take place at the end of 2005, on the tenth anniversary of the cultivation of GM crops worldwide: "The 10th anniversary in 2005 will be a just cause for celebration worldwide by farmers, the international scientific and development community, global society, and the peoples in developing and industrial countries on all six continents that have benefited significantly from the technology, particularly the humanitarian contribution to the alleviation of poverty, malnutrition and hunger in the countries of Asia, Africa and Latin America."



Is the analysis by Monsanto and organizations like ISAAA correct? Are the benefits of GM crops as strong as claimed by pro-biotech interests? If GM crops are safe, economically profitable, and environmentally friendly, why then has there been so much opposition, concern and controversy in recent years? If the scenario is so good, if so many millions of farmers and consumers are benefiting, if the increase in GM crops is so impressive, and if poverty, malnutrition and hunger have been alleviated in developing countries, why then have some governments imposed bans and moratoriums? Why are consumers opposing those products in many places around the world?

There is extensive documentation exposing problems with GM crops in farming communities around the world, in the US, Canada, India, Indonesia and other countries. The list is long and growing.

The controversy and the uncertainties surrounding the human health, environmental and socio-economic impacts of GM crops still loom large after ten years. Public opposition on many continents remains strong, and an increasing number of regions are taking steps to prevent their cultivation.

This report examines the introduction of GM crops around the world over the past ten years since 1996. It cites data from a wide range of sources, including scientific, government, industry, and civil society literature. It presents a series of case studies from different continents that expose the significant misrepresentations made by ISAAA and the biotech industry.

When analyzing and evaluating the first decade of widespread cultivation of GM crops, governments, organizations and UN bodies should make sure that they examine the 'untold' story from the ground, which is never incorporated in ISAAA's annual briefings and Monsanto's reports. This report addresses these issues and asks who is really benefiting from the GM crops introduced over the past decade.

monsanto's strategies

Monsanto is responsible for around 90% of all GM traits used around the world. It has more GM product applications for commercial release than any other company, either directly or indirectly through licensing agreements with local seed companies. One of the company's current priorities is to expand and gain new markets for its GM crops. Monsanto's ambitious plans, if achieved, will have profound implications for the world's food supply, for the environment, for consumers and, in particular, for developing countries.

4.1 expanding the gm seed frontier

Monsanto is at the forefront of constantly pushing for regulatory clearance for its GM products in various countries, in order to maximize profits from the GM seed business.

Towards the end of the 20th century, the seed industry in North America became highly concentrated, with oligopolistic competition among and between a few large firms. In 2005, after acquiring Seminis, Monsanto became not only the global leader in GM crops, but the largest seed company in the world.

Monsanto's estimate of a 25% annual growth up to 2008 is largely based on the rapid adoption of GM seeds throughout the world. The company aims to displace conventional seeds with its patented GM varieties, particularly in soy, corn, canola and cotton. It is striving for a world in which the only agriculture is genetically modified, and predicts that "full adoption of GM crops globally would result in income gains of US$210 billion per year within the next decade, with the largest potential gains occurring in developing countries at a rate of 2.1 percent gross national product per year".

In practical terms, this means that Monsanto's marketing strategy will continue to promote the transformation from conventional to GM seeds. In this scenario, and particularly within the context of Monsanto's dominant seed position, there will be significant implications for farmers in terms of choice and availability of alternatives to what Monsanto has prioritized. Farmers and civil society groups in the US and Africa have already observed that the availability of conventional seed is sometimes reduced in favor of GM crops.

The more hectares that are converted into GM crops around the world, the greater the price per share, and the more Monsanto will benefit. Over the next two years, Monsanto plans to convert at least 100 million acres of the currently available 300 million acres of conventional corn to GM corn. If this happens, Monsanto predicts that it could double its profits by adding over US$2 per share of incremental run-rate earnings. A similar analysis can be made for cotton and soybeans. For cotton, Monsanto calculates that by cultivating 20 million acres more it could increase profits by $0.80 per share of incremental earnings, and in soybeans, 40 million acres more would represent $0.40 more per share in earnings.

For soy, Monsanto has targeted the world's main producers and exporters: the US, Argentina, Brazil, and Paraguay. While the penetration of Monsanto's Roundup Ready soy was quick in the US and Argentina, regulatory barriers have prevented its debut in Brazil and Paraguay for many years. For maize, Monsanto's main targets are Latin America and Europe; for cotton, the company has targeted India, South Africa, and other Asian countries. While maize imports from the US to Europe have dropped dramatically since the adoption of GM crops, Monsanto's latest investment previsions of November 2005 describe Europe as a potential market, and envision the potential uptake of over 13 million hectares of European maize cultivation over the next five years.

4.2. monsanto's assault on regulatory and policy regimes

Within the paradigm of converting hectares of conventional crops by introducing GM traits in as many countries as possible, Monsanto's offices around the world are doing what they can to fulfil the company's predictions and ambitions. Monsanto and the biotech industry's use of their influence to overcome regulatory hurdles and prevent the adoption of adequate biosafety regimes is well documented. Monsanto has used bribery to gain acceptance of its crops and to obtain regulatory approval; evidence of this has been found in Indonesia, for example, where an investigation by the US Securities and Exchange Commission revealed that over US$700,000 in bribes was paid to at least 140 current and former Indonesian government officials and their family members between 1997 and 2002, financed through the improper accounting of Monsanto's pesticides sales in Indonesia.

The US regulatory system, which is based on the substantial equivalence principle and in which GM crops do not require specific regulation, was designed by biotech industry lawyers. As the former official responsible for agricultural biotechnology at the US Food and Drug Administration affirmed: "in this area, the US government agencies have done exactly what big agribusiness has asked them to do and told them to do". In Brazil, it has been verified that a lawyer who worked for Monsanto played an important role in the implementation of a weak biosafety law in the country.

executive summary

4.3 first contaminate, then legalize

Monsanto's products have also penetrated and contaminated areas where the planting of GM crops was forbidden. In Brazil, despite a ban on planting GM soy between 1998 and 2003, the widespread contamination of crops in the south of the country led to the temporary authorization of the 2003 GM soy harvest by the government. In Paraguay, where a ban on GM soy planting was also in place, the de facto contamination led to the authorization of GM soy in 2004. In India, despite the lack of authorization for the commercial release of Bt cotton, contamination was detected in 2002, leading to the approval of GM cotton some months later.

4.4 unethical and irresponsible advertising

Monsanto has used unethical and irresponsible media and advertisement campaigns to gain the confidence of farmers. The National Commission of Indian Farmers has reprimanded biotech companies for their "aggressive advertisement". Intensive marketing through local newspapers, local meetings and television advertisements, using popular actors in some cases, has been used in several Indian states. In Brazil, Monsanto launched an educational program in schools in April 2005, which was eventually halted by the Minister of Culture following public opposition.

Monsanto and pro-biotech organizations are renowned for using so-called 'small farmers' to attest to the success of GM crops. One of the best known is Buthelezi, who is promoted around the world as a poor farmer but in reality appears to be a wealthy South African farmer from the Makhatini Flats. Buthelezi even made an appearance at the launch of the US complaint against the EU at the World Trade Organization in 2003.

ISAAA has used similar 'grassroots' strategies: they supported the work of the so-called Asian Regional Farmers' Network (ASFARNET), which claimed to be a network of farmers from India, the Philippines, Indonesia, Thailand, Malaysia and Vietnam. A background check on these 'farmers' cast some doubt on their professions: Dr. Banpot, the 'farmer' from Thailand, is a high-profile pro-GMO scientist from a public research institution in Thailand, and the 'farmer' from the Philippines, Edwin Paraluman, heads a local irrigators' association in General Santos City but does not appear to belong to any farmers' organization.

farmers: the new biotech pawns

"Buthelezi was by Zoellick's side when the Trade Secretary formally announced a US WTO case against EU restrictions on GM imports. A month later, the Administrator of USAID, Andrew Natsios, described Buthelezi before a Congressional panel on plant biotechnology in Africa. [...] The Council for Biotechnology Information calls him a 'small farmer', and others describe his life as 'hand-to-mouth existence'. Administrator Natsios described him as a 'small farmer struggling just at the subsistence level'. However, independent reporters have revealed that, with two wives and more than 66 acres, he is one of the largest farmers in Makhathini, and chairs the area's farmers' federation encompassing 48 farmers' associations."

Source: De Grassi, 2003.

4.5 challenging farmers' rights: the fight over royalties

In the United States, Monsanto has established a very tough collection regime for royalties on its GM products. The royalty is collected in the form of a 'technology fee', or surcharge for the GM trait, which is paid at the point of seed purchase. This surcharge represents 30% or more of the price of the seed. Farmers are supposed to sign a 'technology use agreement' upon seed purchase stipulating that they are prohibited from saving any GM seed from their harvest for replanting. This 'intellectual property protection' criminalizes the age-old practice of seed-saving, the farmer's most fundamental right. In many cases, however, farmers who never saw or signed this agreement have been sued for violating it, their signatures forged by seed dealers. In other cases, farmers who did not save or replant GM seed have found their fields contaminated with GM traits through cross-pollination from neighboring fields or GM seed blown from trucks.

This system aggressively challenges the fundamental rights of farmers around the world: if farmers reuse seeds without paying technology fees, they risk being taken to court and fined. This is the case even if they have not used the seed and their crops have been contaminated through cross-pollination or other means. Thousands of farmers have been investigated by Monsanto: some have settled, but others have landed in court. Most of the farmers who end up in court face a very unbalanced situation, as their legal resources are far less than those of the multi-billion dollar company. In many cases, these farmers cannot afford any legal representation whatsoever and must stand alone in trial against Monsanto.

Since 2003, Monsanto has focused on implementing these intellectual property right practices at the global level. One important reason for this push is Monsanto's need to replace the reduction in revenues from its Roundup Ready herbicide. Since Roundup went off-patent in 2000, the company has been forced to slash its prices to meet competition from generic makers of glyphosate (the active ingredient of Roundup) in Europe and China. With shrinking profits from its chemicals and Roundup Ready sales, and fierce price competition from China and Europe, the company is trying to bring in as much money as possible in the form of royalties derived from its GM traits division, which requires US-like intellectual property laws.

The company's first targets have been the main adopters of GM crops in South America, and several temporary agreements have been reached in Paraguay, Uruguay and some Brazilian states. Monsanto is making deals based on different approaches: collecting royalties either at the time of purchase of GM seeds, or at the delivery of the harvested crop, or both. The company is dealing directly with farmers' organizations, as well as with grain elevators. It also pushed for changes in national regulatory regimes, for example in Uruguay, in order to replace farmers' rights to freely save and reuse seeds with new mechanisms to allow private contracts that impose restrictions on such rights.

No deal has yet been made in Argentina, where the government is strongly opposed to this approach. Miguel Campos, the Argentinian Secretary of Agriculture and a strong supporter of GM crops, points out that Monsanto has made a good deal of money in the country and should not impose itself unfairly on Argentine farmers: "The great beneficiary of this has been Monsanto. Argentina has been the launching point for the use of this technology in the continent. This has allowed Monsanto to make advances in other countries."

In June of 2005, Monsanto launched a new phase in its campaign by filing lawsuits against the shipment of Argentine soybean products to the Netherlands and Denmark. The company is claiming the possible infringement of its Roundup Ready patent rights in Europe due to the presence of this gene in imported products derived from GM soybeans.

The controversy over royalties has also been ignited in Asia following complaints from farmers. At the beginning of January 2006, the Andhra Pradesh government filed a petition against Mahyco-Monsanto before the Monopolies and Restrictive Trade Practices Commission for what it considered an "exorbitant" royalty collection for Bt cotton. The Minister of Agriculture of Andhra Pradesh, Mr. N. Raghuveera Reddy, said: "The company – Monsanto – is compelling cotton farmers at gun point to pay the extra amount, even as it collected lesser and variable royalties in other countries."

The increasing power of Monsanto in the seed industry, strengthened by looming corporate intellectual property rights systems for collection of royalties, constitutes a major threat to farmers' rights worldwide. In the countries in which such regimes have been adopted, experience shows that farmers who choose to cultivate non-GM varieties have no legal protection against contamination, and can be sued for the non-intentional presence of transgenic DNA in their crops.

Monsanto's June 2005 property rights claim over soy cake from Argentina signals that the company believes that it has proprietary rights over transgenes not only in its patented seeds but in products derived from these seeds. This is a strong warning of the risks involved in allowing a multi-billion dollar company to continuously expand its crop model. In order to obtain what it considers 'adequate' benefits, Monsanto will need to progressively increase its control over the seed, food, and feed supply of any country in which its products are introduced, to the detriment of the nation's farmers.

Farmers in South Sulawesi, Indonesia burning GM cotton in September 2001.

environmental, social and economic impacts

The biotech industry claims that GM crops in the US have provided "significant yield increases, significant savings for growers, and significant reductions in pesticide use". But as the case studies in this report show, a significant number of studies by independent scientists demonstrate that yields from GM varieties are lower than, or at best equivalent to, yields from conventional crops, contradicting the biotech industry's claims to the contrary. Reduced yields are found with Roundup Ready soy in particular.

Furthermore, independent studies have demonstrated not only that pesticide reduction claims are unfounded, but that GM soy has dramatically increased pesticide use, particularly since 1999. This increase in pesticide applications will be exacerbated by the widespread adoption of Roundup Ready crops around the world. By 2005, six different weeds had reportedly become resistant to Roundup in many countries, not to mention a long and growing list of weeds that have developed a degree of tolerance sufficient to require applications of other, often more toxic, herbicides. The decreasing efficacy of Roundup is largely due to the overuse of this single herbicide as the key method for managing weeds on millions of hectares. This underscores the fallacy of the 'one size fits all' approach so prevalent in modern-day farming.

In Argentina, the intensification of soy production has been associated with a decline in soil fertility and soil erosion. It has been predicted that Argentinian soils will be infertile in 50 years if current rates of nutrient depletion and soy production continue. At the same time, soy has displaced other crops such as legumes, fruits, and cattle, which has serious consequences for the country's food sovereignty.

The introduction of GM soy has also contributed to the acceleration of land concentration in Argentina, favoring the establishment of large holdings and the disappearance of smaller farms. During the 1990s, the number of farms in the Pampas declined from 170,000 to 116,000, while their average size doubled. 14 million hectares are calculated to be in debt to banks and big companies.

In 2005, Brazil suffered a drought that caused a 72% reduction in soybean yields in Rio Grande do Sul, where Roundup Ready had been widely adopted. The president of the Rio Grande do Sul seed association explained that crop losses were 25% higher for GM soy than for conventional soy, and the governor of Matto Grosso – which produces 25% of the national soybean crop – announced that the state would not plant GM crops the next year. In the current context, recent reports from Brazil confirm that GM soybean uptake in the country for the 2006 harvest season has been much lower than the 50% uptake forecasted by optimistic industry analysts.

In Paraguay, soy cultivation expels thousands of small farmers from their land each year. Human rights violations and forced evictions of peasant communities by soy landlords have been documented in recent years.

who benefits from gm crops?

The GM crops that have been commercialized during the last decade, from 1996 to 2005, have been oriented towards maximizing benefits for the agribusiness and seed industries that control GM traits and the chemical products associated with GM crops. In ten years, the commercialization of just two GM traits – herbicide tolerance and insect resistance – have dominated the market in three major crops: corn, soybeans and cotton.

Over 70% of the total global GM crop area is herbicide tolerant; the rest is insecticide resistant, namely Bt. Most of those crops are earmarked for animal feed or for heavily processed products. In the case of Argentina, only 2% of all GM soy stays in the country; the rest is exported, primarily to Europe and China, for animal feed and other highly processed products.

The feed industry, the main recipient of GM products, has already expressed its lack of preference for GM over conventional soy. The European feed industry stated in 2005 that there is "no direct advantage from the presence of residues of herbicide resistant genes in the products they buy. The industry is therefore not prepared to pay for the use of this technology."

GM products also do not offer advantages to consumers, as they are neither cheaper nor better quality. Even the French biotech industry has stated that the GM crops currently available in the market do not benefit consumers. There are clearly no environmental benefits to GM agriculture, as seen by the fact that the most widely planted herbicide-tolerant varieties increase pesticide use substantially. Furthermore, soy expansion is driving small farmers off the land, fostering the emergence of huge mega-farms, and contributing to deforestation.

Neither have GM crops done anything to ease hunger in the world, despite the continual use of this argument by the biotech industry to promote GM crops. First, GM crops are overwhelmingly grown in and/or exported to the world's rich nations. Secondly, they are fed primarily to animals for meat production and consumption by the well-to-do in the US, Europe, Japan and other wealthy nations. By and large, the poorer farmers of the world cannot afford to purchase imported soybean meal or maize (whether GM or not) to feed their livestock. While GM maize might be exported to some extent to poorer countries for direct human consumption, it offers absolutely no advantage over conventional corn; indeed, Bt corn's insecticidal toxin has not been adequately reviewed to assess its potential impacts on human health. Third, the reduced yields associated with GM crops shrink rather than expand the world's available feed/food supply. In any case, hunger and malnutrition are ultimately caused more by poverty, lack of access to land, illiteracy and poor health care than by deficient agricultural production techniques.

So then, who does benefit from the GM revolution? Taking into account the way in which GM crops have been introduced, the beneficiaries to date are obvious: big agribusiness and the biotech corporations that 'own' the GM seeds and traits. Secondly, some large farmers in exporting countries have received some benefits, although these appear to be more related to greater ease of production and the ability to cover more acres as opposed to an increase in profits per hectare. On the other hand, small farmers in several developing countries – Argentina and Paraguay in particular - have been evicted from their lands by large landowners to make room for a huge expansion in soybean cultivation – most of it GM – for export to mainly richer nations. To the extent that GM crops like Roundup Ready soy facilitate expansion of monocultures, they also reduce a nation's food diversity and security, as seen most dramatically in the case of Argentina.

time to get serious! the need for independent evaluations of gm crops and truly sustainable agricultural approaches

The evaluation of the impacts and the performance of GM crops is a highly complex field, and comprehensive and independent evaluators are required in order to be able to provide an objective analysis. Unfortunately, many governments and international bodies such as the UN Food and Agriculture Organization appear to base their analyses on the work of organizations like ISAAA and other industry-oriented organizations that have contributed to the GM crop hype.

In 2003, ISAAA claimed that "the three most populous countries in Asia – China, India, and Indonesia (total population 2.5 billion and a combined GDP of over US$1.5 trillion), the three major economies of Latin America – Argentina, Brazil and Mexico (population 300 million and a GDP of $1.5 trillion), and the largest economy on the continent of Africa, South Africa (population 45 million and GDP of $130 billion) are all officially growing GM crops for the benefit of their combined population of 2.85 billion with a total GDP of over $3 trillion."

In order to evaluate the validity of such a claim, a series of structural, regulatory, and economic aspects related to the geographical, political, and scientific context of the country and region in which a particular GM crop is to be adopted must be taken into account. Furthermore, a comprehensive assessment of the performance of GM crops requires a full description of short, medium and long-term impacts, whether they be negative or positive. ISAAA's analysis only extols the benefits, without referring to any of the negative impacts derived from the introduction of GM crops. This raises many questions: if so many millions of small farmers from India are benefiting from GM crops, as ISAAA claims, how can the 2005 ban by the government of Andhra Pradesh on the first three varieties of Bt cotton be explained? How does ISAAA account for the protests and complaints by hundred of farmers about the failures and problems associated with Bt cotton in the District of Warangal, and the negative reports from the Department of Agriculture in Maharastra? If half a million people were lifted out of poverty in Indonesia thanks to Bt cotton, as ISAAA claims, why did Monsanto abandon the commercialization of Bt cotton there in 2003? How does ISAAA explain the poor performance of Bt cotton in South Sulawesi? And why did Indonesia disappear from ISAAA's map of countries cultivating GM crops in 2004 without any explanation?

The fact that problems such as these are so often ignored by people in power is a testament to the mania for agricultural biotechnology in some circles. This uncritical enthusiasm for agriculture biotech is fostered by a sophisticated and well-funded public relations effort on the part of the biotech industry, which spends US$50 million per year to promote its products in ways that are often deceitful and unethical. It is also, unfortunately, fostered by the desperate search for silver bullet solutions so common in areas suffering serious rural decline.

As suggested by the many problems with GM crops outlined above, there is an urgent need for a serious independent analysis of proposed biotech 'solutions' to the agricultural problems facing farmers, particularly in developing countries. Even more important, agricultural officials should always begin their analysis with the specific problem to be solved or improvement to be made, not with a single proposed (biotech) solution. A full range of non-biotech approaches should also be evaluated. For instance, the innovative 'push-pull' system of maize cultivation in Africa accomplishes all that Bt maize can, but offers much more, and at much lower cost. This system involves intercropping maize with plants that repel or 'push' insect pests out, together with a border row of another plant that attracts or 'pulls' the same pests out of the field. Besides insect protection, the intercropped plants repel weeds, and can be harvested to feed livestock. The low cost and added benefits make the 'push-pull' system a much better choice than GM insect-resistant maize.

This is just one example, and many others could be mentioned: bio-control of cassava mealybug in Africa, for instance, rescued Africa's staple crop from almost certain devastation in the 1980s, and saved millions of African lives. Today, scientists would probably rather tinker with cassava genes in hopes of coming up with an 'insect-resistant' GM cassava. In many cases, basic infrastructure improvements such as all-weather roads, or decent fencing, can do more to help farmers than any crop modification can.

conclusion

The future of who controls our food hangs in the balance. Monsanto will target major food and feed markets over the coming years in order to expand its global 'genetic footprint' of GM crops. The biotechnology industry as a whole continues to amass control over the food supply through the purchase of seed companies, the acquisition of patents on GM crops and genes, and the persecution of farmers for alleged patent infringement. The aggressive push in South America to adopt new regulatory mechanisms for imposing technology fees is a clear attempt to export North American practices at the global level.

Monsanto and other biotech companies continue to exercise extraordinary influence over governments and their regulatory apparatuses, ushering poorly tested and potentially hazardous products through weak approval processes. Bribery has been used as a tool to overcome environmental risk assessment hurdles, and unethical and immoral media campaigns have been waged. These are all troubling developments that bespeak a profound disconnection between the profit-driven goals of agribusiness and the clear desires of citizens around the world for healthy, sustainable food systems.

Yet there is also much reason for hope. The biotech industry has failed to introduce new second generation GM crops with consumer benefits as planned. After 30 years of research, only two modifications have made it to the marketplace on any scale. The industry's plans to introduce third generation crops engineered to produce experimental drugs and industrial compounds have also been defeated. Understandably, these so-called pharma and industrial GM crops have aroused considerable controversy among citizens and food companies. The biotech industry also seems to be running out of new ideas, with a decline in the number of GM crop field trials and a return to conventional breeding for some of its most promising new crops. Finally, the most vibrant sector of the food industry continues to be organic agriculture, which prohibits the use of transgenic technologies. These developments are clear signs that genetic modification does not need to be the future of food.

The range of possible food futures is suggested by a recent white paper from the US Department of Agriculture's pro-biotech Advisory Committee on Biotechnology and 21st Century Agriculture. Despite its flaws, which include some of the mistaken assumptions that we have critiqued in this report, the paper outlines three scenarios for the future of GM crops: Rosy Future, Continental Islands and Biotech goes Niche. The latter scenario in particular acknowledges the clear possibility that transgenic plant technologies will fade in importance as technical difficulties in the development of multi-gene traits and consumer rejection continue to block the introduction of new GM varieties. On the other hand, the successful products of organic agriculture and smart non-transgenic breeding approaches that employ our expanding knowledge of genomics (e.g. marker-assisted breeding) are eagerly accepted by consumers around the world. The future of food is ultimately a democratic decision that should involve each and every one of us.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one introduction

introduction

1.1 the beginning

In 1994, a genetically modified (GM) crop was commercialized in the United States for the first time. Two years later, the first significant areas of land devoted to GM crops were sown, over 1 million hectares, the vast majority of which were in the United States. Ten years later, there are 80 million hectares of GM crops around the world, primarily in the United States, followed by Argentina and Canada.

Significant controversy remains about the benefits and risks related to genetically modified organisms (GMOs) and the way in which they have been introduced around the world. This report takes an in-depth look at the experience gathered following 12 years of commercialized GM foods and ten years of extensive planting of GM crops, and draws some preliminary conclusions about the benefits and risks of the GMO crop revolution.

1.2 the agricultural model: geographic and corporate concentration

In recent years, four crops, specifically soybeans, maize, cotton and canola, have been genetically modified and aggressively introduced into the world market. According to industry sources, soybeans, maize, cotton and canola constitute 99% of the world's acreage of GM crops, with soybeans alone covering 60% of the total planted area.[1] In 2004, it was estimated that 56% of the 86 million hectares of soybeans, 28% of the 32 million hectares of cotton, and 14% of the 140 million hectares of maize planted globally were GM.[2]

Today, most of these GM crops are concentrated in a few countries. During the first seven years of cultivation, between 1996 and 2002, over 90% of the global surface of GM crops was concentrated in just three countries: the United States, Argentina and Canada. In 2004, more than 84% of GM crops were still concentrated in these same three countries, although the areas under cultivation in Brazil, China, and India has grown progressively over the past three years.

During this first decade, the introduction of GM crops has been dominated and promoted by a handful of corporations. Three companies - Monsanto, Syngenta, and Bayer - are responsible for virtually all of the commercially released GM crops in the world today.[3] Monsanto, the US agri-business giant, has led the global push for the adoption of GM crops around the world. Today, Monsanto dominates the US seed market and is the world's leading producer of GM seeds. The company's seed technology has been used in at least 90% of all GM crops on the planet.[4]

1.3 the reality of a decade of planting: who benefits from gm crops?

The biotech industry and other industry-oriented organizations claim that the first decade of GM crops has been a clear success for farmers around the world. In their view, 8.25 million farmers - 90 percent of them in developing countries - have chosen to plant biotech crops, and as a result have reduced pesticide applications, decreased production costs, and enjoyed higher yields and greater profits. Monsanto asserts that over the past decade, farmers have "increased [the] area planted in genetically modified (GM) crops by more than 10 percent each year, increased their farm income by more than $27 billion, and achieved economic, environmental and social benefits in crops such as soybeans, canola, corn and cotton".[5] Monsanto believes that its GM technology is a "safe, sustainable, and useful tool in agriculture, nutrition and human health that helps to meet the world's needs for food and fiber".[6]

Monsanto often mentions the International Service for the Acquisition of Agri-biotech Applications (ISAAA) as a reference for the positive performance of GM crops in the world to date. In its 2004 Proxy Statement for investors, Monsanto says that "ISAAA reported that countries that have introduced insect-protected cotton have derived significant and multiple benefits, including increased yield, decreased production costs, and a reduction of at least 50 percent in insecticide applications."[7]

1 James C., 2004. *Global Status of Commercialized Biotech/GM Crops, Executive Summary,* ISAAA Brief 32. http://www.isaaa.org/kc/CBTNews/press_release/briefs32/ESummary/Executive%20Summary%20(English).pdf
2 Ibid.
3 Innovest Strategic Value Advisors, 2005. *Monsanto and Genetic Engineering: Risks for Investors. Analysis of company performance on intangible investment risk factors and value drivers.* http://www.innovestgroup.com
4 The Center for Food Safety, 2004. *Monsanto vs. US farmers.* http://www.centerforfoodsafety.org
5 Monsanto, 2005. *World at a Glance: Conversations about Plant Biotechnology.* http://www.monsanto.com/biotech-gmo/biotech-gmo_world.pdf
6 Monsanto, 2003. *Proxy Statement 2004,* page 23. http://www.monsanto.com/monsanto/content/media/pubs/2004/2004proxy.pdf
7 Ibid.

ISAAA issues an annual report that is full of praise for the performance of GM crops around the world. Its January 2005 report announced great progress in the introduction of GM crops, and portrayed farmers as the primary beneficiaries of this new agriculture technology:[8] "The experience of the first nine years, 1996 to 2004, during which a cumulative total of over 385 million hectares of biotech crops were planted globally in 22 countries, has met the expectations of millions of large and small farmers in both industrial and developing countries." And it is not only farmers who reap these benefits, but also consumers and the rest of society, according to ISAAA: "The continuing rapid adoption of biotech crops reflects the substantial improvements in productivity, the environment, economics, health and social benefits realized by both large and small farmers, consumers and society in both industrial and developing countries." [9]

what is isaaa?

ISAAA defines itself as "a not-for-profit organization that delivers the benefits of new agricultural biotechnologies to the poor in developing countries".[10] However, its structure and the work it carries out show that ISAAA's agenda is set by transnational corporations with the goal of legitimizing and promoting the introduction of GM crops around the world.[11] ISAAA receives funds from all of the big biotech promoters, including major agribiotech corporations like Monsanto and Syngenta.

The Annual Global Review of Commercialized Transgenic Crops, conducted by ISAAA annually since 1996, has become widely accepted at the international level as the authoritative reference for the global deployment of commercialized GM crops. These reports have served as the basis for other highly publicized reports, such as the 2004 UN Food and Agriculture Organization report on GM crops and farmers.[12] In general, governments and 'prestigious' institutions around the world use ISAAA data as a point of reference for supporting the global benefits of GM crops.

However, critique about the methodology and sources of ISAAA data have been increasing in past years. First of all, it is important to note that many governments in developing countries neither keep track of nor monitor the areas planted with GM crops, so verified official statistics can not be obtained from countries such as South Africa, the Philippines and Brazil for the first decade of cultivation. In its 1996 report, ISAAA recognized this, admitting that it acquires most data from developing countries "through informal contacts".[13]

Furthermore, ISAAA reports always describe the number of GM hectares planted in various countries, and these figures are often quoted by other sources in reference to GM crops around the world. But doubts have arisen about the reliability of the figures and sources used by ISAAA in its reports. In South Africa, for example, a study by Aaron de Grassi questions ISAAA's figure of 100,000 planted hectares of Bt cotton. De Grassi's survey team estimates 3,000 hectares, and Agricultural Biotechnology in Europe - an industry coalition - suggests that South Africa has 5,000 hectares of "smallholder cotton".[14] As the South African government does not provide official statistics about the area cultivated with GM crops, one is forced to question ISAAA's figures, which are 20 times higher than the estimates of another biotech industry organization.

In the Philippines, ISAAA claimed that more than 50,000 hectares were cultivated with GM corn. However, the Philippine government does not monitor the actual areas planted with GM corn, nor does it have a system to track the amount of GM corn seeds that have been sold to farmers. When ISAAA director Dr. Randy Hautea was asked about the source of these statistics, he replied that they came from the Department of Agriculture in the Philippines.[15] However, the Philippine Bureau of Agricultural Statistics has no figures on the hectarage or number of farmers using GM corn, and an official from the government said that ISAAA claim was superfluous.[16]

In short, ISAAA seems to have a tradition of inflating figures, even in countries that have official data on GM crop hectarage. For example, the US estimates compiled by Huib de Vriend of LIS Consult show an average of between 2 and 9% inflation of USDA data in ISAAA figures (see table 1).[17]

8 James, C., 2004. Op. cit.
9 Ibid, page 3.
10 See http://www.isaaa.org/
11 See GRAIN, October 2000. *ISAAA in Asia: Promoting Corporate Profits in the Name of the Poor.*
12 FAO, 2004. *The State of World Food and Agriculture 2004. Biotechnology: Meeting the Needs of the Poor?* http://www.fao.org/newsroom/en/focus/2004/41655/
13 James, C. and Krattiger, A., 1996. *Global Review of the Field Testing and Commercialization of Transgenic Plants, 1986 to 1995, The First Decade of Crop Biotechnology. No. 1, ISAAA.*
14 De Grassi, 2003. *Genetically Modified Crops and Sustainable Poverty Alleviation in Sub-Saharan Africa: An Assessment of Current Evidence.* Third World Network Africa.
15 Personal communication with Neth Dano, Third World Network, Philippines.
16 Ibid
17 See http://www.gmwatch.org/archive2.asp?arcid=5343

one introduction

TABLE 1	ESTIMATES OF ACREAGE CULTIVATED WITH GM CROPS IN THE USA, 2000 – 2004			
YEAR	USDA (1,000 HA)	ISAAA (1,000 HA)	ISAAA – USDA (1,000 HA)	ISAAA – USDA % OVERESTIMATED
2000	28,157	30,300	2,143	7.6%
2001	32,751	35,700	2,949	9.0%
2002	36,948	39,000	2,052	5.6%
2003	40,781	42,800	2,019	4.9%
2004	45,367	47,600	2,233	4.9%

Sources; *LIS Consult, 31 May 2005. Based on NASS – USDA, Prospective Plantings 2000 – 2004 and ISAAA, Global Review of Commercialized Transgenic Crops 2000 – 2004.*

1.4 biotech industry claims a decade of success from 1996-2006

An examination of Monsanto and ISAAA reports turns up only praise for GM crops and their successful introduction around the world. No significant problems with the current model of introduction of GM crops are mentioned, and the authors firmly conclude that the introduction of GM crops has provided clear benefits to farmers and consumers worldwide.

For ISAAA and corporate leaders such as Monsanto, the experience with GM crops since 1996 has constituted a huge success. ISAAA called for celebrations to take place at the end of 2005, on the tenth anniversary of the cultivation of GM crops worldwide:

"The 10th anniversary in 2005 will be a just cause for celebration worldwide by farmers, the international scientific and development community, global society, and the peoples in developing and industrial countries on all six continents that have benefited significantly from the technology, particularly the humanitarian contribution to the alleviation of poverty, malnutrition and hunger in the countries of Asia, Africa and Latin America".[18]

Is the analysis by Monsanto and organizations like ISAAA correct? Are the benefits of GM crops as strong as claimed by pro-biotech interests? If GM crops are safe, economically profitable, and environmentally friendly, why then has there been so much opposition, concern and controversy in recent years? If the scenario is so good, if so many millions of farmers and consumers are benefiting, if the increase in GM crops is so impressive, and if poverty, malnutrition and hunger have been alleviated in developing countries, why then have some governments imposed bans and moratoriums? Why are consumers opposing those products in many places around the world?

There is extensive documentation exposing problems with GM crops in farming communities around the world, in the US, Canada, India, Indonesia and other countries. The list is long and growing. A class action by organic farmers against Monsanto and other corporations was given the green light in Canada in 2005.[19] It has been confirmed that Monsanto used bribery to further its interests in Indonesia[20]. Monsanto Bt cotton crop failures have been extensively documented in some Indian states[21]. Claims of pesticide reduction with GM crops have been refuted by independent studies; in fact, pesticide increases have been documented, for example in the US where pesticide use for Roundup Ready soybeans increased over the past decade[22]. Furthermore, the claimed benefits to consumers are highly disputed. This is irrefutable in the light of consumer rejection in the European Union, where even the French biotech industry underlines the lack of consumer benefits associated with the first generation of GM crops.[23]

In the end, as this report shows, the main beneficiaries of the GM crop revolution have been Monsanto and other GM companies, and not consumers, farmers or the environment.

18 See also http://www.isaaa.org/kc/bin/ESummary/index.htm
"2004 is the penultimate year of the first decade of the commercialization of biotech crops during which double-digit growth in global hectarage of biotech crops has been achieved every single year; this is an unwavering and resolute vote of confidence in the technology from the 25 million farmers, who are masters in risk aversion, and have consistently chosen to plant an increasing hectarage of biotech crops year, after year, after year. The 10th anniversary in 2005, will be a just cause for celebration worldwide by farmers, the international scientific and development community, global society, and the peoples in developing and industrial countries on all six continents that have benefited significantly from the technology, particularly the humanitarian contribution to the alleviation of poverty, malnutrition and hunger in the countries of Asia, Africa and Latin America. [...] Taking all factors into account, the outlook for 2010 points to continued growth in the global hectarage of biotech crops, up to 150 million hectares, with up to 15 million farmers growing crops in up to 30 countries."

19 Organic Agriculture Protection Fund, August 2005. *Organic Farmers Granted Leave to Appeal Class Certification Decision.*

20 See chapter five.

21 See chapter four.

22 See chapter two.

23 USDA, June 2005. *ASA Delegation Meets with French Industry on T and L.* USDA GAIN Report FR5037.

monsanto takes over farm fields in the united states

bill freese, friends of the earth united states and juan lopez, friends of the earth international

Biotechnology proponents in the United States claim that GM crops are good for consumers, farmers and the environment, and that they are growing in popularity around the world. Such claims are seldom subjected to critical scrutiny, however, and they are often repeated as fact by the media. A close look at the US experience shows that the actual situation is a good deal more complex and less positive. This section aims to provide a nuanced, fact-based assessment of GM crops in the country where they have been most widely adopted - the United States.

2.1 the adoption of gm crops in the us

The first significant commercial planting of GM crops took place in the US in 1996. In the decade since then, adoption has increased substantially, and US farmers are now growing tens of millions of hectares of biotech crops. Yet what often goes unmentioned is that very few GM varieties are being grown commercially. As of July 2005, the US Department of Agriculture (USDA) had approved 66 distinct biotech 'events' for commercial use. These 66 varieties are combinations of 14 different crops and 10 different traits or trait combinations. Despite the diversity of GM crops that can be planted, since the 1990s only four crops with two traits have been grown to any significant extent (table 2). These four crops are soybean, corn, canola and cotton. The two traits are herbicide tolerance (HT) and insect resistance (IR). HT crops are engineered to withstand direct spraying with weed killers, while IR crops generate insecticides in grain and other plant tissues. Various combinations of these four crops and two traits account for virtually 100% of biotech acreage, both in the US and elsewhere.

TABLE 2 GM CROP TYPES APPROVED FOR COMMERCIAL PRODUCTION (+ BOXES) VERSUS THOSE ACTUALLY GROWN FOR COMMERCIAL USE (SHADED + BOXES)

CROP / TRAIT	HT	IR	HT / IR	STERILE POLLEN	HT / STERILE POLLEN	VR	IR / VR	DELAYED RIPENING	ALTERED OIL	LOW NICOTINE
ALFALFA	+									
BEET	+									
CANOLA	+				+				+	
CHICORY				+						
CORN	+	+	+	+	+					
COTTON	+	+	+							
FLAX	+									
PAPAYA						+				
POTATO		+					+			
RICE	+									
SOYBEAN	+								+	
SQUASH						+				
TOBACCO										+
TOMATO		+						+		

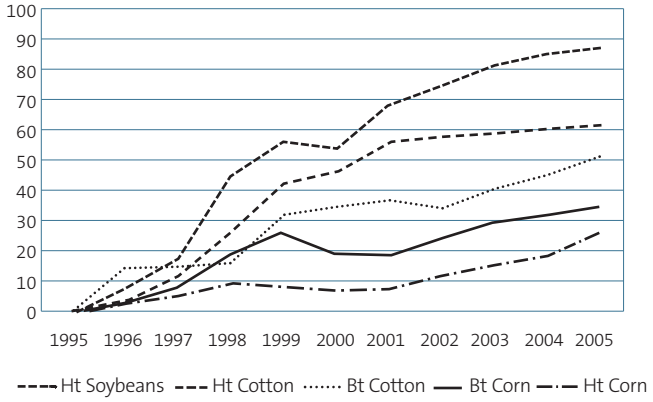
Legend: *Each '+' box represents a type of GM crop that is approved or 'de-regulated' by the US Department of Agriculture and so could be planted commercially in the US. The tinted boxes represent types of GM crops that actually are planted commercially on a widespread basis (i.e. tinted boxes together represent virtually 100% of commercial biotech acreage both in the US and worldwide).*
HT = herbicide-tolerant; IR = insect-resistant; HT/IR = 'stacked' crops with both traits; sterile pollen crops are used for breeding purposes; VR = virus-resistant; IR/VR = crops with both traits. Note that each '+' may represent more than one biotech 'event', so the number of '+' boxes does not add up to 66.
Data from USDA website at http://www.aphis.usda.gov/brs/not_reg.html, downloaded 8 July 2005.

two monsanto takes over farm fields in the united states

While as indicated above the adoption of biotech crops is narrowly limited to just a few plants and traits, it is widespread. In terms of hectarage, soybeans genetically modified to survive the application of specific herbicides have been the most popular GM crop, followed by biotech corn, cotton and canola (see figure 1).[24]

It should be noted that of the three biotech food crops, the two that are most widely planted, soybeans and corn, are used primarily for animal feed and industrial applications rather than as human food. As we will see, biotech crops intended wholly or primarily for human consumption have been rejected in the marketplace.

FIGURE 1 **ADOPTION OF GENETICALLY ENGINEERED CROPS IN THE US**



Data for each crop category include varieties both HT and BT (stacked) traits.
Source: *1996-1999. Fernandez - Comejo and McBride, 2002, 2000-2005*

2.2 the us agriculture system and big agribusiness

2.2.1 the concentrated seed market

Until the 1930s, commercial seed in the United States was supplied mainly by small, family-owned businesses, and these businesses were almost exclusively dependent on plant breeding research in the public sector. More than three-quarters of all rural counties depended on agriculture as their primary source of income, and there were 30.4 million people living and working on 6.3 million farms. The rural farm population represented over half of the total rural population, which itself was a quarter of the US total.[25] By the turn of the 21st century, however, the farm population had declined dramatically. Today, 5.9 million people live or work on 2.1 million farms, representing 2% of the total US population.[26] Due to low commodity prices, many of these remaining farmers and their family members must take off-farm jobs in order to survive. These facts help to explain why only 20% of rural US counties now depend on agriculture for more than 15% of their earnings.[27]

Towards the end of the 20th century, the seed industry became highly concentrated, and is now characterized by oligopolistic competition between a few large corporations.[28] For instance, three companies - Pioneer, Monsanto and Novartis - accounted for nearly 70% of US corn seed sales in 1997, and two - Monsanto and Delta & Pine Land - sold more than 80% of the cotton seed varieties planted that same year.[29]

24 USDA, 2005. *Adoption of Genetically Engineered Crops Grows Steadily in the US.* http://www.ers.usda.gove/Data/BiotechCrops/
25 Offutt, S. and Gundersen, C., 2005. *'Farm Poverty Lowest in US History' in Amber Waves, vol. 3, ERS, USDA,* p. 27. http://www.ers.usda.gov/AmberWaves/September05/pdf/FeaturePovertySeptember2005.pdf
26 Ibid.
27 Ibid.
28 Fernandez-Cornejo, J., February 2004. *The Seed Industry in US Agriculture: An Exploration of Data and Information on Crop Seed Markets, Regulation, Industry Structure, and Research and Development. Agriculture Information Bulletin No. (AIB786),* p. 27. http://www.ers.usda.gov/publications/aib786/aib786g.pdf
29 Ibid.

2.2.2 monsanto

The Monsanto Chemical Company was founded in 1901, and is headquartered just outside St. Louis, Missouri.[30] For many decades, Monsanto was known as a maker of chemicals for industry (e.g. PCBs), the military (e.g. Agent Orange), food companies (e.g. the artificial sweetener aspartame) and agriculture (e.g. weedkillers).

Monsanto's transformation into a biotechnology company began in the 1980s and 1990s with the acquisition of seed companies, including some of the nation's largest, such as DeKalb, Agracetus, Asgrow Agronomics, Holden Foundation Seeds and Calgene, to name just a few.[31] The latest major acquisition in 2005 was Seminis, the world's largest vegetable seed company.[32] With Seminis, Monsanto surpassed Pioneer Hi-Bred (itself taken over by DuPont) to become the world's largest seed company.[33] In addition, Monsanto has acquired significant patent rights over a multitude of genetic engineering techniques and genetically engineered seed varieties, and requires farmers purchasing its seed to sign an agreement that prohibits the saving of the seed. In this context, Monsanto has acquired an unprecedented level of control over the use and sale of seed in the United States.

Monsanto has been the leader in the introduction of GM crops at the global level. Its seed technology is used in at least 90% of all GM crops worldwide.[34] In 2004, more than 175 million acres of GM crops were planted by farmers, 90% of them using Monsanto's technology.[35] Monsanto accounted for 91% of the global area covered with GM soybeans in 2004 (of the 119.5 million total acres, 109 million were Monsanto).[36] It accounted for 97% of GM maize, 63.5% of GM cotton, and 59% of GM canola in 2004.[37] Roundup Ready soybeans accounted for more than 80% of all soybeans planted in the United States. In addition, Monsanto's Roundup is the world's top selling herbicide.[38]

From the very beginning, Monsanto's top priority has been to genetically engineer its seeds to foster increased use of the company's Roundup. This allows Monsanto to profit twice - from an added 'technology fee' for the seed, and from increased sales of the Roundup that is used with the seed:

"Monsanto has maintained and even souped up Roundup's status by forging what analysts say was a brilliant strategy of dropping its price years ahead of patent expiration and tying its use to the early growth of genetically modified crops - crops made to work in tandem with the herbicide."[39]

Monsanto has engineered the herbicide-tolerant trait into widely-grown crops like soybeans, corn, cotton and canola in order to maximize its profits. The company's bid to introduce a herbicide-tolerant version of wheat, the world's most widely grown crop, was thus not unexpected. However, Monsanto dropped its Roundup Ready wheat project in 2003 due to strong resistance by wheat growers in the US and Canada and wheat importers in Europe and Asia.

TABLE 3 **WORLD'S TOP 10 SEED COMPANIES + 1**

COMPANY	2004 SEED SALES (US MILLIONS)
1. Monsanto (US) + Seminis	$2,277 + $526
(acquired by Monsanto in March 2005)	pro forma = $2,803
2. DuPont/Pioneer (US)	$2,600
3. Syngenta (Switzerland)	$1,239
4. Group Limagrain (France)	$1,044
5. KWS AG (Germany)	$622
6. Land 0'Lakes (US)	$538
7. Sakata (Japan)	$416
8. Bayer Crop Science (Germany)	$387
9. Taikii (Japan)	$366
10. DLF-Trifolium (Denmark)	$320
11. Delta & Pine Land (US)	$315

Source: *ETC Group, 2005.*

30 Tokar, B., September/October 1998. *'Monsanto: A Checkered History' in The Ecologist.* http://www.mindfully.org/Industry/Monsanto-Checkered-HistoryOct98.htm
31 Fernandez-Cornejo, J., 2004. *The Seed Industry in US Agriculture: An Exploration of Data and Information on Crop Seed Markets, Regulation, Industry Structure, and Research and Development.* Op. Cit., p. 33.
32 Monsanto, 23 March 2005. *Monsanto Completes Acquisition of Seminis.* Press Release. http://www.monsanto.com/monsanto/layout/investor/news&events/2005/03-23-05.asp; Begemann, B., 10 November 2005. *The Seminis Commercial Opportunity.* Monsanto Biennial U.S. Investor Day. http://www.monsanto.com/monsanto/content/investor/financial/presentations/2005/11-10-05d.pdf
33 ETC Group, September/October 2005. *Global Seed Industry Concentration 2005.* ETC Group Communiqué, Issue 90.
34 The Center for Food Safety, 2004. *Monsanto vs. US farmers.* http://www.centerforfoodsafety.org
35 Monsanto, 2004. *Annual Report.* http://www.monsanto.com/monsanto/content/media/pubs/2004/2004_Annual_Report.pdf
36 ETC Group, September/October 2005. Op. cit.
37 Ibid. Monsanto accounted for 97% of the worldwide GM maize area in 2004 (47.7 million acres of GM maize worldwide; Monsanto GM maize 46.4 million acres); Monsanto accounted for 63.5% of the worldwide GM cotton area in 2004 (22.2 million acres GM cotton worldwide; Monsanto GM cotton 14.1 million acres); Monsanto accounted for 59% of the worldwide GM canola area in 2004 (10.6 million acres GM canola worldwide; Monsanto GM canola 6.3 million acres).
38 Monsanto, 2004. Op. cit.
39 Barboza, D. 'A Weed Killer is a Block to Build On' in *The New York Times,* 2 August 2001.

two monsanto takes over farm fields in the united states

2.3 corporate influence in designing a favorable regulatory and policy regime

The rapid pace of adoption of GM crops in the United States was supported by a very favorable regulatory and policy regime, shaped by the same companies that were pressing for the commercialization of GM crops. Indeed, big agribusinesses like Monsanto were the main designers of US biotech policy.

The influence of the biotech industry upon the regulatory system has been astonishing.[40] Dr. Henry Miller, responsible for biotech issues at the US Food and Drug Administration from 1979 to 1994, declared that "in this area, the US government agencies have done exactly what big agribusiness has asked them to do and told them to do".[41] A New York Times investigative article on the influence of Monsanto upon the US legal system concludes with the following self-explanatory statement: "What Monsanto wished for from Washington, Monsanto and, by extension, the biotechnology industry got. If the company's strategy demanded regulations, rules favored by the industry were adopted. And when the company abruptly decided that it needed to throw off the regulations and speed its foods to market, the White House quickly ushered through an unusually generous policy of self-policing." [42]

Indeed, the biotech industry intensively lobbied for the most favorable framework for the commercialization of GM crops, with as few mandatory requirements as possible. US policy was based on the dubious concept of 'substantial equivalence', according to which GM crops should not be considered different from their conventional counterparts. Monsanto consistently opposed new laws designed specifically for GMOs, and lobbied intensively for a legal framework based on existing laws that had been formulated to regulate food additives, pesticides and plant pests.[43] The general assumption of substantial equivalence in the US is one of the key elements at the heart of many international conflicts today, such as the complaint lodged in the World Trade Organization by the US, accusing the European Union of blocking trade by restricting GMOs.

The US and its biotech industry have opposed the creation of specific regulations on GMOs not only domestically, but also at the international level. For example, they adamantly opposed the creation of the UN Biosafety Protocol, the first international agreement to regulate the transboundary movements of GMOs. However, when the Protocol received widespread international support, the US tried to subvert it and transform the negotiation process into a trade forum.[44]

Over the last 18 years, the US Department of Agriculture (USDA) has received and approved thousands of applications to field test GMOs, and few if any of the applications have been turned down due to concerns about risks.[45] In the meantime, Monsanto has aggressively challenged any claims of risks or agronomic problems connected with its GM crops. If Monsanto has become aware of research that poses questions about the technology, it has challenged the findings and sought to discourage their publication or presentation at public meetings.[46] In one case, the company even refused to release the full version of a rat-feeding study that showed suggestive evidence of harm on the grounds that it was "confidential business information." The full study became available only after a German court ordered Monsanto to release it.[47]

Monsanto funds significant agricultural research, and has threatened to withdraw this funding in order to deter criticism of its products. For example, North Dakota was considering a bill imposing a moratorium on the development of Roundup Ready wheat in 2001, but after Monsanto publicly threatened to pull back all of its agricultural research funding to the state's land-grant university, the legislature suspended discussion of the bill.[48]

This capacity to influence regulations and policy is bolstered by a well-documented 'revolving door' between Monsanto employees and officials from US government agencies.[49] For example, prior to his former posts as Secretary of the US Department of Commerce and US Trade Representative, Michael (Mickey) Kantor was a member of Monsanto's Board of Directors. Michael Taylor, who had previously worked as an attorney for Monsanto, was deputy commissioner for the US Food and Drug Administration when it controversially approved Monsanto's BST milk-enhancing hormone, and later returned to

40 The New York Times, 25 January 2001. *Biotechnology Food: From the Lab to a Debacle.* http://www.nytimes.com/2001/01/25/business/25FOOD.html
41 Ibid.
42 Ibid.
43 Freese, W. and Schubert, D., November 2004. *"Safety Testing and Regulation of Genetically Engineered Foods," in Biotechnology and Genetic Engineering Reviews, vol. 21,* pp. 299-324.
44 Chakravarthi Raghavan, 1995. United States: *Shifting Biosafety Debate to WTO?* http://www.sunsonline.org/tradeareasenvironm10120295.htm; Ahuja, A., 2002. *"A Developing Country Perspective" in The Cartagena Protocol: Reconciling Trade in Biotechnology with Environment and Development?* The Royal Institute of International Affairs, Earthscan Publications Ltd, London.
45 Benbrook, C., 2000. *"Who Controls and Who Will Benefit from Plant Genomics?"* from The 2000 Genome Seminar: *Genomic Revolution in the Fields: Facing the Needs of the New Millennium*. http://www.biotech-info.net/AAASgen.html
46 Benbrook, C., 2002. *Economic and Environmental Impacts of First Generation Genetically Modified Crops: Lessons from the United States.* Trade Knowledge network, p. 28.
47 *Monsanto Ordered to make Secret Study Public*, Greenpeace press release, 20 June 2005.
48 Benbrook, C., 2002. Op. cit., p. 28. See also *Monsanto Courts Farmers on Gene-altered Wheat,* Reuters, 4 March 2003, http://www.planetark.org/dailynewsstory.cfm/newsid/20023/story.htm
49 Mindfully. The Revolving Door. http://www.mindfully.org/GE/Revolving-Door.htm

Monsanto as a vice president. These connections are not limited to the US administration: Monsanto's former Chief Counsel, Rufus Yerxa, was appointed deputy to the WTO Director General in August 2002. The Financial Times described Yerxa as "...just the man [the WTO Director General] will need should the US ever bleat to the WTO about EU restrictions on genetically modified food."[50]

Monsanto and the rest of the US agribusiness lobby have made a concerted effort to ensure that the US government protects corporate interests. The ties between agribusiness corporations like Monsanto and the government are the result of money well spent: in 2000, the company dished out US$2,002,000 on lobbying and donated lavishly to well-placed politicians. This generosity appears to have paid off with direct access for Monsanto to US government officials and negotiators, as well as representation on the government's Agricultural Policy Advisory Committee for Trade and the US Food and Drug Administration's Biotech Advisory Panel.

Monsanto is active in all of the major US agribusiness and biotech lobbies, including the Biotechnology Industry Organization (BIO), the US Grains Council, and the Food Industry Codex Coalition. Monsanto has a close and powerful ally in the American Farm Bureau Federation (AFBF), ranked by Fortune magazine as one of the most powerful organizations in Washington. Despite its cultivated appearance as a "grassroots farmers' organization", the AFBF has extensive corporate connections and its policy positions reflect the concerns of corporate agribusiness. The AFBF totally supports GM crops, including bio-pharmaceutical and industrial types, and has opposed US endorsement of the Biosafety Protocol.[51]

2.4 an assault on north american farmers

Monsanto's aggressive promotion of its biotechnology products, such as recombinant bovine growth hormone (rBGH), has been widely documented and includes a history of ethically questionable practices.[52] With GM crops, Monsanto is extending such practices and threatening the livelihoods of farmers worldwide. The decade-long experience of North American farmers with GM crops offers striking examples of these practices, and the threats that big corporations like Monsanto pose to the essence of agriculture.

Monsanto's seed policy is characterized not only by the aggressive patenting of the techniques needed to create a GM crop, but also the patenting of the seeds and plants themselves. Monsanto has over 600 patents, more than any other biotech company.[53] Today, the company is harassing and suing farmers for doing what they have been doing for centuries: saving seeds. Today, North American farmers who have purchased patented seeds are prevented from freely saving them to use in the following season. In fact, Monsanto requires farmers in countries including the US who use seed containing their patented technology to sign a technology agreement, forcing them to buy new seed every season.[54]

In signing the technology agreement, the grower agrees to the following: "Not to supply any seed containing patented Monsanto technologies to any other person or entity for planting. Not to save any crop produced from seed for planting and not to supply seed produced from seed to anyone for planting. Not to use or to allow others to use seed containing patented Monsanto Technologies for crop breeding, research, generation of herbicide registration data, or seed production."[55]

One consequence of the concentration of the seed industry and Monsanto's seed policy is that US farmers now have fewer seed choices. According to the US-based Center for Food Safety, "for many farmers across the country, it has become difficult if not impossible to find high quality, conventional varieties of corn, soy, and cotton seed."[56]

This strongly suggests that Monsanto, through its numerous seed companies, is offering many of its best seed varieties only in GM versions. In other words, farmers must buy GM in order to get higher quality seeds, even if they do not want the GM trait. Thus, GM adoption rates may give an exaggerated impression of farmers' interest in GM crops.

This level of domination and control over US farmers has no precedent, and has had serious negative impacts on their livelihoods. Farmers who decided to replant Monsanto seeds have faced financial penalties, forcing some into bankruptcy. Even more worrisome are the cases of farmers who have never bought Monsanto seeds but who have been penalized when their fields have been contaminated with patented Monsanto varieties.[57] Monsanto has been brutally

50 Financial Times, 20 August 2002. *Trading Places.*
51 American Farm Bureau Federation, 2005. *Agriculture Biotechnology - International Markets.* http://www.fb.org/issues/backgrd/biotech-inter.doc
52 Tokar, B., September/October 1998. *"Monsanto: A Checkered History"* in The Ecologist.
53 Ibid.
54 Moeller, D. and Sligh, M., 2004. *Farmers' Guide to GMOs. FLAG and RAFI-USA,* pp. 18-19. http://www.rafiusa.org/pubs/Farmers_Guide_to_GMOs.pdf
55 Monsanto, 2005. *Monsanto Technology/Stewardship Agreement.*
56 The Center for Food Safety, 2004. Op.cit.
57 Moeller, D. and Sligh, M., 2004. Op. cit., pp. 18-19. http://www.rafiusa.org/pubs/Farmers_Guide_to_GMOs.pdf

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enforcing the technology agreements upon American farmers by building "a department of 75 employees and setting aside an annual budget of $10 million for the sole purpose of investigating and prosecuting farmers for patent infringement".[58] The Washington Post reported that "the company has hired full-time Pinkerton investigators and, north of the border, retired Canadian Mounted Police, to deal with the growing work load, a total now of more than 525 cases, about half of which have been settled".[59]

Thousands of US farmers have been investigated by Monsanto. In many cases, these intrusive investigations make "farmers feel like criminals even before accusations are made, as investigators frequently solicit local police officers to escort them onto farmers' properties".[60] Many farmers settle with Monsanto, but others end up in court. Most farmers who land in court are confronted with a very unbalanced situation, as their financial and legal resources are invariably smaller than those of the multi-billion dollar company. In many cases, these farmers cannot afford any legal representation whatsoever and must stand alone in trial against Monsanto.[61]

TABLE 4 **TOP 10 CASES ARRANGED BY SIZE OF KNOWN JUDGEMENTS**

CASE	AMOUNT IN US$	DATE
Anderson, No. 4:01:CV-01749	3,052,800.00	4.6.2003
Dawson, No. 98-CV-2004	2,586,325.00	19.12.2001
Ralph, No. 02-MC-26	2,410,206.00	29.07.2003
Roman, No. 1:03-CV-00068	1,250,000.00	17.08.2004
McAllister (S.B.D., Inc.), No. 02-CV-73	1,000,000.00	10.09.2001
Eaton, No. 00-CV-435	866,880.00	11.10.2001
Thomason, No. 97-CV-1454	447,797.05	20.08.2001
Etheridge, No. 00-CV-1592	377,978.15	4.06.2002
Morlan, No. 02-CV-77	353,773.00	3.03.2004
Gainey, No. 03-CV-99	338,137.00	23.02.2004

- The total of the recorded judgements granted to Monsanto for these lawsuits is US$15,253,602.82.
- For cases with recorded judgements, farmers have paid a mean of US$412,259.54.
- The median settlement is US$75,000.00 with a low of US$5,595.00 and a high of US$3,052,800.00.
Source: *The Center for Food Safety.*

In 2003, Monsanto claimed to have opened 600 cases of new seed piracy matters, and the company reported 500 cases in 2004.[62] In many cases, the final results of the lawsuits against farmers are not known because Monsanto has insisted on the inclusion of a clause that prevents farmers from disclosing the terms of the settlement.[63] But the cases for which information is publicly available reveal significant payments to Monsanto. The true costs may be even greater than the payments reflected in table 4, as these do not include the plaintiff's attorney fees, the costs of testing fields, experts, and so forth.[64]

2.5 corporate profits and benefit claims

As we have seen, the first generation of GM crops contains almost exclusively herbicide-tolerant and/or insect-resistant traits (also called inputs). These applications have dominated because they were technically possible and offered a very good way for companies to maximize profits through intellectual property rights and increased herbicide sales.[65] Roundup Ready soybeans have provided Monsanto with hundreds of millions in 'technology fees' linked to the purchase of seed,[66] and hugely increased sales of Roundup. Since inputs are the key focus of the first decade of GM crops in the US, it is not surprising that the input companies (usually the very same company selling the GM seed) are the primary beneficiaries.[67]

The clear focus on inputs and the maximization of profit for the industry would not preclude, in the view of industry and the US government, that farmers and consumers have benefited from GM crops. The biotech industry claims that GM crops in the US have provided "significant yield increases, significant savings for growers and significant reductions in pesticide use".[68] But do these claims accurately reflect the reality in the field? Have GM crops reduced pesticide use, increased yields, and provided economic benefits to farmers? Have consumers benefited from the GM crops commercialized in the last decade?

58 The Center for Food Safety, 2004. Op. cit.
59 Washington Post, 2 March 1999. *Seeds of Discord - Monsanto's Gene Police Raise Alarm on Farmers' Rights, Rural Tradition.*
60 The Center for Food Safety, 2004. Op.cit.
61 Ibid, p. 35.
62 Ibid, p. 24.
63 Ibid, p. 32.
64 Ibid, p. 32.
65 Benbrook, 2000. Op. cit.
66 Ibid.
67 Duffy, M., 2001. *Who Benefits from Biotechnology?* Presented at the American Seed Trade Association meeting, 5-7 December 2001, Chicago, Illinois. http://www.mindfully.org/GE/GE3/Who-Benefits-From-Biotech.htm
68 Monsanto, 2003. *Proxy Statement 2004*, p. 23. http://www.monsanto.com/monsanto/content/media/pubs/2004/2004proxy.pdf; Carpenter, J. and Gianexsi, L., February 2001. *"Why US Farmers Have Adopted Genetically Modified Crops and the Impact on US Agriculture"* in AgBiotechNet, vol. 3. http://www.ncfap.org/reports/biotech/agbiotechnet.pdf

2.6 higher or lower yields?

A significant number of studies by independent scientists demonstrate that GM crop yields are lower than, or at best equivalent to, yields from non-GM varieties. Reduced yields have in particular been found with Roundup Ready (RR) soy. For example, in 1998 several universities carried out a study that demonstrated that, on average, RR soy varieties were 4% lower in yield than conventional varieties.[69] These results clearly refuted Monsanto's claim to the contrary.[70] Even strong supporters of GM crops, like the academics Qaim and Zilberman, recognized in a 2003 report published in Science that "in the United States and Argentina, average yield effects [of GM crops] are negligible and in some cases even slightly negative".[71]

The Food and Agriculture Organization's 2004 report on agricultural biotechnology also acknowledges that GM crops can have reduced yields.[72] This is not surprising when one considers that first-generation genetic modifications address production conditions (insect and weed control), and are in no way intended to increase the intrinsic yield capacity of the plant. Yields of both GM and conventional varieties vary - sometimes greatly - depending on growing conditions, such as degree of infestation with insects or weeds, weather, region of production, etc. [73]

2.7 less or more pesticide use?

Monsanto asserts that pesticide reduction is one of the most valuable benefits of its technology, particularly in connection with GM soy.[74] Yet independent studies have demonstrated not only that these pesticide reduction claims are unfounded, but that GM soy has dramatically increased pesticide use, particularly since 1999. In his exhaustive analysis of US Department of Agriculture pesticide usage data, Dr. Charles Benbrook, a leading expert on GM crops, concludes that GM soy, corn, and cotton have led to a 122 million pound increase in pesticide use since 1996, with a huge increase on herbicide-tolerant crops and a modest decrease on Bt crops: "While Bt crops have reduced insecticide use by about 15.6 million pounds over this period, HT crops have increased herbicide use by 138 million pounds." [75]

Dr. Benbrook identifies three key factors responsible for this increase in pesticide use:

1) Increased applications of glyphosate (Roundup) due to "the emergence and spread of weeds resistant or less sensitive to glyphosate";

2) Increased planting of herbicide-tolerant varieties due to the "limited supplies of conventional crop seeds in a number of popular maturity groups"; and

3) Increased attractiveness of herbicide-tolerance systems like Roundup Ready thanks to "aggressive herbicide price cutting by companies seeking a larger share of the market".[76]

Until the widespread adoption of Roundup Ready crops, there were just two confirmed cases of glyphosate-resistant weeds. But by 2005, six different weeds had become resistant in many countries, not to mention a long and growing list of weeds that have developed a degree of tolerance sufficient to require applications of other, often more toxic, herbicides.[77] Argentina may offer a lesson to the world in this respect. Roundup Ready soybeans comprise 99% of Argentine soybean hectarage. Roundup use on soybeans alone in Argentina has climbed from virtually zero in 1995/96 to 40 million kilograms in 2003/04. With this skyrocketing use of Roundup and Roundup Ready soy, it is perhaps not surprising that 11 glyphosate-tolerant weed species can be found in Argentina.[78]

The decreasing efficacy of Roundup is due in large part to the overuse of this single herbicide as the key method for managing weeds on millions of hectares.[79] This underscores the fallacy of the 'one size fits all' approach so prevalent in modern-day farming. As the New York Times stated: "Industrial agriculture is always searching for a silver bullet, forgetting that eventually a silver bullet misfires".[80]

69 Oplinger, E.S. et al., 1999. *Performance of Transgenetic Soyabeans, Northern US.* http://www.biotech-info.net/soybean_performance.pdf
70 Gianessi, L.P., April 2000. *Agriculture Biotechnology: Benefits of Transgenic Soybeans.* National Center for Food and Agricultural Policy, p. 63. http://www.ncfap.org/reports/biotech/rrsoybeanbenefits.pdf
71 Qaim, M. and Zilberman, D., 7 February 2003. *"Yield Effects of Genetically Modified Crops in Developing Countries"* in Science, vol. 299, p. 900.
72 FAO, 2004. *Agriculture Biotechnology: Meeting the Needs of the Poor?* The State of Food and Agriculture 2003, p. 50.
73 European Commission, 2000. *Economic Impacts of Genetically Modified Crops on the Agri-food Sector.* http://europa.eu.int/comm/agriculture/publi/gmo/cover.htm
74 Monsanto, 2005. *World at a Glance, Conversations about Plant Biotechnology.* http://www.monsanto.com/biotech-gmo/biotech-gmo_world.pdf
75 Benbrook, C., October 2004. *Genetically Engineered Crops and Pesticide Use in the United States: The First Nine Years.* BioTech Infonet Technical Paper No. 7, p. 2. http://www.biotech-info.net/Full_version_first_nine.pdf
76 Ibid, p. 2.
77 Ibid, p. 7.
78 Benbrook, C,. January 2005. *Rust, Resistance, Run Down Soils, and Rising Costs - Problems Facing Soybean Producers in Argentina,* Ag Biotech Infonet Technical Paper No. 8, p. 33.
79 Delta Farm Press, 2005. *No Quick Cures for Glyphosate-Resistant Weeds.* http://deltafarmpress.com/news/050927-glyphosate-resistant/; Business Journal, 24 September 2005. *Major Yield Losses and Harvest Headaches.* http://bjournal.com/2005/content/article_views.php?ID=756&Author=56 Professor Tom Mueller, University of Tennessee weed scientist, said that *"Palmer pigweed that is not killed by glyphosate will cause major yield losses and harvest headaches for soybean, cotton and other row crop producers. [...] It is essential to use more than one herbicidal mode of action on your fields."*
80 New York Times, 19 February 2003. *Roundup Unready.* Open Editorial.

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2.8 good or bad for farmers?

Whether GM crops benefit farmers is a complex issue that is influenced by many factors, including the crop, the size of the farm, the severity of insect infestation, and the weather. Non-economic factors must also be considered. Several reports conclude that net returns for GM farmers are equivalent to, or even less than, those for conventional farmers. For example, the US Department of Agriculture found either no economic gain or an economic loss with some GM crops: "The adoption of herbicide-tolerant soybeans did not have a significant impact on net farm returns in either 1997 or 1998. [...] (A)doption of Bt corn had a negative impact on net returns among specialized corn farms."[81]

However, more consensus exists around the 'convenience effect' of some GM crops. In the case of Roundup Ready crops, for example, most reports agree that this system leads to reductions in farm labor and increased flexibility in the timing of herbicide applications. These two benefits facilitate the ongoing consolidation of farmland in the hands of fewer and fewer corporate farmers, who are always seeking technological means of reducing their labor requirements. This may help explain why a University of Wisconsin study found that a higher proportion of larger growers versus small farmers were adopting GM crops in the state.[82] The high (99%) adoption rate of Roundup Ready soy in Argentina, which is home to some of the world's largest soybean plantations and where only a small percentage of the population is engaged in agriculture, provides additional support for this thesis.[83]

Flexibility and reduced labor expenditures for larger growers, however, do not always translate into higher economic returns. For instance, Mike Duffy, an Iowa State University economist, affirms that farmers' benefits from GM crops "appear to be more related to greater ease of production and the ability to cover more acres as opposed to an increase in the profits per acre".[84]

In addition, with the growing problem of Roundup-resistant weeds, the 'convenience' effect of the Roundup Ready system is beginning to disappear, and as more pesticide applications are necessitated the costs may increase.

2.9 benefits for whom?

As we have seen, the adoption of four GM crops has advanced at a very rapid pace in the United States, chiefly due to the 'convenience' of operations with herbicide-tolerant varieties. While biotech industry supporters claim increased profits from growing GM crops, non-industry sources like the US Department of Agriculture have concluded that conventional farming is as profitable as, or even more profitable than, the cultivation of GM crops. Independent studies have also demonstrated that GM crops are associated with greater pesticide use and equivalent or lower yields vis-à-vis their conventional counterparts, contrary to the claims of the biotech industry. As for consumers, there is no benefit from the increased use of pesticides or the equivalent/lower yields associated with GM crops.

On the other hand, GM contamination is creating huge headaches for American growers, in some cases costing them lucrative export markets. Herbicide-resistant weeds are quickly becoming a serious agronomic problem, driving the use of more toxic weedkillers. Finally, a patent regime which makes farmers liable for the accidental contamination of their fields with patented GM plants, represents an ominous shift in power within the American food supply from farmers and consumers to unaccountable, controlling agribusinesses.

It is clear that the main beneficiaries of the GM crops planted in the past decade have been the corporations that market them, and in particular the Monsanto Corporation. Monsanto's growing control over the seed supply, its aggressive investigation and prosecution of farmers for alleged patent infringement, and its astonishing policy and regulatory influence have been the context for the GM revolution in US agriculture. This revolution is characterized not by an improvement in the quality of food, nor by an increase in the sustainability of farming, but by the transformation of agriculture into a concentrated industry in which ever fewer corporations are gaining overwhelming control over US farms and their farmers.

81 Fernandez-Cornejo, J. and McBride, W., May 2002. *Adoption of Bioengineered Crops*. ERS USDA Agricultural Economic Report, p. 24. http://www.ers.usda.gov/publications/aer810/
82 *Profitability Plays a Major Role in Wisconsin Farmers' Decisions to Plant or Quit Planting Genetically Modified Crops,* University of Wisconsin at Madison, Press Release,27 December 2000. http://www.seedquest.com/News/releases/usa/Universities/n3220.htm.
83 Benbrook, C,. January 2005. *Rust, Resistance, Run Down Soils, and Rising Costs - Problems Facing Soybean Producers in Argentina,* Ag Biotech Infonet Technical Paper No. 8, p. 33. ISAAA 2004 report (where it cites Argentina having only 1% of population as farmers).
84 Duffy, M., 2001. Op. cit.

who benefits from biotechnology?

"Use of herbicide-tolerant varieties results in lower herbicide and weed management costs. However, they also have higher seed costs and slightly lower yields.

If the returns to the herbicide-tolerant and non-tolerant varieties are similar, why have the tolerant crops been adopted so readily? The acreage planted of herbicide-tolerant varieties has gone from nothing a few years ago to more than half of the total acres planted, or higher depending on the estimate. There are several reasons for this phenomenon. First, the ease of harvest is an overriding consideration for many producers. An easy and fast harvest makes farmers more willing to adopt a new technology even if it does not produce clearly superior returns.

Farmers also may be using the herbicide-tolerant varieties on fields with particularly heavy weed problems. If the average returns are comparable, it is simpler to use the same varieties so that commingled soybeans are not an issue.

Advertising and landlord pressure could also be part of the explanation for the phenomenal rise in the use of herbicide-tolerant soybeans. Some landlords insist on clean fields, and the herbicide-tolerant varieties offer that option. But, given analyses in 1998 and again in 2000, there does not appear to be any difference in the per acre profitability between the two varieties. [...]

The preceding analysis shows that the primary beneficiaries of the first generation biotechnology products are most likely the seed companies that created the products. Additionally, in the case of herbicide tolerance, the companies that supply the tolerant herbicides also benefit from the development of the biotech crops.

It also appears that some farmers have benefited from biotechnology. Their gains, however, appear to be more related to greater ease of production and the ability to cover more acres as opposed to an increase in the profits per acre. Farmers' benefits are evidenced by the rapid adoption of this new technology. As noted, in Iowa, soybean acres planted with herbicide-tolerant varieties went from zero to more than half the total acreage in just a few years. Farmers definitely perceive a benefit even if their profits are not increasing.

It has been argued that consumers are also the beneficiaries of the first generation biotech products because the increased production leads to lower prices. Whether or not production increases depends upon the crop under consideration. For soybeans, the yields actually are slightly less, while for corn they are slightly higher.

Regardless of the crop under consideration, it is hard to determine whether consumers actually benefit from the first generation biotech products. The prices for the basic commodities covered are already low due to abundant supplies. In addition, government programs that support prices will cost the taxpayers more if the prices continue to drop.

Consumers actually spend only a fraction of their food dollar on these basic commodities. Changes in the price of the basic commodities will have little impact on the prices charged to the consumers. Additionally, a consumer backlash against biotech indicates that, for at least some consumers, the addition of biotech crops is not seen as a benefit but an added risk.

Today's biotech crops and applications are merely the first generation of products. It appears from these examples that the primary beneficiaries are the seed and chemical companies and, to a lesser extent, the farmers. What will happen with the proposed second-generation products remains to be seen. [...]

Biotechnology is an extremely powerful tool. It has the potential to create many useful products as well as many unforeseen problems. As with any new technology, it must be evaluated carefully. It is not prudent to expect private companies to develop products for the public good. Companies are in the business of making money and the products they pursue are designed for that end. To expect any other result from private research is not appropriate or realistic."

Source: *Duffy, M., 2001. Who Benefits from Biotechnology?*

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2.10 signs of weakness

Despite the power of the biotech industry, there are clear and growing signs of weakness. First, biotech companies have completely failed to introduce the long-promised consumer 'output' traits, such as enhanced nutrition. A look at table 2 shows that none of the approved GM crops involves a trait that benefits consumers. For instance, 'delayed ripening' tomatoes were engineered for longer shelf life (a benefit to industry), and flopped in the marketplace because they were tasteless. GM soybeans with altered oil content are grown on a very small scale (several thousand acres) for industrial use.[85] The only possible exception is a dubious one - 'low-nicotine' tobacco, a non-food crop. One reason for this failure is the technical difficulties involved in developing traits such as enhanced nutrition without unwanted side effects.

Another reason is that the world's consumers and food companies have opposed the introduction of any new varieties of GM crops since 1996. Europeans have taken the lead, and some European/UK supermarkets sell only meat from animals fed on non-GM grain. Even American food companies have proven more averse to GM foods than had been anticipated. To give just a few examples, fast-food giants McDonald's and Burger King refused to buy Bt potatoes for their French fries, effectively killing this GM crop, which is no longer grown.[86] Del Monte and other food processors refuse to buy GM sweet corn for their canned or frozen corn products.[87] Heinz (condiments) and Gerber's (baby foods) are just two of the food companies that have non-GM policies.[88] Massive opposition to GM wheat from farmers and grain traders in the US and overseas forced Monsanto to drop this controversial project in 2003.

Another weakness is that the biotech industry appears to be running out of new ideas. Firstly, the number of permits granted for field trials of GM crops in the US climbed steadily from 1987 to peak in 2002, with a modest drop since then. Secondly, the biotech industry continues to focus its development efforts on the same traits, crops and applications that it did in the 1990s. Herbicide tolerance is still the most frequent trait being field tested; corn, soybeans and cotton are still the most prevalent GM crops in field trials; and animal feed is the exclusive or primary intended use of most next-generation GM crops as well as for those that have already been commercialized.[89]

Finally, it is becoming increasingly evident that conventional breeding is better suited to deliver many of the new traits that we have been told are only possible through genetic modification. Even industry leader Monsanto has turned to conventional breeding for several of its new products: the company's VISTIVE soybeans are conventionally bred to have lower levels of linolenic acid, which means lower levels of trans-fats in products containing processed soybean oil.[90] In 2007, Monsanto and Solae intend to introduce a new line of soy proteins derived from soybeans conventionally bred to contain higher levels of beta-conglycinin, a naturally occurring protein said to improve the texture and flavor of soy protein products.[91]

Interestingly, Monsanto and other companies have tried - but failed - to develop and introduce crops with just these sorts of nutritional characteristics through the use of genetic modification. The failure of the GM approach is underscored by David Lawrence, research director of Syngenta, a leading Swiss-based biotechnology company: "We have conducted many genetic engineering experiments for seed materials and plant protection and they have often failed.' On the other hand, excellent results have frequently been achieved with the traditional approach to plant growing."[92]

85 See http://web.aces.uiuc.edu/value/factsheets/soy/fact-oleic-soy.htm.
86 *"McDonald's, Other Fast-Food Chains Pull Monsanto's Bio-Engineered Potato"* in the Wall Street Journal, 28 April 2000.
87 *Public Research and the Regulatory Review of Small-Market (Specialty) Biotechnology-Derived Crops,* proceedings of a workshop held 8-9 November 2004 at the US Department of Agriculture, draft 14 July 2005, p. 55.
88 Innovest Strategic Value Advisers 2005, op. cit., pp. 43-48.
89 Friends of the Earth's analysis of US Department of Agriculture data on GM crop field trials (unpublished).
90 Thatcher, Anastasia L., November 2004. *Continued Losses Put Pressure on Monsanto Product Launch,* ISB News Report. http://www.isb.vt.edu/news/2004/news04.nov.html#nov0405. http://www.mindfully.org/GE/GE3/Who-Benefits-From-Biotech.htm
91 *"Monsanto, Solae to Create New Soy Protein Line"* in Food Navigator, 28 October 2005. www.foodnavigator-usa.com/news/ng.asp?n=63552&m=1FNUO28&c=qzwvsgxijawydej
92 As quoted in *"Syngenta Halts Genetic Engineering Projects in Europe"* by Hannelore Crolly, Die Welt, 29 November 2004.

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monsanto's dream of a 'gm soy republic' in south america

carmen améndola and marcelo pereira,
redes/friends of the earth uruguay

"The hope of the industry is that over time, the market is so flooded that there's nothing you can do about it. You just sort of surrender."[93]

Argentina was the first South American country to cultivate GM crops in 1996, and today is the second-ranked GM crop producer after the United States. Soy is the country's main GM crop. Uruguay went GM in 1997, but the other two key soy countries in the Southern Cone, Brazil and Paraguay, did not allow GM crops to be planted or imported until more than seven years later. Despite these prohibitions, GM crops were smuggled in and planted over large areas long before these dates.

In South America, Monsanto has implemented an aggressive plan for introducing GM crops. Furthermore, the company is pushing an intellectual property rights system that will constitute one of the most serious changes in agriculture practices globally if implemented and exported around the world. This chapter will explain how Monsanto has promoted its model for GM crops in South America.

TABLE 5 PRODUCTION OF NON GM AND GM SOY, MAIZE, COTTON AND CANOLA IN THE WORLD AND SOUTH AMERICA, 2004.

COUNTRY	MILLIONS OF HA			% OF GLOBAL GM IN SOUTH AMERICA
	TOTAL	GM	% GM	
TOTAL	284	81.0	28.5	100.0
South America subtotal	54.3	22.7	41.8	28.0
Argentina	16.6	16.2	97.6	20.0
Brazil	35.0	5.0	14.3	6.2
Paraguay	2.4	1.2	50.0	1.4
Uruguay	0.3	0.3	100.0	0.4

Source: *REDES based on ISAAA n. 32, Palau (2005) and USDA Foreign Agriculture Service.*

93 Stuart Laidlaw, *"StarLink Fallout Could Cost Bilions"* in The Toronto Star, 9 January 2001. Cited in Smith, J., *Seeds of Deception,* Fairfield, Iowa, 2003.
94 USDA, 21 October 2005. *Argentina Biotechnology Annual.* GAIN Report AR5033. http://www.fas.usda.gov/gainfiles/200510/146131302.doc
95 Fundación para el Cambio, November 2003. *El Peso de la Soja en la Economia Argentina.* Documento de trabajo n. 15. http://www.paraelcambio.org.ar/documentos/15-soja.pdf

3.1 argentina as launching point

3.1.1 exporting soybeans globally

Soybeans are the most important crop for Argentina today, and the country is the world's third largest soybean producer and exporter. The Argentine agronomic model is geared almost entirely towards exports. Only 2% of harvested soybeans, for example, are destined for the national market, whereas 30% are exported as grain and 68% are processed by the national oilseed industry.[94] Argentina sells 40% of the world's soy oil and 34% of total global soy by-products.[95] China and the European Union buy 54% of the world's commercialized soy.[96]

3.1.2 speedy adoption of gm soy

Argentina has been a pioneer in the introduction of GM crops, both in Latin America and in the rest of the world. In 1996, Argentina approved GM soy for the first time.[97] Monsanto introduced the technology into the country's market through licensing and technology transfer agreements with local seed companies.[98] These seed companies were immediately granted the title to plant varieties incorporating the Roundup Ready gene.[99] The introduction of GM soy in the country was accomplished very quickly, from less than 10% of total acreage in 1996 to over 90% in 2001.[100]

In 2004, some 16 million hectares of GM crops, 90% of them Monsanto's Roundup Ready soybeans, were planted in Argentina. This was the most comprehensive adoption of GM soy in the world, with 98% of national soy production based on a genetically modified variety.[101] That same year, more than 1.5 million hectares of GM corn were also cultivated, representing more than 50% of the country's total area planted with corn. The economic and agronomic factors for GM corn were not as favorable as they were for soy, and adoption was thus less widespread. As was reported in the Argentinean newspaper La Nación, "to sow and protect a hectare of soy needs at least three times as much investment as does the equivalent of maize".[102]

96 Ibid.
97 Argenbio, 2005. *Aprobación de Cultivos Genéticamente Modificados en Argentina.* http://www.argenbio.org/h/biotecnologia/19_a.php
98 Monsanto, 2005. *Cronología de los Hechos desde 1995 hasta la Fecha.* http://www.monsanto.com.ar
99 Argentinean government, October 2005. T*rade Disrupted Measures taken by Monsanto on Soybean Meal coming from Argentina.* Non Paper. usa.com/news/ng.asp?n=63552&m=1FNUO28&c=qzwvsgxijawydej
100 ASA, 2005. *Evolución de la Superficie de Siembra con OGM (Argentina)*
101 James, C., 2004. Op. cit.; ISAAA No. 32 (2004); ISAAA 2003; www.fas.usda.gov/psd, site of the USDA Foreign Agricultural Service; Morales, C., 2001. *Las Nuevas Fronteras Tecnológicas: Promesas, Desafíos y Amenazas de los Transgénicos. Santiago de Chile,* CEPAL. Serie desarrollo productivo No. 101.
102 La Nación, 18 October 2003. *Sed de Nutrientes.*

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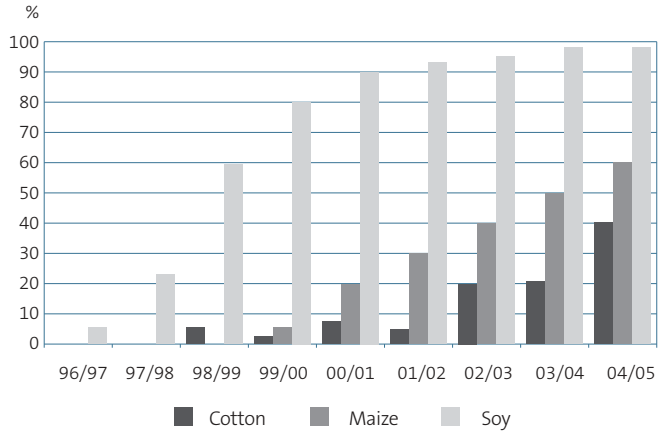
In 2005, ten GM crop varieties were authorized for production and commercialization in Argentina: one soybean (Monsanto 40-3-2); two cotton (Monsanto 531 and 1445); and seven corn (Ciba-Geigy 176, AgrEvo T 25, Monsanto 810 and NK 603, Novartis Bt 11, Syngenta GA 21 and Dow/Pioneer TC 1507). Other crop species have thus far not been authorized, and a GM canola event application for field trial was rejected because of potential genetic introgression with wild relatives, among other reasons.[103]

TABLE 6

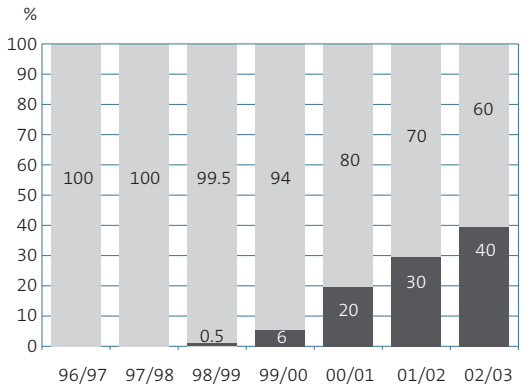
EVOLUTION OF THE PLANTING OF GM COTTON, MAIZE AND SOY IN ARGENTINA



Source: *ASA, 2005.*

TABLE 7

AREA PLANTED WITH CONVENTIONAL MAIZE AND GM MAIZE IN ARGENTINA (PERCENTAGE OF TOTAL).



Source: *DNMA/SAGPyA.*

3.1.3 environmental and socio-economic impacts

Argentina was once a granary for the world and an exporter of wheat, maize and meat for human consumption. Today, with the coming of the GM soy revolution, the country has primarily become a producer and exporter of oil and feed for cattle in Europe and Asia. Neoliberal agricultural policies, adopted in the late 1970s and intensified during the 1990s, have made Argentina a huge grower of GM soy monocultures. With around 11 million hectares under cultivation and 35 million metric tonnes (MT) of production, soybean is currently the most important crop for Argentina.[104]

Roundup Ready soy facilitates weed control, one of the main problems for farmers.[105] While effective non-chemical options exist, applying herbicides is simpler for most farmers, particularly when associated with a no-till planting system.[106] The technological package offered with GM seeds, accompanied by reduced prices for herbicides, is thus very attractive for Argentinean farmers.[107]

However, the move from 6 million hectares in 1997 to 14.2 million hectares in 2004 has been accompanied by significant negative environmental and social impacts. The intensification of soy production has been associated with a decline in soil fertility and soil erosion,[108] and it is predicted that Argentinean soils will be totally depleted in 50 years at current rates of nutrient depletion and soy cultivation.[109]

As the area covered with Roundup Ready soybeans has grown, the use of glyphosate has increased dramatically, to 160 million litres in 2004.[110] This has accelerated the emergence of genetically resistant weeds that need increasing dosages of glyphosate;[111] some farmers are even combining glyphosate with other herbicides in order to deal with difficult-to-control weeds.[112]

103 CONABIO, August 1996. *Solicitud de Ensayo a Campo de Canola Tolerante al Herbicida Glifosato.* http://www.sagpya.mecon.gov.ar/new/00/programas/conabia/ensayo_no_autorizado.php.
104 Pengue, W., August 2005. *"Transgenic Crops in Argentina: The Ecological and Social Debt"* in the Bulletin of Science, Technology and Society, vol. 25 no. 4.
105 Ibid; Benbrook, January 2005. *Rust, Resistance, Run Down Soils and Rising Costs - Problems Facing Soybean Producers in Argentina.* Ag Biotech Infonet, Technical Paper Number 8.
106 Ibid.
107 Pengue, W., August 2005. Op. cit.
108 Ibid.
109 Ibid.
110 Ibid.
111 Benbrook, August 2005. Op. cit.
112 Pengue, W., August 2005. Op. cit.

The transformation of the rural sector and the landscape is notable. Soy has displaced other crops, such as legumes, fruits, and cattle, with significant consequences for the country's food sovereignty. In the Pampas region, for example, 4.6 million hectares of land previously dedicated to dairy, fruit trees, horticulture, cattle and grain has been displaced by soybean production since 2004.[113] Areas planted with sunflowers have been reduced by 9.6%, and areas cultivated with maize by 5.6%.[114] Argentina was formerly self sufficient in milk production, but GM soy has displaced the 'tambos' - small and medium-sized units of production - forcing the Argentinean milk industry to import milk from Uruguay in order to meet internal consumption needs.

The introduction of GM soy has also contributed to the acceleration of land concentration in Argentina. The intensification of agriculture since the 1990s has created many indebted farmers, who must repay bank loans at high interest rates. An estimated 14 million hectares are indebted with outstanding loans from banks and big companies. This has enabled the establishment of large holdings and the disappearance of smaller farms.[115] During the 1990s, the number of farms in the Pampas area declined from 170,000 to 116,000, while the average size of farms doubled.[116]

TABLE 8 **STATUS OF GM EVENTS APPROVED IN ARGENTINA**

CROP	TRAIT CATEGORY	EVENT/APPLICANT	TRAIT DESCRIPTION	STATUS
Soybean	Herbicide Tolerant	40-3-2 Monsanto	Glyphosate Herbicide Tolerant	Approved Feed Food Commercialization
Maize	Herbicide Tolerant	T 25 AgrEvo	Resistant to Glufosinate Ammonium	Approved Feed Food Commercialization
Maize	Insect Tolerant	176 Cyba-Geigy	Resistant to lepidoptera	Approved Feed and/ or Food Commercialization
Maize	Herbicide Tolerant	NK 603 Monsanto	Glyphosate Herbicide Tolerant	Approved Feed and/ or Food Commercialization
Maize	Insect Tolerant	MON 810	Resistant to lepidoptera	Approved Feed and/ or Food Commercialization
Maize	Insect Tolerant	Bt 11 Novartis Agrosem S.A.	Resistant to lepidoptera	Approved Feed and/ or Food Commercialization
Maize	Insect and Herbicide Tolerant	TC 1507 Herculex DowAgro Sciences	Resistant to European Corn Borer and to Glufosinate Ammonium	Approved Feed and/ or Food Commercialization
Maize	Herbicide Tolerant	GA 21 Syngenta	Glyphosate Herbicide Tolerant	Approved Feed and/ or Food Commercialization
Cotton	Insect Tolerant	Mon 531 Monsanto	Resistant to lepidoptera	Approved Feed and/ or Food Commercialization
Cotton	Herbicide Tolerant	MON 1445 Monsanto	Glyphosate Herbicide Tolerant	Approved Feed and/ or Food Commercialization

Source: *CONABIA. http://www.sagpya.mecon.gov.ar/new/0-0/programas/conabia/bioseguridad_agropecuaria2.php#eventos*

113 Ibid.
114 Ibid.
115 Desafíos Urbanos, 2005. *La Nueva Protesta Social Campesina en el Norte y el Oeste de Córdoba ante los Desalojos Generados por la Ofensiva de los Sojeros.* Año 10, n° 50. CECOPAL, Argentina.
116 Pengue, W., August 2005. Op. cit.

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The expansion of soy in Argentina is a clear example of the conflict between environmental and socio-economic priorities and economic ones. The export of products made from soybean accounted for one-fourth of Argentina's export earnings in 2003, and soybean exports have increased by 125% since 1997.[117] Soybean exports are also an important source of government tax receipts. However, it is clear that short-term economic objectives are taking precedence over medium and long-term environmental and socio-economic concerns.

Despite these negative impacts, the government plans to expand soybean plantations to 16 million hectares in order to produce 44 million tonnes of soy. This will mean further deforestation and loss of biodiversity.[118]

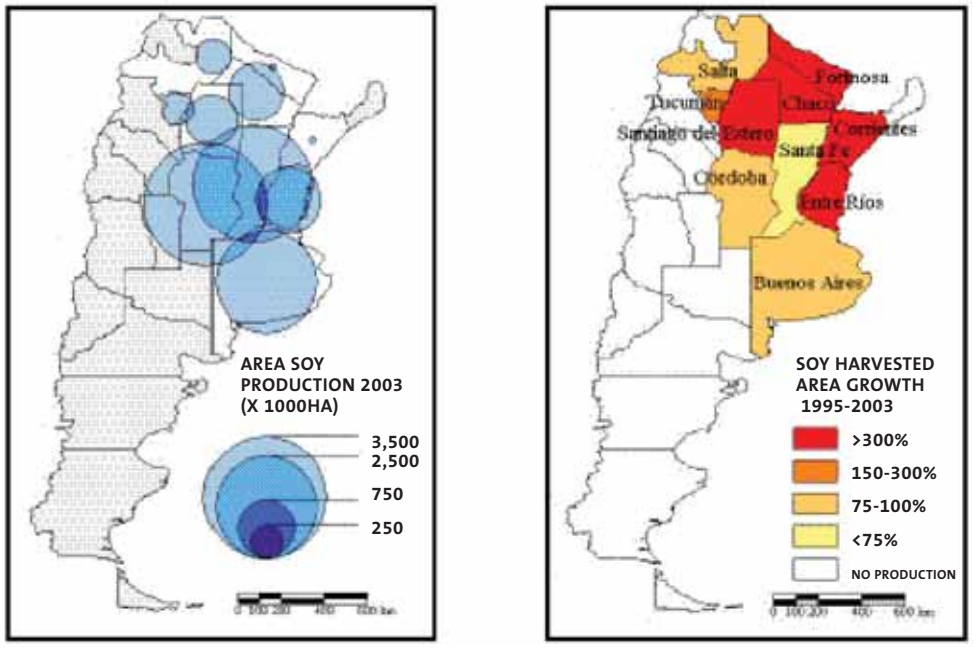
The question remains: Will a larger share of global soybean exports improve the quality of life of Argentinean people? Benbrook, in his evaluation of Argentina's GM soy revolution, concludes that "the economic gains stemming from a somewhat larger share of world soybean exports will do relatively little to improve the quality of life for most people in the country".[119]

3.1.4 monsanto's aggressive collection of gm soy royalties

Argentinean farmers, unlike their North American counterparts, were able to use GM soy with no intellectual property rights restrictions or royalties attached. Although Monsanto applied for patent protection of Roundup Ready soy in Argentina in 1995, it was never granted. In 1996, the company brought GM technology onto the market through licensing and technology transfer agreements with local seed companies.[120] In 1999, the company started to commercialize its own varieties of Roundup Ready soy.[121] In 2001, the company's request for a patent on Roundup Ready soy was officially denied in a Supreme Court decision.[122] At that time, Monsanto and other seed companies, eager to gain access to the Argentinean market, chose not to pressure the government to change seed patent laws so that they could collect royalties.[123]

In the meantime, with the expiration of Roundup patent protection in the US in late 2000, prices for the chemical plummeted by more than 50%, and Monsanto lost over one-third of its market share due to competition from Europe and China.[124]

FIGURE 2 GEOGRAPHICAL DISTRIBUTION OF SOY IN ARGENTINA



Source: *Maarten Dros, J. 2004. Manejo del Boom de la Soja: Dos Escenarios sobre la Expansión de la Producción de Soja en América del Sur. Amsterdam, AIDEnvironment.*

In response, the company started to advocate for a new royalty collection system for Roundup Ready soy. As Frank Mitsch, an analyst at Fulcrum Global Partners in New York, said: "they're going after [royalties] a bit more aggressively now than perhaps they had in the past because they realize they may be losing some business on their chemical side".[125]

Argentinean farmers can store GM soy seeds from one season to the next without paying Monsanto anything.[126] US farm organizations such as the American Soybean Association complained that this gave Argentinean farmers an unfair competitive advantage over their North American counterparts.[127] In 2003, due to meagre profits from its soy seed business in Argentina, Monsanto decided to discontinue its soy improvement program there.[128] The company also complained that as GM soybean seeds were widely traded on the black market, the mechanism of building royalty fees into seed prices was not working.

In 2003, Monsanto began to consider a new licensing scheme, based on its intellectual property rights systems in countries importing soy containing Roundup Ready technology.[129] By this time, Monsanto was clearly pressing for the introduction of a new 'technology fee' for GM crops, something alien to South American legal systems up to that time.[130] The company took out huge advertisements in Argentinean newspapers, calling for the creation of a new royalties payment system.[131] In 2004, Monsanto openly communicated its intention to implement royalty collection systems in importing countries.[132]

Monsanto worked with the Seed Association in Argentina (ASA) and the national Plant Protection Association to this end, presenting several proposals including a compensation of 1% of the value of a tonne of soy for the next two years, and an increase of up to 4% with the 2006/2007 harvest.[133]

The Argentinean government opposed Monsanto's proposals, accusing the company of abuse.[134] Miguel Campos, Secretary of Agriculture in Argentina and a strong supporter of GM crops, said that Monsanto made a good deal of money in the country and should not impose itself unfairly on Argentine farmers: "The great beneficiary of this has been Monsanto. Argentina has been the launching point for the use of this technology in the continent. This has allowed Monsanto to make advances in other countries".[135]

The conflict heated up in June 2005, when Monsanto filed lawsuits regarding the shipment of Argentinean soybean products to the Netherlands and Denmark, arguing a possible infringement of its patent rights on the Roundup Ready gene in Europe.[136] Monsanto took samples of Argentinean soy meal as transport ships arrived at customs points in Denmark and Holland, implying that they were claiming property rights not just for the seeds themselves but for the products obtained from the seeds.[137]

Argentina's economic stakes in this issue are huge, as EU member states import around 50 million tons of feed each year, 10 million tons of which are from Argentina.[138] In this context, the Argentinean Agriculture Secretary toured Europe in October 2005, seeking support for the country's case. The European feed industry stated its neutrality in the dispute, but firmly communicated that it would not pay royalties related to GM soy as no advantage is derived from the presence of the Roundup Ready gene: "The European feed industry, using up to 10 million tons of soybean meal from Argentina annually, has no direct advantage from the presence of residues of herbicide-resistant genes in the products they buy. The industry is therefore not prepared to pay for the use of this technology."[139]

117 Benbrook, 2005. Op. cit.
118 Ibid.
119 Benbrook, January 2005. Op. cit.
120 Monsanto, 2005. *Cronología de los Hechos desde 1995 hasta la Fecha.* http://www.monsanto.com.ar
121 Ibid.
122 Monsanto, 2005. *Información sobre los Sistemas de Protección: Ley de Semillas y Ley de Patentes.* El Caso de la Patente RR en Soja en Argentina.
123 Benbrook, January 2005. Op. cit.
124 UBS, 22 November 2004. *Monsanto. UBS Investment Research.*
125 Reuters, 28 September 2004. *Monsanto Prods South American Nations on Soy Royalties.*
126 Dow Jones Newswires, 21 September 2004. *Argentina Rejects Monsanto Plan to Collect GMO Royalties.*
127 Reuters, 28 September 2004. Op. cit.
128 Monsanto, 2005. Op. cit.
129 Ibid.
130 Bravo, E., November 2005. "El Control de la Producción Agrícola en América Latina, a través de los Sistemas de Propiedad Intelectual" *in Hoja Informativa del Observatorio de los Agronegocios, por una Agricultura Humana,* Año 1, Edición 1.
131 Dow Jones Newswires, 21 September 2004. *Argentina Rejects Monsanto Plan to Collect GMO Royalties.*
132 Monsanto, 2005. Op. cit.
133 Ibid.
134 La Nacion, 15 November 2005. *Preocupación Europea por las Regalías de la Soja.* http://www.lanacion.com.ar/Archivo/nota.asp?nota_id=756445.
135 Dow Jones Newswires, 21 September 2004. Op. cit.
136 Argentinean government, 3 October 2005. *Miguel Campos en Visite en Europe dans le Cadre de l'Affaire Monsanto. Information de presse.* Buenos Aires; The Business Online, 12 October 2005. *Argentina's Ag Sec to Discuss Monsanto with US Ag Sec.*
137 Argentinean government, October 2005. *Trade Disrupted Measures taken by Monsanto on Soybean Meal coming form Argentina.* Non Paper.
138 FEFAC (Fédération Européenne des Fabricants d'Aliments Composés), 23 April 2004. *The Facts about Use and Labelling of GM Feed Ingredients in Animal Feed.*
139 FEFAC, 14 November 2005. *FEFAC calls on Argentinean Government and Monsanto to Cut a Deal Now on Farmer's Fee for Soybean Seed.* Brussels.

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In May 2004, Argentina's National Seed Institute implemented a resolution requiring that each sack of seed be labelled with quantity, unit price, total sales price, and seed species, type or variety. However, Monsanto was not satisfied, claiming that seeds continued to be sold illegally.[140] In an October 2005 report, the US Department of Agriculture praised Argentina's support for GM crops, but also voiced strong criticism of the Argentinean intellectual property system: "Argentina is a major producer and exporter of agricultural biotechnology products, yet it does not have an adequate and effective system in place to protect the intellectual property rights of new plant varieties or plant-related technology. Penalties for unauthorized use of protected seed varieties are negligible. Judicial enforcement procedures in Argentina likewise are ineffective as a mechanism to prevent the unauthorized, commercial use of protected varieties."[141]

In order to resolve the controversy, proposals to limit Argentinean farmers' rights to save seeds for their own use were put forth.[142] The Secretary of Agriculture, Miguel Campos, was a proponent of this approach. Farmers' organizations, however, were opposed: the Argentinean Agricultural Federation stated that this would constitute the "unacceptable elimination of an inherent right of our farmers".[143] As of December 2005, no agreement had been publicly announced on the matter.

Soy in South America.

3.2 brazil's gm soy struggle

3.2.1 ban, smuggling, and legalization

Brazil is the second largest soy producer in the world after the United States. Soybean production for the period 2004/05 was forecast at 61.8 million tons, covering an area of 23 million hectares,[144] and a total of 19.2 tons of soybeans were exported in 2004.[145] More than 80% of the total production is still non-GMO.[146]

In 1998, Monsanto's Roundup Ready soy was approved by the Brazilian authority in charge of dealing with GMO applications, the National Technical Commission on Biosafety (CTNBio) for commercial purposes in Brazil.[147] Planting could not proceed, however, as Greenpeace and the Institute for the Defense of Consumers (IDEC) won a lawsuit in September 1998 prohibiting the commercial use of GM soybeans until a full environmental impact study had been carried out.[148] In 1999, this preliminary decision was confirmed when a federal judge suspended the cultivation of GM soy until an environmental study had been conducted, foiling Monsanto's plans to legally market Roundup Ready soybean seeds in Brazil in time for the 2000 harvest.

Although planting was illegal during this period, there was a growing awareness that GM seeds had been planted in the South of Brazil. In Rio Grande do Sul, for example, it was estimated that up to 60 percent of the total crop was genetically modified.[149] Despite the ban, seeds were being smuggled in from Argentina, and quickly entering Brazilian fields.

During the 2002 elections, candidate Lula da Silva vowed to maintain the ban on GMOs and to support GMO-free production in Brazil. Lula's agricultural policy advisor stated: "We want to establish a reputation as GM-free. We get premium prices on specialty markets that our competitors - the US and Argentina - don't because they plant GM."[150] However, immediately after Lula came to power, his government cleared the path towards

140 USDA, 21 October 2005. *Argentina Biotechnology Annual.* GAIN Report AR5033. http://www.fas.usda.gov/gainfiles/200510/146131302.doc
141 Ibid.
142 El Tribuno de Salta, 17 October 2005. *Aceptan Limitar el Uso Propio de la Semilla.*
143 Ibid.
144 USDA, 2005. Brazil. *Oilseeds and Products.* Soybean Update. GAIN Report. BR5604. http://www.fas.usda.gov/gainfiles/200502/146118775.doc
145 Ibid.
146 Batista Rodríguez, J.G. and Oliveira, M.A., February 2004. *O Complexo Soja e a Conjuntura Internacional.* Boletim do Deser No. 135. http://www.fas.usda.gov/psd, site of the USDA Foreign Agricultural Service.
147 Cardoso, F., April 2003. *Genetically Altered Quagmire: Brazil's Involuntary Moratorium.*
148 Ibid.
149 Reuters, 14 May 2003. *Brazil Lower House Clears Genetically Modified Soy Decree.*
150 Swing, R., 7 October 2002. *Lula Government would Favor GM-free Brazil.*

TABLE 9 STATUS OF PRODUCT APPROVAL IN BRAZIL, 2005

CROP	TRAIT CATEGORY	APPLICANT	EVENT	TRAIT DESCRIPTION	STATUS
Cotton (Gossypium hirsutum)	Insect Resistant	Monsanto	BCE 531	Lepidoptora Order	Textile fibers Food and Feed
Soybeans (Glycine max (L.) Merrill)	Herbicide Tolerant	Monsanto (Monsoy)	TTS-40-3-2	Glyphosate Herbicide Tolerant	Food and Feed
Corn (Zea Mays)	Insect Resistant Herbicide Resistant	AVIPE (Poultry Producers from Pernambuco	Cry 1a (c) Cry 1a (b) PAT/bar MEPSPS	Lepidopteran resistant Gluphosinate tolerant	Import/Processing/Feed

Source: *CTNBio.*

legalization of GM crops in the country. At the end of 2002, the Secretary of Agriculture, Roberto Rodrigues, said: "We need to give Brazilian farmers the chance to use GM crops," and stated that such crops could help combat famine by reducing food prices.[151]

Some accused Monsanto of supporting the smuggling of GM soy from Argentina in order to contaminate crops so that the way would be smoothed for eventual legalization. In any case, it is not clear how GM soy penetrated into Rio Grande do Sul, but that the contamination was widespread is undisputed.

In this context, the Lula government temporarily authorized GM soybeans through a provisional decree in March 2003.[152] The decree did not allow seed to be planted that year, but aimed to legalize GM soybean cultivation by the 2003 harvest. At this stage, Monsanto stepped up its lobbying and pressure activities. In June 2003, for example, the US government invited a group of 20 Brazilian politicians and scientists for a study visit on the use of GM crops in the US and South Africa, which included meetings with Monsanto executives.[153]

This illegal introduction and forced legalization of GM crops took place at a time when most of the Brazilian population was opposed to GM crops until they had been proven safe for human consumption and the environment. In a December 2003 survey by the Brazilian Institute of Public Opinion, 73% of respondents stated that they were against deregulating the cultivation of GM crops until it was known that they were safe for human health and the environment.

In March 2005, a law establishing the new national biosafety requirements was adopted.[154] The consumers' association, the environmental ministry and a wide range of stakeholders including the Episcopal Conference of the Catholic Church were all disappointed with the new legislation. The law, which they considered very weak, does not respect the precautionary principle and contains no liability rules. Civil servants from the Brazilian Ministry of Environment protested that the new biosafety law was not what they had hoped for, and that it was weakened by other forces influencing legislative process in the Brazilian Congress.[155] Indeed, in its press release welcoming the new law, Monsanto confirmed that it was "encouraged" by its enactment.[156]

In addition, Beto Ferreira Martins Vasconcelos, a lawyer who had worked from 1998 to 2002 for Monsanto, got involved in the working group in charge of establishing the decree to implement the Biosafety law.[157] Many in Brazil argued that there was a conflict of interests, but he was not removed from his regulatory position.

151 Reuters, 16 December 2002. *Brazil's Farms Chief Backs GM Crops.*
152 Reuters, 14 May 2003. *Brazil Lower House Clears Genetically Modified Soy Decree.*
153 The Financial Times, 19 June 2003. *Washington Takes the Battle over Future for Genetically Modified Crops to Brazil.*
154 Law no. 11.105 of 24 March 2005. http://www.ctnbio.gov.br/index.php?action=/content/view&cod_objeto=102
155 Canes, M., 13 December 2005. *Conference Coordinator says Congress was Responsible for Authorizing Transgenics.* Agencia Brasil.
156 Monsanto, 24 March 2005. *Monsanto Encouraged by Enactment of Brazilian Biosafety Law; AP,* 3 February 2005. *Brazil Oks Law to Legalize Biotech Seed;* Reuters, 2 March 2005. *Brazil Seen Opening Door to GM Crops in 2005.*
157 ASPTA, 25 November 2005. *Campanha por um Brasil Livre de Transgenicos.* Boletim 280. http://www.aspta.org.br/publique/cgi/cgilua.exe/sys/start.htm?infoid=180&sid=8

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3.2.2 gm crops authorized

To date, three GM varieties have been authorized in Brazil. In addition to soy, a Monsanto GM cotton was legalized in March 2005. The Ministry of Environment and environmental NGOs have opposed the release of GM cotton seed due to the possibility that it could cross with native cotton species.[158] The National Technical Commission on Biosafety has required Monsanto to prepare an impact study on the effects of planting the GM cotton seed, so it will likely not be sold before 2007.[159]

GM corn has been authorized for import, but only as animal feed and not for planting. The pork and poultry industry has already requested the segregation of imported GM corn in order to avoid problems with exports to the EU.[160] Once again, however, echoing the soy episode, it is suspected that corn was illegally introduced into Brazil; a company in Rio Grande do Sul has reportedly been selling GM corn smuggled from Argentina. In November 2005, Brazilian deputy Frei Sergio Antonio Gorjeen presented a complaint at the Federal Public Ministry about this contamination.[161] Fewer and fewer people believe that the contamination is just accidental, as both the soy and corn releases have coincided with Monsanto's push to legalize these crops.[162]

the things monsanto says...

Imagine a world that preserves nature, air and rivers. A world where we can produce more with fewer pesticides, without deforestation. Imagine a world with more nutritious and great quantities of food, and healthier people. Did you ever think about that? You never imagined GM crops could help with this? Did you ever think of a better world? You are thinking like us.

(Monsanto advertisement released in Brazil in 2004).

3.2.3 new corporate strategies

Since 2003, Monsanto's campaign has gathered steam both nationally and internationally. In 2005, a Brazilian government delegation played a pivotal role at the Second Meeting of the Parties to the UN Biosafety Protocol in undermining an international decision that would have put in place a mechanism for the identification and labelling of GMOs. Just what happened during the final days of this meeting has not yet been convincingly explained to Brazilian civil society organizations; many believe that biotech industry representatives strongly influenced the Brazilian delegation. Joaquim Machado, a Syngenta employee, was often seen talking to Hadil Fontes da Rocha Vianna, head of the Brazilian delegation, and was even seated beside him during the official sessions. Some Brazilian government representatives complained that Machado had better access than they did to Vianna. In general, members of the official delegation refused to talk to the independent Brazilian observers who were present.[163]

In April 2005, Monsanto launched a public relations campaign in public schools all over the country. With the support of the Ministry of Culture, the company developed a 'social responsibility' project that would have promoted GM crops in classroom material about agriculture and environment. The plan was to train 560 schoolteachers on how to use the material. Fortunately, after an intensive campaign was launched against the program, the Minister of Culture put an end to it.[164]

158 USDA, 12 July 2005. Brazil. *Annual Agricultural Biotechnology Report*. GAIN Report BR5618.
159 Ibid.
160 Ibid.
161 Massarini, L., 5 December 2005. *Illegal GM Corn Found in Brazil.* SciDev. Net.
162 Valor Economico, 6 December 2005. *US Monsanto to Reinforce Focus on Maite Seeds in Brazil.*
163 ASPTA, 9 December 2005. *Letter from Brazilian NGOs to European NGOs.* Rio de Janeiro, Brazil.
164 *GM-Free Brazil,* Bulletin #15, 20 April 2005.

3.2.4 the fight over royalties

Echoing the Argentinean experience, US farm groups and Monsanto started to agitate on the issue of Brazilian royalties in 2003. US farm organizations complained that Brazilian farmers, who did not have to pay for Roundup Ready technology, were receiving an unfair advantage. The American Soybean Association (ASA), for example, argued that Brazilian growers earned between US$9.30 and $15.5 more per acre than US growers.[165]

In March 2003, after the provisional measure authorizing the commercialization of GM soy was adopted, Monsanto launched an aggressive campaign to make farmers pay royalties for the use of Roundup Ready soybeans.[166] The company took out newspaper advertisements stating that: "Independent of the process of lifting the ban, producers that plant Roundup Ready soy ought to consider paying for the use of the technology at the time of sale of the production."[167] Pressure from US farm groups continued in the wake of the second decree in September of 2003, which authorized farmers holding illegal seed to plant GM soybeans in the 2003/04 season.[168] American Soybean Association President Ron Heck stated in tough terms: "I am very sceptical. Just because it's a law in Brazil doesn't mean that there will be any enforcement. Growers have been illegally planting pirated Roundup Ready soybean seed right under the government's nose for more than six years."[169]

Monsanto's campaign produced its first results in 2004, when the company started collecting royalty fees from growers in southern Brazil who used Roundup Ready soybeans. Monsanto devised a detection system in which more than 95% of the grain elevator companies in two southern Brazilian states (Rio Grande do Sul and Santa Catarina) test incoming soybeans for the presence of Monsanto's trait. If the trait is detected, the grain elevator company shares the technology fee with Monsanto.[170] According to Reuters, farmers in Rio Grande do Sul agreed to pay 10 real (US$3.50) per ton to Monsanto upon delivery of the 2003/04 harvest to grain elevators.[171]

According to the US Department of Agriculture, 98% of grain handlers (elevators, processors, crushers and grower co-ops) in the southern states of Brazil have signed contracts with Monsanto to collect royalties for GM technology in incoming crops. In 2004, royalties increased to 20 real per ton (US$7). If farmers do not declare their soybeans as genetically modified, their load is tested on site. If the Roundup Ready trait is detected, they are subject to the normal fee plus a penalty.[172]

For the 2005/6 season, according to the US Department of Agriculture, Monsanto has reached an agreement with farmers' organizations that a 1% post-harvest fee will be collected for declared soybeans, and 3% for non-declared soybeans. Based on soy prices at the end of 2005, the fee requested would be about $2.10 per ton in 2005/06 and $4.20 per ton in the next season for declared soybeans and $6.30 per ton of non-declared.[173]

In 2005, Monsanto and the Brazilian Association of Seeds (Abrasem) reached an additional agreement on royalties per bag of Roundup Ready soy. Monsanto announced in June that it will charge a royalty fee of $0.88 real (US$0.38) per kilo of certified seed.[174] Despite the agreement with Abrasem, the Seed Producers Association of Rio Grande do Sul State (Apassul) rejected this double royalty payment. "If Monsanto continues to permit producers to pay a 2% royalty at the point of sale, but at the same time tries to charge 0.88 real per kilo for legal seed royalties, it will encourage producers to buy GMO soy seed on the black market," said Narciso Barison Neto, president of Apassul.[175]

In this context, according to US Department of Agriculture reports, royalty fees were then lowered to $0.77 real per kilo at the request of the Brazilian Seed Producers Association.[176] In addition, producers in Rio Grande do Sul have argued that poor crops over the past two years have cut returns so that the fee for 2005/06 should be based on 2% of the value of production. Thus it remains to be seen whether Monsanto will succeed in implementing royalties upon seed bags.[177]

165 OsterDowJones, 1 October 2003. *Monsanto GMO Royalties Questioned;* Reuters, 16 September 2003. *Monsanto Urges Brazil Soy Growers to Pay Royalties;* Reuters, 20 May 2003. *Monsanto asks Brazil GM Soy Exporters to Pay Royalty.*
166 Reuters, 16 September 2003. Op. cit.
167 Ibid.
168 Medida Provisoria no. 131, 25 September 2003. *Establece Normas para o Plantio e Comercializacao de Producto de Soja da Safra de 2004, e da Outras Providencias.* http://www.abrasem.com.br/legislacao/organismo_modificados/medida_provisoria/medida_provisoria_131.asp
169 ASA,26September2003. *ASA Members view Brazilian Decree on Biotech Planning as Incomplete.*
170 UBS, 28 September 2004. Op. cit.; Reuters, 2004. *Monsanto Prods South American Nations on Soy Royalties.*
171 Reuters, 28 September 2004. Op. cit.
172 USDA, 2004. *Brazil Oilseeds and Products.* Brazil's 2004/05 Soybean Outlook. GAIN Report BR462; Bravo, E., 2005. Op. cit.
173 USDA, 12 July 2005. *Brazil Annual Agricultural Biotechnology Report.* GAIN Report BR5618.
174 Monsanto, 18 July 2005. *Monsanto e Sementeiras Chegam a Acordo sobre Cobranca de Royalties.* http://www.monsanto.com.br
175 Reuters, 29 July 2005. *Brazil Soy Seed Producers Reject Monsanto Royalty.*
176 USDA, 30 August 2005. *Brazil Soybean Update.* GAIN Report BR5623.
177 Ibid.

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3.2.5 environmental and socio-economic impacts

One of the most striking consequences of Brazilian soy expansion is deforestation. The area of land devoted to soy production in Brazil has grown at an average of 3.2%, or approximately 320,000 hectares, per year since 1995.[178] Soy covers the largest area of any crop in Brazil, occupying 21% of total cultivated land.[179] In Brazil, the cerrado (savanna) has been particularly affected by the soy advance.[180] Large-scale cultivation degrades soil, particularly in areas that are intensively farmed, and it has been verified that Amazonian soils are rendered unproductive by large-scale monocultures.[181]

The use of pesticides also increases with the advance of soy cultivation, as has been shown by studies from the US and Argentina.[182] In addition, it has been verified that under drought conditions, transgenic soybeans suffer higher losses than conventional soybeans. In 2005, Brazil's drought caused a 72% decrease in soybean yields in Rio Grande do Sul, where Roundup Ready had been widely adopted.[183] The president of the Rio Grande do Sul seed association explained that crop losses were 25% higher for GM soy than for conventional soy, and the governor of Matto Grosso, which is responsible for 25% of total national production, announced that the state would not plant GM crops the following year.[184]

"Yields of transgenic soybeans are especially low under drought conditions. Due to pleiotropic effects (stems splitting under high temperatures and water stress), transgenic soybean suffer 25% higher losses than conventional soybean. Seventy-two percent of the yields of transgenic soybeans were lost in the 2004/2005 drought that affected Rio Grande do Sul, and a 95% drop in exports is expected with dramatic economic consequences. Most farmers have already defaulted on 1/3 of government loans."

Altieri, M. and Pengue, W., 2005.

178 Altieri, M. and Pengue, W., 2005. *GM Soya Disaster in Latin America. Hunger, Deforestation and Socio-ecological Devastation.*
179 Ibid.
180 Ibid.
181 Ibid.
182 Ibid.
183 Polaris Institute, 29 June 2005. *Drought in Brazil could Dry Up Monsanto's Sales.*
184 Ibid.
185 USDA, 6 October 2005. *Paraguay Biotechnology Annual 2005.* GAIN Report PA5005.
186 CAPECO, 2001. *Paraguay Comercio Exterior.* http://www.capeco.org.py/index2.html
187 Monsanto, 21 October 2004. *Paraguayan Official Approves Commercial Soybean Varieties with Monsanto's Roundup Ready Technology: Framework Agreement also Signed in Support of Royalty Collection System.* Press release; Reuters, 20 October 2004. *Paraguay Gives Green Light for GMO Soy.*

3.3 penetrating paraguay

Paraguay is the fourth largest soybean exporter in the world, producing about 2% of total global soy.[185] In 2004, over one million hectares were cultivated with Roundup Ready soy, 90% using no-till systems. A similar technological package to the one promoted by the Argentinean Association of No-till Producers (AAPRESID) was introduced in Paraguay. In the 2003/04 season, soy production was calculated at 4.5 million tons, 3 million of which were exported. Brazil, which purchases around 47% of overall production, is the main destination for Paraguayan grains, followed by the EU with 23%, and the rest of the Andean Pact countries with 14%. The powerful Paraguayan Chamber of Exporters of Cereals and Oilseeds (CAPECO) is a focal point for the main Paraguayan companies involved in the production and export of agricultural products.[186]

3.3.1 authorization and royalties agreement

Four Roundup Ready soy varieties were approved in Paraguay in 2004,[187] and according to the US Department of Agriculture, about 70% of the 1.5 million hectares under cultivation in the country are genetically modified.[188] Monsanto welcomed the Paraguayan government's decision to use GM soy as a "milestone for agriculture in Paraguay". Until 2004, GM crops were not permitted in the country,[189] but according to Reuters around half of the soy cultivated in Paraguay had been genetically modified for years due to smuggling from Argentina. Paraguay imports around 80% of its seeds from Argentina, and the rest from Brazil.

A similar model to Monsanto's Brazilian system of double royalty payment appears to have been introduced in Paraguay as well. According to Dow Jones in October of 2004, soy farmers, seed producers, co-operatives and exporters agreed to pay a royalty of US$3 per metric ton to Monsanto for the 2004-2005 season, and this rate will be increased over a five-year period to eventually reach US$6 per metric ton.[190] In addition, according to a US Department of Agriculture report, an agreement was reached between Monsanto and farm lobby groups in March 2004 to pay $3.22 per bag of seed sowed in the 2004/05 crop year.[191] Monsanto has committed a portion of these fees to research and germ plasm improvement in Paraguay.

188 USDA, 6 October 2005. *Paraguay Biotechnology Annual 2005.* GAIN Report PA5005. www.rural.clarin.com/suplementos/rural/2004/06/; Palau Viladesau, T., 2005. "Soja Transgénica, Monsanto y Derechos Humanos en Paraguay" in Vernet, E. (ed.), *Observatorio de los Agronegocios, por una Agricultura Humana.* Hoja Informativa. Año 1, Edición 001; and James, C., 2004. Preview: *Global Status of Commercialized Biotech/GM Crops.* ISAAA briefs No. 32. ISAAA, Ithaca, NY (in Spanish).
189 USDA, 23 June 2000. *Paraguay Renews GMO Planning Restrictions.* GAIN Report PA0007.
190 Dow Jones, 14 October 2004. *Paraguay Soy Producers Close to Monsanto Royalties Deal.*
191 USDA. *Paraguay Biotechnology Annual 2005.* GAIN Report PA5005; USDA, 10 March 2005. *Paraguayan Framework in Support of Royalty Collection System.* GAIN Report PA5001.

3.3.2 environmental and socio-economic impacts

Half of the population of Paraguay lives in poverty; in rural areas, poverty levels reach 80%. The land is highly concentrated, with 1.5% of companies controlling 77% of the land. It has been estimated that soy cultivation is responsible for the annual expulsion of 90,000 small farmers from their land.[192] Conflict levels between local communities are high, and the resistance against soy growers, most of whom are Brazilian entrepreneurs, have been growing in recent years.

In June 2005, for example, press and civil society reports documented the eviction of a peasant community from their land in Tekojoja, in the department of Caaguazu. Brazilian soy growers, under protection by police and paramilitary forces, brutally harassed and beat local people despite the presence of attorneys. Meanwhile, paramilitary groups burned homes and levelled them with caterpillar tractors.

According to reports from farmers' organizations, 270 people were evicted, 130 were arrested, all 54 homes were bulldozed and the community's crops were burned. Two members of the community were killed by hired gunmen. Church committees and farmers' organizations strongly condemned the incident.[193] Dr. Idalina Gómez, coordinator of the church committees, strongly denounced the protection of plantations owned by foreign companies while local farmers are forced from their land.[194] A Paraguayan senator who toured the area, José Nicolás Morínigo, called on the government to take action to redress the situation.[195] The National Institute of Rural Development and Land proclaimed that the eviction in Tekojoja was executed in an irregular manner.[196]

The ecological impacts of Paraguay's soy revolution are extremely negative. The destruction of ecosystems has been very high due to pressures not only from soy production, but also from the coal and timber industries. The Paranense forest, which covered 8 million hectares in 1970, has today been reduced to 1.7 million hectares. Much of the Atlantic Forest has been cut down. In the 1990s alone, 2 million hectares of forest were destroyed, and the rate of deforestation has reached an estimated 13,866 hectares per month (around 462 hectares per day) over the past three years.

In Paraguay, soybeans occupy more than 25% of all agricultural land.[197] Countless biodiversity is lost every day in the country, and there is a climate of impunity towards these destructive environmental actions. In 2005, 4,000 hectares were reported deforestated and burned in the department of San Pedro, particularly on the properties of the Brazilian ranchers who have acquired extensive land for soy plantations.

3.4 the uruguayan context

Uruguay is a small country located between Brazil and Argentina. It is similar to Argentina in climate, culture, and infrastructure, and in fact many Argentines view Uruguayan agricultural regions as extensions of their own land. The area covered by soy increased from 77,000 hectares in 2002/03 to over 240,000 hectares in 2004/05.[198] The increase is largely due to the rental and purchase of land by Argentinean businesses for growing soybeans. Approximately 98 percent of the total area planted with soy is Roundup Ready.

In Uruguay, access to land and other means of production is highly concentrated. This has been aggravated by the neoliberal policies implemented over the past decades, which significantly worsened the situation for family farmers. More than 70% of the country's farms are held by 40,000 Uruguayan farming families. Between 1970 and 2000, more than 20,000 farms disappeared, 12,000 of which were smaller than 50 hectares.[199] This process of forcing farming families from the land has significant implications for the country's food sovereignty and biodiversity. The price of land in Uruguay is less than in Argentina or Brazil, so that businesses from these countries can afford to rent and buy land for forest and soy plantations.[200]

Three GM varieties have been authorized in Uruguay. Monsanto's Roundup Ready soybean followed a similar path as in Argentina: it was approved in 1997, and Roundup soy seeds smuggled from Argentina (where they had been approved the previous year) were detected as early as 1996.[201] Two maize varieties have been approved, one from Monsanto in 2003 and another from Syngenta in 2004.[202] The first variety of maize in particular faced a lot of opposition from Uruguayan civil society, but the court case brought against its authorization by organic farmers was thrown out of court.[203]

192 Palau Viladesau, T., 2005. Op. cit..
193 ABC, 26 June 2005. *Sectores Sociales Repudian Muerte de los Labriegos.* http://www.abc.com.py/articulos.php?fec=2005-06-26&pid=187690&sec=7&jer=1 ;)Ibid.;) Ultima Hora, 18 December 2005. *Vaquería: Colones Detenidos con Escopetas y Municiones.* http://www.ultimahora.com.py/template.asp?notic=200605
194 Ibid.
195 Ultima Hora, 18 December 2005. *Vaquería: Colones Detenidos con Escopetas y Municiones.* http://www.ultimahora.com.py/template.asp?notic=200605
196 ABC, 28 June 2005. *Indert Sostiene que Fiscalia Varela obró mal en Vaqueria.* http://www.abc.com.py/articulos.php?fec=2005-06-28&pid=188126&sec=7&jer=1
197 Altieri, M. and Pengue, W., 2005. Op. cit.
198 USDA, 12 September 2005. *Uruguay Biotechnology Annual.* GAIN Report UY5003.
199 *Censos Generales Agropecuarios de 1980, 1990 y 2000 del Ministerio de Ganadería, Agricultura y Pesca de Uruguay.*
200 Amendola, C., 2003. *Estrategias de las Corporaciones y Políticas Nacionales Asociadas en la Agricultura y Mercado Alimentario en América Latina.* Estudio Nacional, Uruguay. Convenio Depto. de Ciencias Sociales de la Fac. de Agronomía de Uruguay and Redes/Friends of the Earth Uruguay.
201 Ibid.
202 USDA, 12 September 2005. *Uruguay Biotechnology Annual.* GAIN Report UY5003.
203 Améndola, 2003. Op. cit.

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TABLE 10 STATUS OF PRODUCT APPROVAL IN URUGUAY

CROP	TRAIT CATEGORY	APPLICANT	TRAIT DESCRIPTION	STATUS
Soybean	Herbicide Tolerant	40-3-2 Monsanto	Glyphosate Herbicide Tolerant	Approved Feed and/or Food
Maize	Insect Resistant	MON 810 Monsanto	Resistant European Corn Borer	Approved Feed and/or Food
Maize	Insect and Herbicide Tolerant	Bt 11 Syngenta Seeds	Resistant European Corn Borer and Glufosinate Ammonium	Approved Feed and/or Food

Source: *USDA.*[204]

GM maize was approved in 2003, despite the publication of a technical report by the University of Agronomy which recommended waiting until adequate scientific studies had been carried out at the national level.[205] However, the Risk Assessment Commission based its favorable report on the information provided by Monsanto, and not on studies made within the country.[206]

Monsanto and the soy businesses have succeeded in implementing a system to secure royalties for Roundup Ready soy in Uruguay, so that extended royalties must be paid for all seed purchases in the country.[207] In addition, the Uruguayan government enacted a decree in December of 2004 that authorizes seed companies to sign contracts with farmers for the payment of royalties.[208] Farmers that sign these contracts are renouncing the right - enshrined in the national seeds legislation - to save seeds for their own use.

3.5 conclusions

Agribusinesses and local seed companies, in alliance with Monsanto, have been the main beneficiaries of the decade of GM soy planting in South America. Big landowners have adapted most easily to the GM soy model, and have managed to turn it into many countries' largest agriculture export product.

Monsanto chose Argentina as the focal point for the launch of its GMO campaign in the region, as the Argentinean Ministry of Agriculture has himself recognized. But the company's products were also smuggled into countries where planting was initially forbidden, including Brazil and Paraguay. The soy boom in Argentina, and the de facto contamination in neighboring countries, has given Monsanto a foothold in the region, allowing it to claim property rights not only on seeds but on processed products like soy cake as well.

Not satisfied with simply converting all soy areas in Argentina to GM crops, Monsanto is now pushing for the creation of new intellectual property rights systems to maximize the profits from its GM business in the region. While it has made preliminary agreements with national and regional authorities in Paraguay, Uruguay and Brazil, the company has still not reached an agreement with Argentina. Monsanto's attempt to export this intellectual property rights model of agriculture is a major threat to farmers all over Latin America.

Meanwhile, the negative impacts of the intensive model of soy cultivation are becoming more prominent. Increased weed resistance, greater pesticide use, further deforestation, and destruction of agriculture biodiversity are some of these effects. Family farmers are being replaced by large landowners. The consolidation of bigger farms, the destruction of the small and medium-sized farmer, and the promotion of an agricultural export model focused on feeding richer external markets is damaging the livelihoods of people in the region. Unless these countries stop embracing the neoliberal model of agricultural development, the rapid advance of soy will continue to wreak social and environmental havoc in South America.

204 USDA, 12 September 2005. Op. cit.
205 Report from the Commission of the University of Agronomy, September 2002; Gazzano, I. and Amendola, C., 2004. "El Maíz en Uruguay" *in Maíz. Sustento y Culturas en América Latina. Los Impactos Destructivos de la Globalización.* Published by REDES/Friends of the Earth Uruguay in Biodiversidad magazine.
206 In 2000, thanks to the decree 249/000, a Commission of Risk Assessment of Genetically Modified Vegetables (CERV) was created in Uruguay, with the representation of the Minister of Cattle, Agriculture and Fisheries, the Minister of Territorial Planning, the National Seed Institute, the National Institute of Public Health, and the National Institute of Research. The report is based on information given by Monsanto.
207 USDA, 12 September 2005. *Uruguay Biotechnology Annual.* GAIN Report UY5003.
208 INASE, 2005. *La Excepción del Agricultor en el Uso de Semillas de Cultivares Protegidos.* www.inase.org.uy.

four india's controversy over gm cotton

india's controversy over gm cotton

juan lópez, friends of the earth international

Cotton is an important commercial crop for India, with some 8.9 million hectares of land currently under cultivation. The country ranks as the third largest global cotton producer, growing around 2.86 million tons of cotton lint each year.[209] ISAAA considers India as one of the world's largest biotech countries, cultivating half a million hectares of GM cotton in 2004.[210] A UN Food and Agriculture Organization study from 2004 featured India as one of the developing country success stories for Bt cotton, as both higher yields and lower pesticide use were claimed.[211] However, one wonders whether the reality in the field corresponds to the claims of sources.

4.1 the pre-commercialization period

Monsanto catalyzed the first releases of GM seeds in India. Field trials with Bt cotton started when Mahyco, Monsanto's Indian subsidiary, imported 100 grams of Bt cotton seed in 1995. This was controversial, as permission had been obtained from the Department of Biotech under the Ministry of Science and Technology, but not from the Ministry of Environment as required.[212] Three years later, in 1998, Monsanto began open field trials on approximately 100 hectares nationwide. These trials were undertaken in great secrecy, and in some cases even the farmers on whose fields they were being carried out were not aware that the varieties grown were genetically modified. Adequate biosafety mechanisms were not in place,[213] and many irregularities were identified.[214]

In 2001, the Indian Genetic Engineering Approval Committee (GEAC) verified illegal contamination with Bt cotton in Gujarat, and ordered the uprooting and burning of the entire crop, including seed production plots and harvested seeds.[215] The company involved was called Navbharat Seeds, but the origin of the Bt in the Navbharat 151 cotton variety is to this day unknown.[216] Bt cotton was authorized a few months later, in March 2002, following the 'first contaminate, then legalize' pattern occurring in other countries. A common argument given for the approval was that there was no reason to deny permission to Monsanto-Mahyco GM varieties when there was so much illegal Bt cotton growing already.

4.2 the commercialization of bt cotton: corporate misinformation versus the facts

Mahyco was authorized to release genetically modified cotton over a three-year period between April 2002 and March 2005.[217] In March 2002, the GEAC allowed the planting of the first GM crop in India in six Indian states. This GM cotton was the product of a Mahyco-Monsanto venture for three hybrid varieties: Mech-12, Mech-162 and Mech-184.[218] The GEAC decision was driven by the promised economics of Bt cotton, that "the yield would be higher and would fetch 10,000 Rupees (US$207) more per hectare for the farmer than the traditional variety of cotton".[219]

TABLE 11 **COMMERCIAL CULTIVATION OF BT COTTON HYBRIDS IN INDIA, 2002 (IN HECTARES)**

STATE	MECH-12	MECH-162	MECH-184	TOTAL
Maharashtra	112	9,300	5,334	14,746
Madhya Pradesh	60	404	1,756	2,220
Karnataka	-	3,828	80	3,908
Andhra Pradesh	44	5,564	-	5,608
Gujarat	76	4,136	4,642	8,854
Tamil Nadu	-	2,042	660	2,702
TOTAL	292	25,274	12,472	38,038

Source: *Center for Sustainable Agriculture, 2005.*

209 Sharma, D., March 2001. "The Introduction of Transgenic Cotton in India" in *Biotechnology and Development Monitor*, no. 44/45. http://www.biotech-monitor.nl/4404.htm
210 James, C., 2004. *Preview: Global Status of Commercialized Biotech/GM Crops.* ISAAA.
211 FAO, 2004. *The State of Food and Agriculture 2003-04*, pp. 51-52.
212 Center for Sustainable Agriculture, February 2005. *The Story of Bt Cotton in Andhra Pradesh: Erratic Processes and Results.*
213 Navdanya. *Monsanto's Illegal Trials.* http://www.navdanya.org/articles/btcotton_trail.htm
214 Bharathan, G., 2000. "Bt Cotton in India: Anatomy of a Controversy" in *Current Science*, India, vol. 79, pp.1067-1075.
215 Parvathi Menon, 10 November 2001. "Waking up to GM Cotton" in *Frontline*, vol. 18, issue 23. http://www.frontlineonnet.com/fl1823/18230440.htm; The Hindu Business Line, 12 November 2001. *AP to Seize Bt Cotton.*
216 Center for Sustainable Agriculture, 2005. Op. cit.
217 Qayum, A. and Sakkhari, K., 2004. *Did Bt Cotton fail Andhra Pradesh again in 2003-2004? A Season Long Study (2003-2004) of the Performance of Bt cotton in Andhra Pradesh, India.* Deccan Development Society, AP Coalition in Defence of Diversity, Permaculture Association of India, p. 6.
218 The Hindu, 27 March 2002. *Commercial Release of Bt Cotton Approved.* http://www.hinduonnet.com/2002/03/27/stories/2002032703411100.htm
219 Ibid.

four india's controversy over gm cotton

FIGURE 3

MAP OF COTTON GROWING STATES IN INDIA

Source: *Kambhampati, U., Morse, S., Bennett, R., and Ismael, Y., 2005.*

The company defined Bt cotton as environmentally safe and economically beneficial, as it would reduce pesticide use and cultivation costs and result in increased yields.[220] These stated benefits encouraged many farmers to buy the seed, hoping to save money despite the fact that the Bt cotton seeds cost more than conventional ones.

Right after the first planting season, Mahyco-Monsanto claimed success regarding the use of its Bt cotton technology on the basis that it "reduced pesticide use by 65-70 percent and, consequently, led to yield gains of 30 percent and an extra income of 7,000 Rupees (US$145) per acre (17,500 Rupees or US$363 per hectare) in the southern states".[221] Mahyco's survey of Bt cotton's performance in the six states, described in table 12, showed a substantial increase in yield, a significant decrease in the number of insecticide sprays (the overall average indicated a yield increase of 8.1 quintals of cotton and a reduction of 1.93 sprays), and an average additional income of more than 18,000 Rupees (US$373) per hectare for Bt in comparison with non-Bt cotton.[222]

These conclusions and data, provided by Monsanto, were the basis for hyping the success of Bt cotton in an article in the reputed scientific journal Science, in which academics Qaim and Zilberman concluded that "the technology substantially reduces pest damage and increases yields".[223] This published paper is the basis for the conclusion of the 2004 UN Food and Agriculture Organization (FAO) study that Bt cotton in India is an example of the success of GM technology.[224] In short, the FAO came to these conclusions on the basis of the very limited analysis carried out in the Qaim and Zilberman article, which was based only on 2001 field trial data provided by Monsanto-Mahyco.

However, the claims of Monsanto-Mahyco, spun for the media and treated as official by organizations such as the UN Food and Agriculture Organization, ISAAA and others, contrasted heavily with other information coming from the field. The findings of state governments, farmers' organizations, non-governmental organizations and scientists revealed a different scenario.[225] Shortly after the planting season, negative reports and complaints from farmers started arriving, initially from Andhra Pradesh and Madhya Pradesh, but eventually from all states.[226] The conclusions were similar: resistance to the bollworm, the major cotton pest that the Bt was supposed to repel, was low; yields were poor; and Bt cotton was more susceptible to attacks by other pests such as aphids, jassids and white mosquitos than other popular varieties.[227]

220 Qayum, A. and Sakkhari, K., 2004. Op. cit.
221 Krishnaukumar, A., 24 May - 6 June 2003. *"A Lesson from the Field" in Frontline,* vol. 20, issue 11. http://flonnet.com/fl2011/stories/20030606005912300.htm
222 Barwale, R.B., Gadwal, V.R., Zehr, U. and Zehr, B., 2004. *"Prospects for Bt Cotton Technology in India" in AgBioForum,* 7(1&2), pp. 23-26. http://www.agbioforum.org/v7n12/v7n12a04-zehr.htm
223 Qaim, M. and Zilberman, D., February 2003. *"Yield Effects of Genetically Modified Crops in Developing Countries".* Science, vol. 299, p. 900.
224 FAO, 2004. *The State of Food and Agriculture 2003-04,* pp. 51-52.
225 Krishnaukumar, A., 24 May - 6 June 2003. Op. cit.; The Hindu, 7 December 2002. *Yield from Bt. Cotton Less: Study.* http://www.hinduonnet.com/thehindu/2002/12/08/stories/2002120802660600.htm; The Hindu Business Line, 8 June 2003. *No Gains from Bt Cotton, Say Farmers.* http://www.blonnet.com/2003/06/09/stories/2003060900180700.htm; The Hindu Business Line, 19 March 2003. *Farmers Likely to Shy Away from Bt Cotton - Unhappy over Low Bollworm Resistance.* http://www.blonnet.com/bline/2003/03/20/stories/2003032000871100.htm.
226 Center for Sustainable Agriculture, February 2005. *The Story of Bt Cotton in Andhra Pradesh: Erratic Processes and Results,* p. 7; Maharashtra State Department of Agriculture, 2003. *Performance of Bt Cotton Cultivation in Maharashtra.* Report of State Department of Agriculture. http://envfor.nic.in/divisions/csurv/btcotton/srmh.pdf; Sahai, S. and Rahman, S., 2003. *Performance of Bt Cotton in India: Data from the First Commercial Crop.* The Gene Campaign. http://www.genecampaign.org/archive12.html; Qayum, A. and Sakkhari K., 2003. *Did Bt Cotton Save Farmers in Warangal? A Season Long Impact Study of Bt Cotton.*
227 Krishnaukumar, A., 24 May - 6 June 2003. Op. cit.

TABLE 12 BT COTTON RESULTS FROM KHARIF[a] 2002 SEASON, JUNE-DECEMBER (YIELD IN QUINTALS[b]).

STATE	NON-BT YIELD	BT YIELD	YIELD INCREASES WITH BT	NON-BT SPRAYS	BT SPRAYS	SPRAY REDUCTION WITH BT	ECONOMIC BENEFIT PER HECTARE[c]
Andhra Pradesh	14.42 (5-25)	20.52 (12.5-32.5)	6.10	4.81 (1-8)	2.08 (0-4)	2.73	Rs.16,747
Gujarat	19.80 (3.7-37.5)	28.35 (10-44)	8.55	3.42 (1-7)	2.09 (0-5)	1.33	Rs.18,430
Karnataka	10.50 (1.3-30)	17.82 (7.5-40)	7.32	2.53 (0-6)	1.00 (0-3)	1.53	Rs.16,170
Madhya Pradesh	15.00 (10-50)	25.82 (35-62.5)	10.82	3.29 (1-9)	0.93 (0-3)	2.36	Rs.24,000
Maharashtra	14.47 (2.5-45)	20.82 (2.5-62.5)	6.35	2.78 (0-7)	0.99 (0-4)	1.79	Rs.14,490
Tamil Nadu[d]	-	-	-	-	-	-	-
TOTAL	13.25	21.35	8.10	3.10	1.17	1.93	Rs.18,130

Note: *All figures given in the table are based on a survey conducted by Mahyco in the six states where Bt cotton seed cotton was sold in the 2002 kharif season.[a] The total sample size was 1,069 farmers. Averages are on weighted average basis. Figures in parentheses represent the range for yield (quintals per hectare) and number of sprays.*

a Kharif refers to a crop that is harvested at the beginning of winter.
b 1 quintal = 100 kg.
c Economic benefit per hectare was calculated on the basis of an average cotton rate of Rs.2,000/q and an average cost of each bollworm complex spray of Rs.1,000/ha.
d Cotton picking still in progress in Tamil Nadu at date of writing.

Source*: Barwale, R.B., Gadwal, V.R., Zehr, U., and Zehr, B., 2004.*

"The average boll weight of Mahyco Bt cotton varieties [...] is very little in comparison with other non-Bt popular hybrids; the staple length of the Bt cotton varieties is also short, and hence it fetches lower prices in market compared with other popular hybrids; the Bt cotton varieties show more susceptibility to wilting under heavy rains compared to other popular varieties."

Maharashtra State Department of Agriculture, 2003. 'Performance of Bt Cotton Cultivation in Maharashtra', report of State Department of Agriculture.

A study from Andhra Pradesh concluded that the net profit for Bt cotton farmers was inferior to that of conventional farmers, and even the state's Minister of Agriculture said in March 2003 that the "overall information is that the farmers have not experienced very positive and encouraging results," and that they should be compensated.[228] The Department of Agriculture of the State of Maharashtra similarly reported that the performance of Bt cotton was no better than that of other popular non-Bt hybrids.[229]

Despite the results of this first season, Mahyco-Monsanto did not acknowledge the failure of the crops, nor did the company offer compensation to farmers. On the contrary, they stepped up propaganda and promotional activities for the use of Bt cotton in the coming season.[230] The director of Mahyco-Monsanto said that the "farmer's performance in six states has been good, prompting us to expand our sales this kharif season".[231] The company launched media campaigns in which GM seeds were portrayed as highly performing and endowed with magical qualities. It also spread propaganda about the excellent performance of Bt cotton in other parts of the world, including the United States and Australia. Free gifts, feasts and per diems were offered to farmers in Monsanto's Bt cotton

228 Center for Sustainable Agriculture, February 2005, Op. cit., pp.14-15; The Indian Express, 11 March 2003. *As Bt Cotton Fails, Andhra Promises Relief.* http://www.indianexpress.com/full_story.php?content_id=19973
229 Maharashtra State Department of Agriculture, 2003. *Performance of Bt Cotton Cultivation in Maharashtra.* Report of State Department of Agriculture.
230 Center for Sustainable Agriculture, February 2005. *The Story of Bt Cotton in Andhra Pradesh: Erratic Processes and Results,* p. 21
231 Krishnaukumar, A., 24 May - 6 June 2003. Op. cit.

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TABLE 13

ANNUAL PERFORMANCE OF MAHYCO-MONSANTO BT HYBRIDS [MECH BT] AND NON-BT HYBRIDS FROM 2002-03 AND 2004-05

	2002-03			2003-04			2004-05		
	ECONOMICS OF CULTIVATION OF BT AND NON BT CROPS AND THE % OF EXPENDITURE TO THE TOTAL COST OF CULTIVATION								
DESCRIPTION (COSTS/ACRE)	**MECH BT**	**NON BT**	**GAIN WITH BT**	**MECH BT**	**NON BT**	**GAIN WITH BT**	**MECH BT**	**NON BT**	**GAIN WITH BT**
Seed cost (Rs/acre)	1600 (15%)	450 (5%)	-1150	1469 (12%)	445 (4%)	-1024	1062 (13%)	505 (5%)	-1097
Pest management (Rs/acre)	2909 (27%)	2971 (31%)	62	2287 (19%)	2608 (23%)	321	2510 (21%)	2717 (26%)	207
Total costs of cultivation (Rs/acre)	10655	9653	-1002	12030	11127	-903	12081	10298	-1783
Net returns (Rs/acre)	-1295	5368	-6663	7650	8401	-751	-252	597	-849
Yield (kg/acre)	450	690	-240	827	800	27	669	635	34

Figures in parentheses denote percentage of the total cost of cultivation.

Source: *Quayum A. and Sakkhari, K. 2005. Bt cotton in Andhra Pradesh: a three year assessment.*

promotional drive.[232] Intensive marketing through local newspapers, local meetings and television advertisements - some featuring popular actors - appeared in several Indian states.[233] The National Commission on Farmers reprimanded the seed company for its "aggressive advertisement".[234]

The report by Quayum et al. on the second planting season in 2003/2004 also concluded that the performance of Bt cotton in Andhra Pradesh was a failure, with net profits 9% less than profits from non-Bt hybrids. Furthermore, the yield difference between Bt and non-Bt was negligible.[235] The conclusion of the Andhra Pradesh farmers' coalition was that "though Bt cotton was touted with the claim that it would reduce the total cost of cultivation by reducing the number of sprays and thereby the cost of pesticide consumption, it totally failed in fulfilling this promise. It in fact increased the cost of cultivation for all categories of farmers" (see table 13).[236]

Once again, the farmers' results strongly differed from the report commissioned by Mahyco-Monsanto on yields, pesticide use, and number of sprayings for Bollworm in the 2003-2004 season. In terms of profits, the Monsanto study claimed a net profit of 7276 Rupees (US$151) per acre for each Bt farmer, but interestingly, kept silent about the profits of non-Bt farmers.[237]

Nonetheless, Monsanto India's marketing manager described expectations for the future of Bt cotton as very high in 2004: "The commercialization of Bt cotton is benefiting cotton producers in India. They use less insecticide, have lower costs and have peace of mind. The mills have better quality and cleaner cotton. [...] At present, we saw an increase of 30% in yield, which is equivalent to £1 billion (US$1.4 billion) for India. [...] Our aim is to work with all the cotton seed companies in India and to introduce the Bt gene in most of the important cotton hybrid in India. We are currently working with Mahyco, Rasi, Ankur, and Nuzividu, and aim to release some 20 Bt hybrids."[238]

232 Greenpeace, 2005. *Marketing of Bt Cotton in India: Aggressive, Unscrupulous and False.*
233 Ibid.
234 The Financial Express, 18 November 2005. *Bt Firms Pulled Up for Unethical Sales.*
235 Qayum, A. and Sakkhari, K., 2004. Op. cit.
236 Qayum, A. and Sakkhari, K., 2005. *Bt Cotton in Andhra Pradesh: A Three-year Assessment,* p. 17.
237 Op. cit., p. 20.
238 Kambhampati, U., Morse, S., Bennett, R. and Ismael, Y., 2005. *'Perceptions of the Impacts of Genetically Modified Cotton Varieties: A Case Study of the Cotton Industry in Gujarat, India'* in AgBioForum, 8(2&3), pp. 161-171. http://www.agbioforum.missouri.edu/v8n23/v8n23a13-morse.htm#R10

That scenario was again challenged following the third year of planting, when similar negative reports were gathered in Andhra Pradesh.[239] The Bt cottonseed was over 300% more expensive than non-Bt hybrids, and the yield performance was again poor. The yield for small farmers growing Bt under rain-fed conditions was about 535 kilograms in 2005, while the same farmer cultivating non-Bt hybrids under the same conditions harvested 150 kilograms more.[240] Ultimately, the three-year evaluation of Bt cotton planting in Andhra Pradesh showed that non-Bt farmers earned 60% more than Bt farmers.

Protests by angry farmers were reported in early 2005. The farmers' coalition of Andhra Pradesh describes how "in actual fact, in place of profit, Bt cotton, especially the Mahyco Monsanto varieties, brought untold miseries to farmers culminating in violent street protests and the burning of seed outlets in the city of Warangal".[241] Hundreds of farmers demanded compensation for the losses they had incurred with the cultivation of Bollgard Bt cotton.[242] In this context, the government of Andhra Pradesh called for Monsanto to compensate the farmers who had incurred losses.[243] This was the origin of a landmark 2005 decision to ban the use of commercialized Bt cotton varieties in some Indian states.

"On at least 25,000 acres, farmers used Mahyco's Bollgard seeds. In many places crops were damaged, even at the flowering stage. Compared to other cotton varieties, Bt yields are hopeless. Realizing that they were cheated again by seed companies, farmers today destroyed seed shops in Warangal and burnt their hoardings. [...] In Warangal District, farmers have lost over ten million rupees. That Mahyco seeds have totally failed is completely true."

Maa TV News, 15 October 2004, quoted in Qayum, A. and Sakkhari, K., 2005.

4.3 first generation of bt cotton banned

In May 2005, the GEAC refused to renew the licenses for the sale in Andhra Pradesh of the three first-ever GM cottonseed varieties authorized for commercialization in India: Monsanto's Mech-12 Bt, Mech-162 Bt and Mech-184 Bt. These varieties had completed three years of commercial cultivation, and were awaiting renewal at the beginning of the 2005 season. The reason given was that the varieties had been found ineffective in controlling pests in Andhra Pradesh.[244] The decision was taken after adverse reports were received from about 20 farmers' organizations in the region.[245] Farmers' organizations demanded that the unauthorized Bt cotton be seized before the sowing season.[246]

The GEAC also disallowed the commercial cultivation of Mech-12 Bt in all of southern India after receiving adverse reports about its performance over the previous three years.[247] Mech-12 cultivation was limited to Maharashtra, Gujarat and Madhya Pradesh. Mech-162 Bt and Mech-184 Bt could still be cultivated in the other Indian states.

"This decision was taken on receiving adverse reports from about 20 farmers' organizations. The Andhra Pradesh government had given adverse reports on the performance of Bt cotton, while other states like Karnataka, Tamil Nadu, Maharashtra and Madhya Pradesh have sent mixed reports. The Gujarat government has not sent any reports so far."

Senior GEAC member in India's Finance Express, 2005.[248]

Nonetheless, the Indian government continued to allow the commercial cultivation of four new Bt cotton hybrids: MRC-6322 Bt and MRC-6918 Bt developed by Mahyco, and RCH-20 Bt and RCH-368 Bt developed by Rasi Seed.[249] In central India, the GEAC approved five new Bt cotton hybrids for commercial cultivation: RCH-144 Bt and RCH-118 Bt developed by Rasi Seed, MRC-6301 Bt developed by Mahyco, and Ankur-681 and Ankur-09 developed by

239 The Financial Express, 18 March 2005. *Study Rejects Bt Cotton.* http://www.financialexpress.com/fe_full_story.php?content_id=85499
240 Qayum, A., Sakkhari, K., 2005. Op. cit.
241 Ibid.
242 Financial Express (India). 18 April 2005. *Storm of Protest against Nod for More Bt Crops.* http://www.financialexpress.com/fe_full_story.php?content_id=88237
243 Center for Sustainable Agriculture, February 2005. Op. cit.

244 Associated Press, 3 May 2005. *India Bans 3 Monsanto Genetically Modified Cotton Types;* Financial Express (India), 4 May 2005. *GEAC Rejects 3 Varieties of Monsanto Bt Cotton in Andhra Pradesh;* The Hindu Business Line, 3 May 2005. Bt Cotton Allowed in Some States, not in AP. http://www.thehindubusinessline.com/2005/05/04/stories/2005050402380100.htm
245 Financial Express (India). 4 May 2005. Ibid.
246 Financial Express (India). 9 May 2005. *Seize Illegal Biotech Cotton Seeds.* http://www.financialexpress.com/fe_full_story.php?content_id=90370
247 Financial Express (India), 4 May 2005. Op. cit.
248 Ibid.
249 Ibid.

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Ankur Seeds.[250] The very same GEAC members who had banned the first varieties in Andhra Pradesh made these approvals, despite the fact that the reports sent by four governments were mixed and no report was sent by the fifth government.

Meanwhile, reports from the 2004-2005 kharif are showing similar problems.[251] The Maharashtra government observed that Bt cotton suffered more from sucking pests than non-Bt cotton, and organic cotton farmers had higher yields than Bt cotton farmers. Similar findings were also observed in some districts of Andhra Pradesh, while a significant percentage of Bt seeds failed to germinate in Tamil Nadu.

India.

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4.4 conclusions

Monsanto affirms on its website that "Indian farmers now represent the most rapid adopters of biotech crops in the world. In 2004, these farmers - with typical land holdings of 1-3 acres - increased the planted area of GM cotton by 400% over 2003 to 1.3 million acres. Net farm income from biotech cotton has already improved by US$124 million, while pesticide applications have been reduced by 3.6 million kilograms."[252] An ISAAA report from 2004 states that 500,000 hectares of Bt cotton were planted in 2004, benefiting approximately 300,000 small farmers.[253] No hint of any problems, difficulties or failures related to Bt cotton in India are to be found on the websites of either Monsanto or ISAAA. According to Monsanto and other institutions promoting GM crops, all Indian farmers have clearly benefited from the technology, and this explains the growth in Bt cotton cultivation over the last three years.

Monsanto and organizations like ISAAA whose goal is to facilitate biotech uptake in developing countries are responsible for the Bt cotton hype. Farmers in Andhra Pradesh and other Indian states obviously have alternative stories to tell. Bt cotton was introduced amidst controversy and a contamination episode at the end of 2001, catalyzing its approval a few months later in 2002. The progression of Bt cotton in India has been more the result of an aggressive lobby and media campaign offering false promises than of the genuinely adequate performance of a technology that benefits farmers. The ban of the first three varieties of Bt cotton tested in Andhra Pradesh shows that these varieties are not desired by farmers there.

Ultimately, the story of the introduction of Bt cotton in India shows that when a big corporation decides to push a product, it will take extraordinary measures to conquer markets. The marketing blitz of seed companies like Mahyco-Monsanto has succeeded in convincing many farmers to switch over to Bt cotton, and such false promises and aggressive claims continue to this day.

250 Ibid.
251 The Hindu, 10 November 2005. *Bt Cotton Seeds Fail to Germinate;* Monitoring and Evaluation Committee (MEC), 2005. Report of a Fact Finding Team's Visit to Nanden District, Maharashtra; MEC, 2005. Report of a Fact Finding Team's Visit to Warangal District; MEC, 2005. Report of a Fact Finding Team's Visit on Performance of Bt Cotton in Adilabad District, Andhra Pradesh; The Financial Express, 31 October 2005. *Bt Cotton Wilt Reduces Production:* Report.
252 Monsanto, 2005. *Conversations About Plant Biotechnology: India.* http://www.monsanto.com/biotech-gmo/india.htm
253 James, C., 2004. *Preview: Global Status of Commercialized Biotech/GM Crops: 2004.* ISAAA. See also Barwale, R.B., Gadwal, V.R., Zehr, U., and Zehr, B., 2004. *"Prospects for Bt Cotton Technology in India"* in AgBioForum, 7(1&2), pp. 23-26. http://www.agbioforum.org/v7n12/v7n12a04-zehr.htm

five monsanto pushes transgenic cotton in indonesia

monsanto pushes transgenic cotton in indonesia

farah sofa, walhi/friends of the earth indonesia
and juan lópez, friends of the earth international

Indonesia is a major importer of cotton, a raw material for its huge textile industry. In 2001, Monsanto Bt cotton was approved for commercial release by the Indonesian government and declared environmentally safe for planting in the country. The approval of Bt cotton in Indonesia was welcomed by Monsanto as another example of how this product improves farmers' livelihoods. Monsanto's Chief Technology Officer, Robert T. Fraley, said that Indonesia's approval was "good news for growers around the world who find the benefits of biotech products are well worth their investment in this technology".[254]

The three most populous Asian countries - Indonesia, China and India - have a combined population of 2.5 billion people,[255] and the introduction of GM cotton in Indonesia was a very important step in Monsanto's strategy for the continent. The story of the introduction of Bt cotton in Indonesia is, however, very different from what Monsanto had anticipated. After three years, not only had Bt cotton failed to perform adequately in the field and angered most farmers, but its introduction involved a very serious episode of bribery and corruption, and an attack on national environmental regulations.

5.1 the introduction of bt cotton in the fields

PT Monagro Kimia, a subsidiary of Monsanto US, started field trials of Bt cotton in Indonesia in 1996. Its main objective was to identify adequate varieties for cultivation in the country, specifically for South Sulawesi.

In February 2001, the Ministry of Agriculture issued a decree allowing the limited release of transgenic cotton Bt DP 5690B under the trade name NuCOTN 35B, or Bollgard, in seven districts of South Sulawesi. The next month, 40 tons of Bt cottonseed, imported by the Monsanto subsidiary, were flown in from South Africa.[256] The seeds were trucked away under armed guard, to be sold to farmers in South Sulawesi.

Opposition was strong from the very beginning.[257] Local NGO activists opposing the imports tried to block the trucks from leaving the airport, and protested against the use of the Indonesian military police to guard the vehicles. Activists said that the seed should be quarantined for detailed examination before distribution, and accused the company of attempting to disguise what it was doing by using trucks marked "rice delivery".[258] Protests continued in 2001, and hundreds of farmers and NGO activists joined a demonstration led by the Indonesian Federation of Peasants' Unions calling for a boycott of GM seeds and GM products. Farmers called for the destruction of the Bt cotton trials and other transgenic trials in the country, a halt to further releases of Bt cottonseed, and the eviction of Monsanto from the country.

In addition, a coalition of Indonesian groups took legal action against the February 2001 decree. They considered it as a violation of Indonesia's Environmental Law (23/1997), since no environmental impact assessment had been conducted and public participation was lacking. The decree had been issued on the quiet by the Agriculture Ministry, and not even the other ministries were informed. An editorial in the Jakarta Post characterized the decree as a sad case of when "business interests [...] prevail over environmental concerns".[259] The NGO coalition lost the case in court in September 2001,[260] but later that year the Environmental Ministry obliged Monsanto to undertake an environmental risk assessment.

5.2 the failure of bt cotton

Monsanto promoted Bt cotton among farmers by arguing that it was environmentally friendly, required fewer pesticides, had better yields and would bring in more income.[261] Branita Sandhini, a Monsanto subsidiary, provided the seeds and fertilizer through a credit scheme, and promised to buy the farmers' cotton at a good price.[262]

Pro-biotech sources were positive about the initial performance of Bt cotton in Indonesia. ISAAA's first conclusions in 2001 backed those of Monsanto, that "preliminary evaluations of Bt cotton indicate farmer income increases due to higher yields

254 Monsanto, 11 February 2002. *New Approvals and Increased Acreage of Monsanto Traits in 2001 Demonstrate Growing Acceptance of Biotech; Pre-Commercial Field Trials Taking Place in 25 Countries.* Press Release. http://www.monsanto.com/monsanto/layout/media/02/02-11-02.asp. *Fraley added that: "Where they're grown commercially, these products have repeatedly demonstrated their ability to increase growers' incomes."*

255 James, C., 2002. *Preview: Global Status of Commercialized Transgenic Crops.* ISAAA Brief no. 27, p. 23.

256 The Jakarta Post, 17 March 2001. *Genetically Modified Cotton Seed Arrives in Makassar from South Africa.*

257 Asia Times, 7 March 2001. *Indonesian Ministries at Odds over Transgenic Crops.* http://www.atimes.com/se-asia/CC07Ae04.html

258 The Jakarta Post, 17 March 2001. Op. cit.

259 Down to Earth, 2001. *GM Agriculture through the Back Door.* Down to Earth n. 49, May 2001. http://dte.gn.apc.org/49GM.htm; IPS, 6 March 2001. *Indonesia: Ministries Clash over Transgenic Cotton.*

260 PAN AP, October 2001. *PAN AP Summary of Bt Cotton Developments in Indonesia.* http://ngin.tripod.com/11101a.htm

261 The Jakarta Post, 1 June 2002. *GMO Brings Hardship to S. Sulawesi, Farmers Claim.* http://www.thejakartapost.com/yesterdaydetail.asp?fileid=20020601.L03

262 Ibid.

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(30% average), reduced pesticide usage and better productivity".[263] ISAAA also claimed that 2,700 farmers growing Bt cotton in the region of South Sulawesi were already benefiting from the new technology.[264]

Despite Monsanto's subsidiaries promises and propaganda, however, the Bt cotton was a failure, succumbing to drought and pest infestations. Many farmers complained about the claims of the superiority and performance of the genetically engineered cotton, and criticized Monsanto for its false promises (see testimony by Ibu Santi below). Monsanto spokespeople continued to dispute the results of the planting, denying the testimonies of farmers like Santi, and repeating that farmers' productivity had increased.[265]

"There are two possibilities for my cotton harvest: I will keep it until decayed or I will burn it, even though I might lose in production cost and effort, rather than sell it to Monsanto."

Baco, a farmer in Manyampa village, South Sulawesi.

But the facts proved the contrary, and the government ultimately revealed that more than 70 percent of Bt crop locations had not produced the expected yields. Many farmers were furious, in some cases even setting fire to the cotton. In September 2001, farmers in the village of Kajang, about 230 kilometres south of Sulawesi's capital, Makassar, torched their plantations in protest. At least three hectares were destroyed, and two tons of rough cotton were burned.


© harry surjadi/konphalindo

Ibu Santi Profile.

testimony by ibu santi, an indonesian farmer who burned her cotton fields

"My name is Santi. I am a farmer and the head of a group of women farmers in Bulukumba, South Sulawesi. One year ago, officers from the plantation office came to my door and persuaded me to plant Bt cottonseeds on our 25 hectares of farm land. They told me that it will yield a good harvest, a productivity of 4 to 7 tons per hectare. They said the company, Branita Sandhini [a subsidiary of Monsanto] that provides us with the seeds and fertilizers through credit schemes will buy our harvest at a good price, so we can pay our debt to the company and improve our welfare. So, despite my farmer group's doubt and our limited experience in cotton planting, I encouraged them to alter the cornfield into a Bt cotton field. For the sake of our welfare, to improve our future.

But that was a lie. Good harvest was nothing more than illusion. The harvest was very poor, just 2-3 rugs (around 70-120 kilograms) for each hectare. Far from helping, the company then raised the price of the seeds and fertilizer before the harvesting time and forced us to agree to that one-sided decision by signing the letter of agreement. If we didn't sign the letter, the company refused to measure or buy our harvest. The company didn't give the farmer any choice, they never intended to improve our well being, they just put us in a debt circle, took away our independence and made us their slave forever. They try to monopolize everything, the seeds, the fertilizer, the marketing channel and even our life.

I refused it. We, myself and my fellow group members, did not deserve this kind of fate. Many other farmers and their groups chose to surrender their independence but we didn't. Instead of signing the letter, we burned our cotton. We were angry about the company's dirty tricks, unfair treatment and empty promises. We demand justice so we burned our cotton to make the message clear. We are not bluffing. We know that we're risking our life by taking this position through the tide of intimidation and threat from local government and security officers, but we'd rather die protecting our right than surrender it to the hands of the company that has deceived us.

This is my testimony. A testimony that was based on my bitter experience, a traumatic one. The practice of Bt cotton planting has done more harm than good. Many of my fellow farmers have experienced the same things. Their voices were unheard, covered by the company's lies and our local government's repudiation that put the blame on our limited knowledge and experience. I speak for them, the unheard voices, for the injustice that they got, so that we can learn from the truth."

Source: *Konphalindo.*

263 James, C. 2001. *Global Review of Commercialized Transgenic Crops: 2001.* Feature Bt Cotton. ISAAA Briefs n. 26, page 155.
264 James, C, 2002. *Preview: Global Status of Commercialized Transgenic Crops: 2002.* ISAAA Briefs n. 27page 9.
265 The Jakarta Post, 1 June 2002. Op. cit.
266 The Jakarta Post, 15 September 2001. *Transgenic Cotton Irks Farmers.*
267 United States Securities and Exchange Commission Complaint, 2005. http://www.sec.gov/litigation/complaints/comp19023.pdf
268 Asia Times, 20 January 2005. *The Seeds of a Bribery Scandal in Indonesia.*
269 United States Securities and Exchange Commission Complaint. Op. cit., par. 10.

5.3 bribery and corruption: how monsanto tried to get rid of environmental regulations

In order to increase acceptance of GM crops in Indonesia, Monsanto needed a friendly regulatory framework for its GM products. Thus, since 1998, Monsanto has hired consultants in Indonesia to lobby for legislation and a ministerial decree favorable to GM crops.[267] It was thanks to these activities that Monsanto obtained limited approval from the Ministry of Agriculture to grow Bollgard cotton in February 2001, as described above. But later that year, following a change in government, the Minister of Environment issued a decree requiring an environmental impact assessment as a condition for approving certain products, including Monsanto's Bollgard cotton.[268]

When these new requirements were adopted, Monsanto consultants lobbied for their repeal.[269] These efforts however proved to be illegal. The former State Minister for Environment, Nabiel Makarim, admitted in 2005 that Monsanto had lobbied him to facilitate the company's business in Indonesia.[270] Nabiel also admitted that he had a close relationship with Harvey Goldstein, the Director of the Jakarta-based Harvest International Indonesia business consulting company. According to the Komisi Pemberantasan Korupsi (KPK), the Indonesian Corruption Eradication Commission, the consulting company had been hired by Monsanto to lobby the Indonesian government for legislation and ministerial decrees supporting the development of GM crops.[271]

Evidence of bribery and other corrupt practices was found, and Monsanto was charged for violating the US Foreign Corrupt Practices Act. According to a criminal complaint lodged by the Department of Justice and the US Securities and Exchange Commission (SEC), an employee of the consulting firm that represented Monsanto paid $50,000 to a senior Indonesian environmental official in 2002, in an unsuccessful bid to amend or repeal the requirement for an environmental impact statement for new crop varieties. The SEC reported that: "Near the end of 2001, when it became clear that the lobbying efforts were having no effect on the Senior Environment Official, the Senior Monsanto Manager told the Consulting Firm Employee to 'incentivize' the Senior Environment Official with a cash payment of $50,000".[272] As the SEC report shows, the cash payment was delivered by a consultant working for the company's Indonesian affiliate, but was approved by a senior Monsanto official based in the US and disguised as consultants' fees. Although the payment to the senior official was made, that official never repealed the environmental impact assessment requirement for Monsanto products.[273]

The complaint also stated that over US$700,000 in bribes were paid to at least 140 current and former Indonesian government officials and their family members between 1997 and 2002, financed through Monsanto's improper accounting of its pesticides sales in Indonesia.[274] The largest single set of payments, totalling $373,990 in 1998 and 1999, was made in the name of the wife of a senior Ministry of Agriculture official to pay for buying land and building a new house.[275]

Monsanto agreed to pay a US$1 million penalty to the US Department of Justice (DoJ), which charged the company with violating the US Foreign Corrupt Practices Act when it bribed certain government officials to allow it to develop GM crops in Indonesia.[276] The company also agreed to pay another $500,000 to the US Securities and Exchange Commission (SEC). Monsanto said that it had first become aware of financial irregularities connected with its Indonesian affiliates in 2001, and had begun an internal investigation. The company also said it had voluntarily notified US government officials of the results of this investigation, and had fully cooperated with the investigations by the DoJ and the SEC.

As part of the agreement with the DoJ and the Securities and Exchange Commission, Monsanto has pledged to appoint independent consultants to review its business practices over a three-year period, at which point the criminal charges against it could be permanently dropped.

Christopher Wray, assistant US attorney general, said in a statement that the agreement required Monsanto's full cooperation and acceptance of responsibility for the wrongdoing. "Companies cannot bribe their way into favorable treatment by foreign officials," he said.[278] Charles Burson, Monsanto's general counsel, said: "Monsanto accepts full responsibility for these improper activities, and we sincerely regret that people working on behalf of Monsanto engaged in such behavior".[279]

270 The Jakarta Post, 13 January 2005. *Monsanto Lobbied Me:* Nabiel.
271 Ibid.
272 United States Securities and Exchange Commission Complaint. Op. cit., par. 11.
273 Ibid. Par. 17.
274 Ibid. Par. 21.
275 Ibid. Par. 21.
276 The Jakarta Post, 10 January 2005. *KPK to Investigate Monsanto Bribery Case Munniggar Sri Saraswat;* Agence France Press, 7 January 2005. *Monsanto Pays $1.5 m. Bribe Penalty.*
277 SEC, 6 January 2005. *SEC Sues Monsanto Company for Paying a Bribe. Monsanto Settles Action and Agrees to Pay a $500,000 Penalty. Monsanto also Enters into Deferred Prosecution Agreement with Department of Justice.* Litigation Release No. 19023. http://www.sec.gov/litigation/litreleases/lr19023.htm
278 Agence France Press, 7 January 2005. *Monsanto Pays $1.5 m. Bribe Penalty.*
279 Monsanto, 6 January 2005. *Monsanto Announce Settlements with DOJ and SEC Related to Indonesia.*

five monsanto pushes transgenic cotton in indonesia

"In both its federal court complaint and its administrative order, the Commission charged that, in 2002, a senior Monsanto manager, based in the United States, authorized and directed an Indonesian consulting firm to make an illegal payment totaling $50,000 to a senior Indonesian Ministry of Environment official ('the senior Environment Official'). The bribe was made to influence the senior Environment Official to repeal an unfavorable decree that was likely to have an adverse effect on Monsanto's business. Although the payment was made, the unfavorable decree was not repealed. The Commission further charged that the senior Monsanto manager devised a scheme whereby false invoices were submitted to Monsanto and the senior Monsanto manager approved the invoices for payment.

In addition, the Commission charged that, from 1997 to 2002, Monsanto inaccurately recorded, or failed to record, in its books and records approximately $700,000 of illegal or questionable payments made to at least 140 current and former Indonesian government officials and their family members. The approximately $700,000 was derived from a bogus product registration scheme undertaken by two Indonesian entities owned or controlled by Monsanto. The largest single set of payments was for the purchase of land and the design and construction of a house in the name of the wife of a senior Ministry of Agriculture official. The Commission further charged that, in certain instances, entries were made in the books and records of the two Indonesian entities that concealed the source, use and true nature of these payments."

US Securities and Exchange Commission, 6 January 2005. *Securities and Exchange Commission v. Monsanto*. Litigation Release No. 19023.[277]

5.4 monsanto abandons commercialization of bt cotton in indonesia

Indonesia was ranked as a GM-producing country by ISAAA from 2001 until 2003. In 2004, Indonesia completely disappeared from ISAAA's widely publicized map.[280] In December of 2003, the Minister of Agriculture finally announced that Monsanto had pulled out of South Sulawesi after three years of carrying out field experiments there. The company had stopped supplying seeds to farmers in February 2003, and by the end of the year had closed down its biotech cotton sales operations, keeping its business in Indonesia to sales of Roundup Ready herbicide and conventional corn seeds.[281] Monsanto's justification for this retreat was that its cotton business in South Sulawesi was no longer economically viable.

Nonetheless, despite the fact that Monsanto has abandoned the commercialization of Bt cotton in Indonesia, the company continues to lobby for the introduction of other GM varieties, such as Roundup Ready corn, Bt Corn and Roundup Ready soy.

Farmers in South Sulawesi, Indonesia burning GM cotton in September 2001.

280 James, C., 2004. *Preview: Global Status of Commercialized Biotech/GM crops: 2004.* Executive Summary, ISAAA Briefs no. 32.
281 Asia Times, 20 January 2005. *The Seeds of a Bribery Scandal in Indonesia.*

six monsanto's biotech disaster in europe

monsanto's biotech disaster in europe

adrian bebb, friends of the earth europe

In November 2005, the people of Switzerland voted in a referendum to ban GM crops for the next five years. This protest was not an isolated incident, but followed eight years of objection and rejection across the European continent. Monsanto, the biggest GM player in Europe, has been at the forefront of the push for more GM foods and crops.

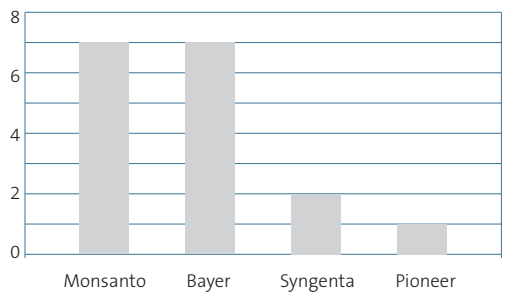
The European Union (EU) first licensed the import of Monsanto's Roundup Ready soybeans in 1996.[282] There was little public debate prior to this decision, but what followed was a public relations disaster for Monsanto and the loss of Europe as a key market for its new GM food.

6.1 europe's market leader

Despite its public image, Monsanto remains the leading applicant for GM foods and crops in Europe. The following tables shows how many products have been permitted to date, and how many applications are waiting in the pipeline.[283]

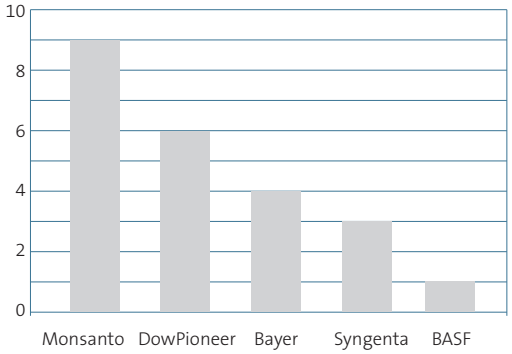
All of the food or feed crops thus far approved, or pending approval, are genetically engineered to tolerate either broad-spectrum herbicides or insect attacks. These products offer little, if any, benefit to either European farmers or the environment, and no consumer benefit whatsoever.

TABLE 14 NUMBER OF GMOS APPROVED FOR COMMERCIAL IMPORT OR CULTIVATION IN THE EU



Source: *European Commission*

TABLE 15 NUMBER OF GMOS PENDING APPROVAL IN THE EU



Source: *European Commission*

The GMO industry in Europe claims that genetic modification is "a tool for plant breeders developed over the past 30 years. [...] It enables new crop varieties to be produced with desirable traits not achievable using longer-established methods."[284] Given the hype from the industry about its potential, it is remarkable that it has only managed to bring two traits to the European market despite 30 years of research.

6.1.1 monsanto's influence

The impact of Monsanto's lobbying in Europe can be seen not from its public image but from its success in influencing decision-makers. Despite overwhelming public objection, some national governments and the European Commission continue to support and push for GM foods and crops. This is no coincidence, and shows the real impacts of industry lobbying.

282 http://europa.eu.int/comm/food/food/biotechnology/gmfood/qanda_en.htm
283 Ibid.
284 Europabio, 2005. *Ten Years of Biotech Crop Production.* http://www.europabio.org/green_biotech.htm

six monsanto's biotech disaster in europe

6.1.2 the lobby groups

On GMOs, Monsanto works mainly in two European lobby groups - the European Association for Bioindustries (Europabio) and the European Seeds Association (ESA).

Europabio is the main lobby group for the GMO industry in Europe. Besides Monsanto, its members include Bayer, Syngenta and Dow Chemical. Although Europe has some of the most comprehensive GMO legislation in the world, lobbying by Europabio and its members have resulted in weaker standards than those demanded by the public. For example, during the debate on GMO labeling legislation, Europabio lobbied against the labeling threshold of 0.5% that was proposed by the European Parliament's Environment Committee. It argued that: "Setting the labeling threshold at this level will prevent the use of innovative and beneficial biotechnology in food production in Europe."[285] The group's protests succeeded, and the labeling threshold was set at 0.9%, thereby allowing for a higher level of food contamination.

Another contentious issue is liability. Industry continues to fight against a strict liability regime in Europe for GMOs. This is a key issue, considering the lack of knowledge about the long-term effects of GMOs combined with the poor-quality research that has been submitted by industry. Europabio uses a wide range of arguments to attempt to avoid liability. During negotiations for EU-wide environmental liability legislation, the lobby group argued against strict GMO liability, stating that: "This would only result in more years of lost opportunity and outright disinvestment in European biotechnology. Protect the Environment - Don't Stigmatize GMOs!"[286]

Europabio is now pushing European institutions into supporting GMOs for the sake of "growth, competitiveness and jobs". The group even claims that GM crops will be good for the environment. One of its latest lobbying publications claims that: "Today, agriculture biotechnology can help European farmers to grow crops more efficiently while providing sustainable options that can improve farmland, wildlife and diversity. "[287]

The reality is vastly different. The most comprehensive environmental trials of GM crops ever done in the world were conducted in the UK over a four-year period between 1999 and 2003.[288] Farmers grew GM crops alongside conventional ones, and scientists examined the impacts on wildlife from both crops. The GM crops were grown following agronomic guidance from the GMO industry. Of the four different GM crops tested, three were shown to have damaging effects on wildlife, and follow-up research has suggested that these effects are likely to persist for many years. The GMO industry chooses to ignore inconvenient outcomes like these, despite the comprehensive research and clear results.

Monsanto's other vehicle is the European Seeds Association (ESA). One of the most contentious GMO issues in Europe is the contamination of conventional seeds by GMOs. The ESA had long lobbied for weak standards that would lead to widespread contamination of both agriculture and the environment. Within the current debate, the ESA reacted strongly to proposals from the EU Environment and Agriculture Commissions to put in place a 0.3% threshold for maize seed contamination. The ESA maintains that the threshold for maize should be 0.5%, arguing that 0.3% is "economically unsustainable and poses unnecessary additional costs on seed producers, farmers and consumers in the EU."[289] GM maize is the only crop grown commercially in Europe, and any measures to reduce contamination are likely to have a big impact on the GMO industry, and Monsanto in particular. The ESA also lobbied against a lower labeling threshold in food, and "deplored" proposals for EU-wide co-existence measures.[290] In order to protect consumer and farmer choice for GMO-free food and farming, no GMO contamination should be allowed in seeds.

6.2 monsanto's plans for europe

Despite the clear opposition to GM foods and crops in Europe, Monsanto still attempts to persuade its investors that it will succeed on that continent. At its recent Investor Day in November 2005, one of Monsanto's vice presidents made an extraordinary presentation, outlining ambitious plans for expanding Monsanto's global 'genetic footprint' in Europe over the next five years (see tables 16 and 17).[291]

285 Europabio, June 2003. *Food Feed & Traceability Labeling*, position paper on GMOs labeling threshold.
286 Europabio, June 2003. *Environmental Liability*, position paper following 1st Reading.
287 Europabio, 2005. *Plant Biotech for a Competitive Europe*. http://www.europabio.org
288 http://www.defra.gov.uk/environment/gm/fse/index.htm
289 ESA position paper, April 2004. ESA_04.0099.
290 ESA position paper, May 2003. ESA_03.0170.2.
291 Brett Begemann, Executive Vice President, Monsanto Bienniel US Investor Day, 10 November 2005. http://www.monsanto.com/monsanto/content/investor/financial/presentations/2005/11-10-05e.pdf

TABLE 16 MARKET POTENTIAL FOR BIOTECH TRAITS HIGHLIGHTS CONTINUED GROWTH OPPORTUNITY

	SOYBEAN ROUNDUP READY	CORN ROUNDUP READY	CORN YIELDGUARD BORER	CORN YIELDGUARD ROOTWORM
Europe	1 million acres (400,000 Ha)	24 million acres (9.7m Ha)	8 million acres (3.2m Ha)	5 million acres (2 m Ha)

Sources: *Monsanto Bienniel US Investor Day, 10 November 2005.*

In other words, Monsanto sees itself targeting the maize production of the entire European continent over the next five years. The company also predicts an annual increase in seed ownership in Europe and Africa over a similar period, pointing out that it has increased seed ownership on the two continents by 4% over the past two years alone.

TABLE 17 GLOBAL BREEDING PROGRAMS SHOULD FUEL FUTURE MARKET SHARE GROWTH IN SEED IN EUROPE-AFRICA

2003	2004	2005
10%	12%	14%

Sources: *Monsanto Bienniel US Investor Day, 10 November 2005.*

6.3 the growing of gm crops in europe

The biotechnology industry has permission to grow only three GM crops commercially in Europe. These include Syngenta's insect resistant Bt176 maize (approved in 1997) and Monsanto's MON810 maize (approved in 1998). The German-based Bayer also has permission to grow its T25 liberty-tolerant maize (approved in 1998), but attempts to market it in the Netherlands and the UK failed due to safety concerns and a lack of market, and Bayer has not attempted to push it any further. There has not been a new approval to grow GM crops in Europe since 1998.

In the eight years of commercialization, the industry has managed to persuade only Spain to grow GM maize on any scale. Both Bt176 and MON810 were grown on approximately 50,000 hectares in 2005 there.[292]

In 2004, the European Food Safety Authority declared that the antibiotic resistant marker gene present in the Bt176 maize should not be grown commercially due to health concerns,[293] and in July of 2005, the Spanish Ministry of Agriculture withdrew the authorizations of all remaining Bt176 varieties.[294] Monsanto's MON810 maize is now the only GMO permitted in Spain for commercial growing.

The biotechnology industry also has permission to grow a small amount of Monsanto's MON810 maize in Germany. However, due to public opposition, the industry failed in 2005 to find a sufficient number of farmers to grow the full quantity. The German government gave permission for up to 1,000 hectares to be grown in 2005. Following large protests, however, only 250 hectares were grown commercially, and 50 hectares were planted for research purposes.[295]

In September of 2005, the French newspaper La Figaro published a story claiming that 1,000 hectares of MON810 maize had been grown that year in France. Other newspaper reports however questioned this amount, arguing that the figures were released by the GM industry in an attempt to show that GM crops were grown on a larger area than in reality.[296]

Because MON810 maize was approved under old EU GMO legislation, there is no requirement for a public register. This means that it is virtually impossible for the public and for farmers to find out where the crops are grown.

Monsanto faces a hostile environment in France, in particular from the radical farming union, Confédération Paysanne. Following a court ruling on 26 November 2005, Monsanto seized the bank accounts of the union after it was fined 196,000 Euros for destroying a GMO test site in 1998.[297] Following further protests, some GM crops now require protection by the French military.

292 Ministry of Environment, *GMO, Situation in the EU and in Spain,* document distributed to the members of the Environment Adviser Committee on 20 October 2005.
293 http://www.efsa.eu.int/science/gmo/gmo_opinions/384_en.html
294 Order of the Ministry of Agriculture, number 2628/2005 from 28 of July, that excludes and includes GM corn varieties in the Catalogue of Commercial Varieties. It excludes the 4 Bt176 varieties that were still registered in the Catalogue.
295 Monsanto press release, http://www.monsanto.de/newspresse/2005/01082005.php
296 *'OGM : Déjà un Millier d'Hectares en France'* in Le Figaro, 6 September 2005.
297 http://www.confederationpaysanne.fr/index.php3

six monsanto's biotech disaster in europe

In 2007, Romania and Bulgaria are expected to join the European Union. Both countries have grown GM crops, but as EU accession beckons, they have brought in measures to stop widespread growing.

Romania has cultivated Monsanto's Roundup Ready soy for several years. According to ISAAA, 70,000 hectares were grown in 2003 and 100,000 hectares in 2004. Although the seeds are sold by Monsanto, there is also a large black market in seeds, making the situation largely unregulated and uncontrolled. Monsanto's GM soy cannot be legally cultivated in the EU, so in order for Romania to join the Union it must stop cultivating biotech soy. On 23 November 2005, the Romanian government announced that it will reduce the amount grown in 2006 and stop all commercial production in 2007[298]. ISAAA regarded Romania as one of its biotech "mega-countries".

Although Bulgaria has not permitted commercial growing, it previously allowed for the extensive cultivation of GM maize from Monsanto, Pioneer and Novartis for scientific purposes. However, in line with its EU accession plans, the government has reduced all major trials.[299] Bulgaria has also brought in GMO laws that in places go beyond even EU regulations, for example, banning the genetic modification of all vegetables and fruits and placing 30 kilometre buffer zones around protected areas.

6.4 barriers to monsanto's expansion plans

6.4.1 european public opinion

Public opinion in Europe remains steadily opposed to genetically modified food. European polls show that 70% of the public do not want to eat GM food, and around 95% demand labeling in order to be able to make an informed choice.[300] European food retailers were some of the first in the world to introduce and market GM foods. The first food product, a GM tomato purée, arrived on the shelves of UK retailers Sainsbury's and Safeway in 1996. By 1999, however, the tomato purée was nowhere to be seen. Public disquiet forced all of the major manufacturers and retailers to remove GM ingredients, and in particular Monsanto's GM soy, from their foods.

This position has not weakened, and the market for GM food in Europe has since been dead. A 1998 leaked report by the pollster Stan Greenberg, believed to be written for Monsanto, pinned the blame clearly on Monsanto. It stated that: "They [the supermarkets] carry with them their resentment of Monsanto for badly mismanaging the introduction of biotechnology in Europe and for allowing the issue to be decided in the supermarkets."[301] Indeed, it seems that even Monsanto has little confidence in its products. In 1999, GMOs were removed from Monsanto's own staff canteen in the UK.[302]

6.4.2 national bans

A growing number of EU countries have banned the import or cultivation of some GM products as outlined in table 18. In June of 2005, the Environment Ministers of all EU states voted on a proposal from the European Commission to lift these bans. The proposal was comprehensively defeated, and the bans remain in place. This is the first time that EU member states have defeated the Commission on the issue of GM crops.[303]

TABLE 18

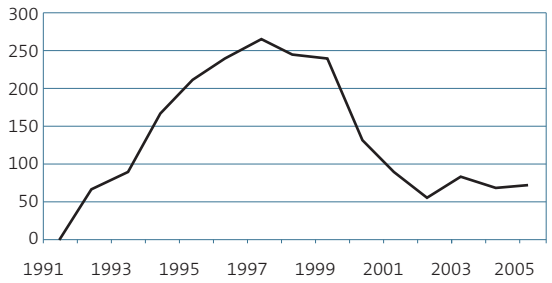
COMPANY	GMO	BANNED IN:
Syngenta	Bt176 maize	Austria, Germany, Luxembourg
Bayer	Topas oilseed rape	France, Greece
Bayer	MS1xRf1 oilseed rape	France
Bayer	T25 maize	Austria
Monsanto	MON810 maize	Austria, Greece, Poland, Hungary

298 Statement by the *Minister of Agriculture* at the Roundtable on GMOs, Bucharest.
299 Position of the *Bulgarian Ministry of Agriculture and Forestry* regarding the structure of Bulgarian agriculture concerning the different ways of production: organic, conventional and agriculture based on GMOs, 2004.
300 Eurobarometer, http://europa.eu.int/comm/research/press/2001/pr0612en-report.pdf
301 http://archive.greenpeace.org/pressreleases/geneng/1998nov18.html
302 http://www.foe.co.uk/pubsinfo/infoteam/pressrel/1999/19991222160014.html
303 http://www.foeeurope.org/press/2005/AB_24_June_vote.htm
304 EU Joint Research Centre. http://biotech.jrc.it/a

6.4.3 test site applications plummet

The number of applications to test GM crops in Europe has shrunk dramatically in recent years. In 1997, the industry made over 260 notifications to test GM crops, but following public opposition this number has withered to some 60 or 70 per year.[304] It is believed that this will have a major impact on the future development of GMOs in Europe.

FIGURE 4 NOTIFICATIONS TO TEST GMOS IN THE EU

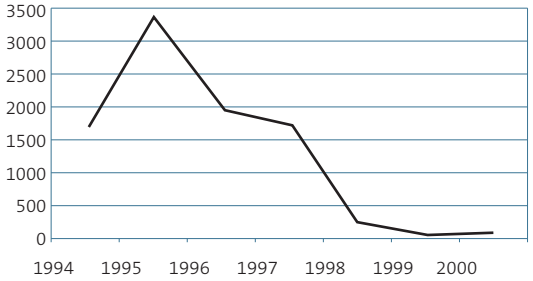


Source: *European Commission*

6.4.4 no markets

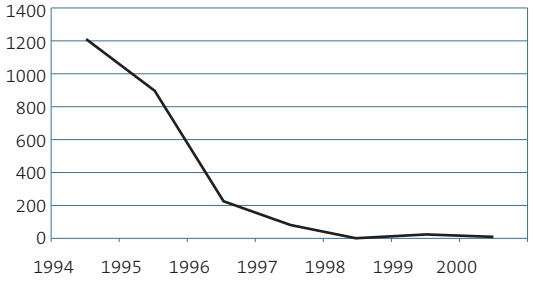
The GMO industry in Europe, in its attempts to persuade us that we need its products, claims that: "Agricultural subsidies are under pressure, European farmers continue to leave their land because they cannot make a living, other countries' agricultural economies are experiencing rapid export growth, and the economic and environment needs of rural development are increasing. It is necessary to adopt the modern technologies that the rest of the world has to face these challenges."[305] It is highly questionable whether farmers in other countries are really experiencing "rapid export growth" as stated. The introduction of GMOs in North and South America has had a major effect on these regions' agriculture trade with Europe. Canada, for example, has lost virtually all of its export market of oilseed rape to Europe (replaced by Poland) since introducing GM oilseed rape. Similarly, the United States has lost its exports of maize (replaced by Argentina) over the same time period.[306] As reported elsewhere in this report, the introduction of GM crops in many countries has fueled the disappearance of the small farmer and has led to the increase of industrial-sized farms.

FIGURE 5 EU IMPORTS OF MAIZE FROM THE US



Source: *European Commission*

FIGURE 6 EU IMPORTS OF OILSEED RAPE FROM CANADA



Source: *European Commission*

305 Europabio, 2005. *Plant Biotech for a Competitive Europe.* http://www.europabio.org
306 Toepfer International, Edition 2000/01.

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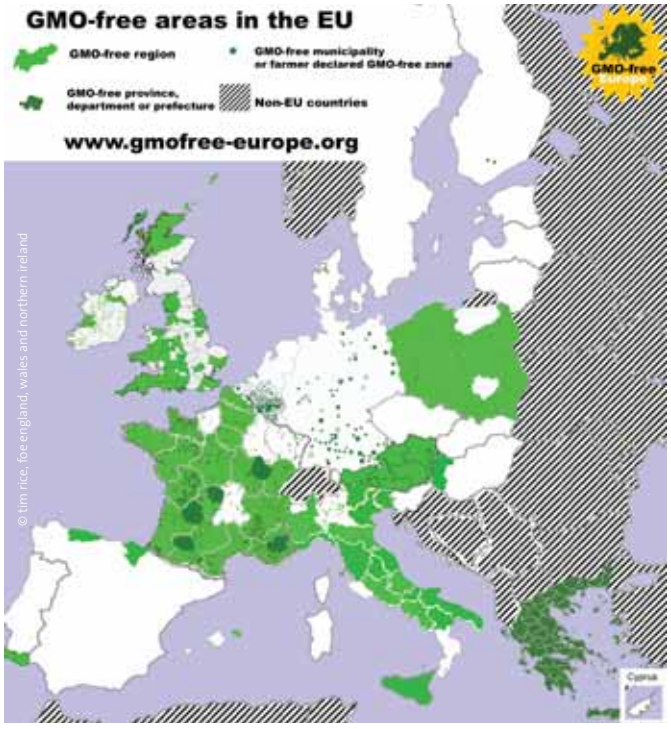
6.4.5 gm-free europe

In 2004, the European Commission commercialized Monsanto's MON810 seeds, making them available to farmers across the whole of the EU.[307] Instead of allowing Monsanto to increase its 'genetic footprint' in Europe, this decision has instead generated a new movement against the cultivation of Monsanto's GM crops. Not only have a number of countries introduced bans on either the GMO itself or on the Monsanto seeds (see map below), but a growing number of political regions and local governments have declared themselves entirely GM-free. This dramatic development has resulted in countries, including Greece and Poland, in which virtually every region has declared itself GM-free. There are currently 165 European regions and 4,500 local government and smaller areas that have declared themselves GM-free.[308]



6.5 conclusion

Europe has probably seen more protests against the introduction of GM crops than anywhere else in the world. The public is solidly against eating GM food, and a remarkable political movement against its cultivation is rapidly growing. Although Monsanto continues to believe it has a future in Europe, its prospects continue to look poor. No markets, more national bans, and growing evidence of environmental damage ensure that one of the world's biggest markets will remain a disaster zone for Monsanto.

307 Commission press release, IP/04/1083, Brussels, 8 September 2004.
308 See http://www.gmofree-europe.org

seven monsanto winning hearts, minds and markets in africa

monsanto winning hearts, minds and markets in africa

mariam mayet, african center for biosafety

Scattered liberally on the walls leading to Monsanto's conference room at their offices in Johannesburg, South Africa, are a number of 'feel good' environmental posters. One is a flowery poem advocating the implementation of no-till agricultural practices in order to encourage the use of the company's Roundup Ready herbicide. The impression created by these posters for visitors and employees alike is that Monsanto is an environmentally attentive and responsible agricultural company.[309]

Employees of Monsanto South Africa are bound together by the 'pledge' adopted by Monsanto in 2000: "The Monsanto Pledge is the set of values that defines who we are as a company. The values it embraces - dialogue transparency, respect sharing, benefits, ownership for results and creating a great place to work - were borne out of what we heard from society and from our employees. [...] It is the 'how' we do what we do."[310]

These pledged values are contradicted by the well-documented history of Monsanto's environmental abuses and social injustices.[311]

So how does Monsanto do what they do in Africa, and for whom do they do it? A spokesperson at Monsanto South Africa, Wally Green, expressed his concern that not having taken part in the 'Green Revolution', an underdeveloped and food insecure Africa can not afford to miss out on the current 'Gene Revolution' (as advocated by Monsanto).[312] It may be conceded that the 'Green Revolution' produced somewhat higher yielding seed varieties, and that the necessary additional inputs (such as fertilizers and mechanized equipment) did in fact increase agricultural yields. But more important, it is also evident that farming became a less viable option for small and micro-scale subsistence farmers with the Green Revolution. As a result, "...severe malnutrition exists alongside flourishing (export-driven) 'cash crops' such as bananas, coffee, and rice. Why? Because in children's diets, as in the farm fields, diverse foods have been replaced with monotony. A bowl of white rice is lunch and dinner."[313]

As part of its gene spin, Monsanto has used the small-scale African cotton farmers of Makhathini Flats in KwaZulu-Natal to argue that GM crops are a solution to poverty and hunger. In Africa, Monsanto also relies on front organizations such as AfricaBio and ISAAA to generate positive publicity and public perceptions of GMOs, and to publicly attack and vilify opponents.

There is a substantial body of evidence suggesting that biotechnology companies like Monsanto and various US public and quasi-public international institutions are cooperating to facilitate the adoption of GM crops in Africa. The institutions include, amongst others, the International Food Policy Research Institute (IFPRI);[314] the US Department of Agriculture Animal and Plant Health (USDA & APHIS);[315] [316] the Environmental Protection Agency (EPA);[317] the Food and Agriculture Organization of the United Nations (FAO); the United Nations Environment Programme/Global Environmental Facility (UNEP-GEF);[318] and the World Health Organization of the United Nations (WHO).[319] Employees at Monsanto South Africa have openly admitted that they work with these institutions and the South African based industry lobby group, AfricaBio, in order to encourage the uptake of GM crops in Africa.[320] Why would they dispute this? It is after all Monsanto's business to profit from the sale of GM products, and the company's aim is to increase its sales by accessing untapped and intellectual property secure markets for GM products throughout Africa.[321] [322]

309 Ibid.
310 Herndon, D. (ed), 2004. *Pledge 04 Awards: 2004 Pledge Awards,* Monsanto Imagine™, A2s, 800 N. Lindbergh Blvd., St. Louis MO 63167. Collected 7 November 2005 at Monsanto Head Office, Fourways, South Africa.
311 Tokar, B., 1998. Op. cit.
312 *Interview with Wally Green and Andrew Bennett,* Monsanto South Africa, 7 November 2005.
313 Klein, N., 2001. *Memories of Consumer Choice.* http://www.nologo.org. Site accessed 11 November 2005.
314 *The Promise of Plant Biotechnology, Monsanto brochure.* Collected 7 November 2005 at Monsanto Head Office in Fourways, South Africa. *"Putting the brakes on biotechnology could have dire consequences for developing countries, where populations are growing rapidly and all arable land is already under cultivation. [..]. For most people in developing countries, a better standard of living depends on increasing productivity in agriculture."* Pinstrup Andersen, Director General International Food Policy Research Institute, on biotech and the poor, 27 October 1999, The Washington Post.
315 *"Biotechnology has the potential to create more and better sources of food, to reduce pesticide use, increase yields and improve nutrition and quality of life."* Dr. Sally L. McCammon, US Department of Agriculture Animal and Plant Health Inspection Service, Congressional hearings on biotechnology, October 1999.
316 *"Biotechnology can help us solve some of the most vexing environmental problems: it could reduce pesticide use, increase yields, improve nutritional content and use less water."* Dan Glickman, Secretary US Department of Agriculture (USDA) in a speech given to the National Press Club, 13 July 1999.
317 *"Biotechnology has great potential to reduce our reliance on some older, more riskier chemical pesticides."* Janet Andersen, Director Biopesticides and Pollution Prevention Division, US Environmental Protection Agency, Congressional hearings on biotechnology, October 1999.
318 Mayet, M., 4 November 2005. *GM crops for Africa? No Thanks!* http://www.i-sis.org.uk/full/GMCFANTFull.php.
319 *"Biotechnology provides new and powerful tools for research and for accelerating the development of new and better foods. [...] The benefits of biotechnology are many and include providing resistance to crop pests to improve production and reduce chemical pesticide usage, thereby making major improvements in both quality and nutrition."* Report of a Joint FAO/WHO Consultation on Biotechnology and Food Safety, 30 September-October 4, 1996, Rome.
320 *Interview with Wally Green and Andrew Bennett,* Monsanto South Africa, 7 November 2005.
321 Ibid.
322 Hoovers, 2005. *Monsanto Company Fact Sheet.* http://www.hoovers.com/free/. Site Accessed 31 October 2005.

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Project (ABSP), which is currently enjoying its second resurrection as ABSP II, and more recently the Program for Biosafety Systems (PBS).[323] PBS members include the International Food Policy Research Institute (IFPRI, from the US), the Donald Danforth Plant Science Center (DDPSC, from the US), AGBIOS (Canada), Michigan State University (MSU; from the US) and Western Michigan University (WMU; from the US).

These USAID projects are specifically mandated to partner with US biotechnology corporations in order to make GM crops available to developing countries (including governments and institutions in Africa).[324] The mandate of the PBS is to assist African and Asian countries in developing biosafety systems and to help with biosafety decision-making. The ABSP's objectives are best described in an ISAAA commissioned report as follows: "To improve the capacity and policy environment for the use, management and commercialization of agricultural biotechnology in developing countries and transition economies."[325] According to the same report: "Private companies (Monsanto and Garst Seeds) were also the source of proprietary genes, and contractual arrangements were concluded for their use in research. In-house training for developing country scientists in companies involved in research collaboration under the ABSP project (Pioneer and Monsanto) was the third form of partnership."[326]

The ABSP II and PBS programs have been active in encouraging African governments to adopt GM on US sanctioned terms (particularly by using conditional aid packages and specifically with the aim of introducing GM cotton in West Africa).[327] [328] [329] For Monsanto, this includes lobbying the US government both at home and during official US government 'fact finding' visits to South Africa.[330] Furthermore, in line with its 'new pledge', the company is making a concerted effort to win both the 'hearts and the minds' of African politicians and farmers[331] [332] by supplying them with technical expertise and financial backing through a network of NGOs and 'other' organizations.[333]

Together with a dazzling array of well-funded, capital-intense lobbying tools and a determined attempt by the world's sole remaining superpower, the US,[334] to secure its global economic foothold, biotech companies such as Monsanto are targeting cotton production areas in Africa for the introduction of their GM cotton. They use the rapid adoption of GM cotton across the world to argue that Africa will miss out on this 'second Green Revolution' if it does not immediately adopt the technology.

Yet the language of poverty reduction and humanitarianism they use is but a thinly veiled disguise for the global expansion of transnational corporate interests. Building on the social devastation left by colonialism and International Monetary Fund (IMF) led structural adjustment programs that are still all too apparent across Africa, the introduction of GM crops seeks to further restructure political, social and economic systems mainly to benefit these interests. African nation states play an important role in facilitating these processes of technology-driven development and economic concentration by maintaining and restructuring the required regulatory frameworks, in line with those propagated by the World Trade Organization.[335]

323 Mayet, M., 4 November 2005. Op. cit.
324 Brenner, C., 2004. *Telling Transgenic Technology Tales: Lessons from the Agricultural Biotechnology Support Project (ABSP) Experience.* International Service for the Acquisition of Agri-Biotech Applications. ISAAA Briefs No. 31, page vii.
325 Brenner, C., 2004. Ibid, page ix.
326 Ibid, page vii.
327 Ibid, page vii.
328 Kuyek, D., 14 November 2005. *US Announces Launch of West Africa Cotton Improvement Program.* GRAIN.
329 United States Trade Representative, 10 November 2005. US Announces Launch of West Africa Cotton Improvement Program. http://allafrica.com/stories/200511100703.html
330 Herndon, D., (ed), 2004. *"Outstanding Performance in Promoting Dialogue and Sharing from Monsanto: Monsanto South African successfully hosted an official visit from several US congressional representatives on a fact-finding trip to South Africa, including the chair of the House Agriculture Committee."*
331 Ibid. *"Monsanto team members, including the chair of the Malawian Seed Trade organization, began having a dialogue with the Malawian Ministry of Agriculture to explain to them the benefits of hybrid corn and to introduce the benefits of biotechnology traits in crops."*
332 Ibid. *"Promotion of Biotechnology Among Anti-GMO Clients: Due to the efforts of Monsanto representatives in South Africa, many clients who had previously been anti-biotech now are willing to consider the benefits of biotechnology and have accepted transgenic trials in their area."*
333 Ibid. *"Creating Economic Growth Among Rural Communities in South Africa: A Monsanto team in South Africa worked with governmental, non-governmental, and other organizations to provide products, training, technical support, and production credits to spur economic development for poor farmers."*
334 Kennedy, P., 1989. *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000.* Fontana Press, USA.
335 Greenberg. S., 2004. *Global Agriculture and Genetically Modified Cotton in Africa.* African Centre for Biosafety.

7. 1 kenya: monsanto and usaid's propaganda pulpit

Kenya is home to the African Agricultural Technology Foundation (AATF), a public-private partnership with the purpose of developing agricultural biotechnology, including GM technology, in Africa. The AATF received start-up funds from USAID, the Rockefeller Foundation and the United Kingdom's Department for International Development (DFID), as well as from Monsanto, Dupont, Dow and Syngenta.[336] In 2004, the AATF signed a memorandum of understanding with the US Department of Agriculture to share and disseminate agricultural technologies.[337] Focal areas include development of insect-resistant maize, pro-vitamin A enhancement in maize and rice, and cowpea production.[338]

Florence Wambugu, a two-time Monsanto Company Outstanding Performance Award winner and author and publisher of the books Modifying Africa: How Biotechnology Can Benefit the Poor and Hungry: A Case Study from Kenya, has been an instrumental player in biotechnology's thrust into Kenya. She was the first director of ISAAA's AfriCentre, and has spun off a number of innocuously named pro-GMO fronts, such as the African Biotechnology Stakeholders Forum (ABSF), of which she is the vice chair, and the African Biotechnology Trust. In January 2002, Wambugu established her own entity, becoming chief executive of A Harvest Biotechnology Foundation International (AHFBI). AHBFI's communications program is supported by CropLife International, an organization led by companies such as BASF, Bayer, Dow, DuPont, Monsanto and Syngenta.

The cornerstone of Florence Wambugu's career has been Monsanto's and USAID's GM sweet potato project, which she adopted as her own in memory of her mother. She was reported in the Toronto Globe & Mail in July of 2003 as saying that feathery mottle virus resistant GM sweet potatoes can achieve yields of 10 tons per hectare (compared with a natural Kenyan crop that yields four tons per hectare). There was a flurry of press on the resounding success of Wambugu's GM sweet potato, but by early 2004 there was no way of knowing the actual yields as no peer-reviewed reports or official figures were published during the three years of trials in Kenya. Nevertheless, these trials were presented by Wambugu as an agricultural revolution in Africa: "Millions served: Florence Wambugu feeds her country with food others have the luxury to avoid."[339]

However, by the end of January 2004, and more than US$10 million later, the results of the trials were quietly published in Kenya, showing that none of her claims were true. Kenya's Daily Nation reported: "Trials to develop a virus resistant sweet potato through biotechnology have failed. US biotechnology, imported three years ago, has failed to improve Kenya's sweet potato."[340] Indeed, the results revealed that the non-GM sweet potatoes had yielded significantly more than the GM variety. New Scientist also reported the project's failure as "Monsanto's Showcase Project in Africa Fails."[341] It emerged that the sweet potato feathery mottle virus was not a primary constraint on sweet potato production, nor was it a significant cause of the food insecurity, let alone famine.

Kenya is also actively represented in the USAID-funded Association to Strengthen Agricultural Research in East and Central Africa (ASARECA). ASARECA facilitates collaborative research between its African associates, the US public and private sectors, and international agricultural research centers. The principal aim is to foster regional acceptance of GM crops through weak biosafety regulations.[342] ASARECA is a partner of USAID's Agricultural Biotechnology Support Project (ABSP) whose goal, as was mentioned above, is to support research, product development and policy development for the commercialization of GM crops in Africa. Private partners of ABSP include Monsanto, Syngenta, Pioneer Hi-Bred and DNA Plant Technology.[343]

336 GM Watch, 26 June 2004. http://www.usda.gov/Newsroom/0247.04.html.
337 USDA, 21 June 2004, Press Release No. 0247.04. http://allafrica.com/stories/200406160970.html.
338 East African Standard, 17 June 2004. http://www.doylefoundation.org/BiosciencesBrochure.pdf.
339 Forbes, December 2002.
340 Kenyan Daily Nation, 29 January 2004. *GM Technology Fails Local Potatoes.*
341 New Scientist. 7 February 2004. *Monsanto's Showcase Project in Africa Fails.* 'Vol. 181, no. 2433.
342 Mariam Mayet. www.afrsd.org/Agriculture/Biotechnology/ABSP%20BioTech%20Dev%20in%20Africa.PDF.
343 USAID, 2002. *ABSP Biotechnology Development in Africa*, 1991-2002.

seven monsanto winning hearts, minds and markets in africa

7.2 making a grab for west africa's cotton

"We will defend US agricultural interests in every form we need to."

Richard Mills, a spokesperson for United States Trade Representative Robert Zoellick.

More than 10 million people in Africa rely on cotton production as their main source of income. Smallholders are the main producers of cotton; in the United States, the world's largest producer, large-scale agribusiness dominates production. African cotton production is modest compared to production levels in the US, China, India and Pakistan. However, as these countries use most of their production internally, Africa is one of the largest exporters and thus depends heavily on the international market.

According to the proponents of GM, the introduction of transgenic cotton will enable African farmers to increase their productivity and reduce their input costs. The USAID Initiative to End Hunger in Africa approaches the reduction of poverty "primarily through efforts to increase productivity and incomes in the agricultural sector".[344]

Indeed, multiple strategies are underway to coerce several key West African cotton producing countries to adopt GM cotton. These include small projects such as those sponsored by the US Department of Agriculture and the Norman E. Borlaug International Science and Technology Fellows Program (which trains African scientists in biotechnology in the US);[345] as well as USAID's PBS; the partnership between the International Institute for Tropical Agriculture (IITA) based in Nigeria and USAID-funded Le Conseil Ouest et Centre Africain pour la Recherche et le Developpement Agricoles (CORAF, Senegal);[346] and the West African Biotechnology Network (WABNET) launched in May 2004, consisting of the Nigerian government, USAID and IITA.[347] In July 2004, a Ministerial Conference was held Ouagadougou, Burkina Faso, co-sponsored by the US Department of Agriculture, USAID and the government of Burkina Faso. At this political milestone event, West African Ministers adopted a resolution calling for greater research and investment in agricultural biotechnology and recommending a West African Centre for Biotechnology.

344 Abt Associates Inc., February 2003. *Current USAID Science and Technology Activities in West Africa and How They Might be Augmented: A Contribution to the West Africa Regional Programme Initiative Action Plan for the Initiative to End Hunger in Africa:* Agricultural Policy Development Programme, paper prepared for USAID AFR/SD (PCE-I-00-99-00033-00). http://www.abtassoc.com/reports/USAIDScienceandTechnologyActivitiesinWestAfrica.pdf
345 Ibid.
346 International Service for National Agricultural Research news release, 9 June 2003. http://www.futureharvest.org/pdf/Biosafety_FINAL1.pdf.
347 Checkbiotech, 11 May 2004, http://www.checkbiotech.org/root/index.cfm?fuseaction=news&doc_id=7749&start=1&control=210&page_start=1&page_nr=101&pg=1.

7.3 burkina faso: the first to fall in west africa?

Along with the other major West African cotton producing countries, Burkina Faso is under increasing pressure from the US government and multilateral organizations to rapidly introduce GM cotton.[348] As a result, in July 2003 biotechnology and transgenic cotton field trials of two Bt cotton varieties began there, in partnership with Monsanto and Syngenta, at research stations of the Institut Nationale de l'Environnement et de la Recherche Agronomique in Farakoba and Kouaré.[349] In July 2003, the Burkina Faso Fibre and Textile Company (SOFITEX), announced plans to embark on the commercial production of GM cotton.[350]

These developments all occurred prior to the introduction of biosafety regulations, which were subsequently issued by Ministerial Decree, without public participation.[351] The preamble to the Decree reads like a page out of a Monsanto pamphlet, and the regulations are empty when it comes to traceability, public participation, transparency and liability. They are however loaded with detail when it comes to how GM companies must hire and compensate Burkina scientists - the very scientists in charge of approvals.[352] The national agricultural research institute (IER) is engaged in ongoing negotiations with Monsanto and Syngenta to encourage further GM cotton field trials.[353]

Viewed by Monsanto as a success story in West Africa, one of the Pledge Awards 2004 nominations referred to Burkina Faso as an important contributing factor to the "commercial acceptance of biotechnology" in Africa and is cited as follows: "This project succeeded in establishing biosafety guidelines and the first trials with transgenic cotton in Burkina Faso, in Western Africa - North of Ghana."[354]

In his paper "Going for Growth in Africa: Science, Technology and Innovation in Africa", Syngenta CEO Michael Pragnell unsurprisingly emphasizes "technological upgrading"[355] as a solution to Africa's agricultural problems. Pragnell proudly shows off Syngenta's close ties to governments, and apparently sees nothing wrong with the industry writing laws to regulate itself on GMOs. "Syngenta has been able to work successfully with the authorities in Burkina Faso in supporting their development of regulatory expertise in new technologies."

348 Apart from additional material which is footnoted otherwise, these case studies are replicated verbatim in this report from the ACB website. For further case studies and other African biosafety information, please visit http://www.biosafetyafrica.net/index.htm.
349 Genetic Resources Action International (GRAIN) press release, 2 February 2004, http://www.grain.org/publications/btcotton-newsrelease-feb-2004-en.cfm.
350 Agbios, 29 July 2003, http://www.agbios.com/main.php?action=ShowNewsItem&id=4668.
351 Mayet, M., 2005. Op. cit.
352 GENET, 2005. http://www.genet-info.org/. Site accessed November 2005.
353 Greenberg, S., 2004 pp. 10-11.
354 Herndon, D. (ed), 2004. Op. cit.
355 Smith Institute/Syngenta paper. *Going for Growth in Africa: Science, Technology and Innovation in Africa*, edited by Calestous Juma, former Executive Director of the Secretariat of the Convention on Biological Diversity. Gareth Thomas, Dato' Lee, David King and Syngenta are among the contributors, as well as Robert Tripp on Civil Society.

7.4 south africa: applying the brakes after quick gmo uptake

The South African government supports genetic modification in agriculture, and uses its own infrastructure and resources to encourage positive public attitudes about GM. South Africa's permissive regulatory system and its technologically advanced agriculture system make the country an ideal gateway into Africa for the spread of GM crops. South Africa has gone against the grain of the general distrust of GM foods in Africa, and has served as a base from which to distribute GM food aid into the region. The state's support for GM has allowed South Africa to become a platform for GM's expansion into Africa and for the export of GM seed around the world, as well as a testing ground for new GM crops not approved elsewhere.[356]

Countries that have received GM seed from Monsanto in South Africa include the Philippines, France, Argentina, the US, China, Indonesia, Egypt, Colombia, Romania, Spain, Belgium and Chile. This seed has been exported for commercial planting as well as field trials, backcrossing and research. The vast majority of exports have been three maize varieties (MON810, NK603 and GA21), with two permits granted for soybean exports (CTS40-3-2) to Romania and China. MON810 has been exported to the Philippines in bulk (more than 820 metric tons) for planting, suggesting that Monsanto in South Africa is a big GM seed supplier to the Philippines. Controversy has surrounded some exports. In 2001, GM cotton seed produced in South Africa, by Delta & Pine Land South Africa under license from Monsanto, was secretly shipped to Indonesia and driven under armed guard from the airport in boxes marked "logistic depot rice" (see chapter 5).[357]

The South African government does not produce official data about the uptake of GM crops, so it is impossible to know with exactitude the extension of the GM planting, but what is clear is that South Africa is not a significant GM producing country. Despite all the hype, the fact remains that South Africa does not produce more than 300,000-500,000 hectares of combined GM cotton, maize and soy crops. South Africa does not produce enough cotton for domestic needs, and has to import the shortfalls each year. South Africa's soybean industry is similarly small. According to GRAIN South Africa, South Africa imported 41,000 tons of soy for the period 2003-2004, and a staggering 570,000 tons of soymeal cakes for animal feed in 2004.[358]

Despite its historical status as a net exporter of maize, South Africa has become reliant on imports of enormous amounts of GM maize from Argentina and the US. According to GRAIN South Africa, the country imported just under 2 million tons of maize for the period 2001-2004.[359]

In a surprise move in November 2005, the pro-GM South African government advised the African Centre for Biotechnology (ACB) that it had placed a moratorium on import approvals, pending the outcome of a socio-economic study that the Department of Trade and Industry is now in the process of conducting. This study, coordinated by the University of Potchefstroom, is expected to adhere to the recommendations made by public interest groups working on GMOs such as the ACB to assess the social and economic impacts of the importation by the animal feed industry in South Africa of millions of tons of GM maize from Argentina and the United States. Such an investigation will also examine the impacts on the production of maize in South Africa, the distortions in the marketplace caused by the sale of this maize, the long-term food security and food sovereignty impacts for South and Southern Africa, and the predatory pricing policies and huge subsidy regimes provided to exporters by their governments, helping them to dominate markets and displace local producers.[360]

GRAIN South Africa, which has applied considerable pressure on the South African government, is concerned about the oversupply of GM products on the world market. They believe that biosafety restrictions in many grain-importing countries have contributed to depressing global prices of GM products on the international grains market.

356 ACB, 2005. Op. cit.
357 Ibid.
358 *Personal Communication*, 4 May 2004.
359 Ibid. 1 May 2004 to end of April 2005: 220,000; 2003/2004: 441,000; 2002/2003: 925,000; and 2001-2002: 395,000 tons.
360 Mayet, M., *A Glimpse Through the Cracks in the Door: South Africa's Permitting System for GMOs*. www.biosafetyafrica.net

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7.4.1 monsanto in south africa

In South Africa, Monsanto is involved in both the agrochemicals and seed markets. The local agrochemicals market is broadly divided into pesticides, herbicides and fungicides. An estimated 895,584 metric tons of agrochemicals were used on South African cropland annually from 1994 to 1996,[361] and although market share information is difficult to come by, retail sales of agrochemicals were valued at 1.3 billion Rand (US$215 million) in 1997.[362]

Glyphosate, the active ingredient in Monsanto's Roundup, has been off-patent since 1990 in South Africa.[363] This has allowed at least 69 glyphosate-based products produced by 26 companies including Syngenta, Dow Agrosciences, Bayer, Volcano Agroscience and Kynoch Agrochemicals to be offered on the South African market.[364] Monsanto relies on the expansion of GM seed to generate further sales of its agrochemicals, and aggressively protects this market by including the exclusive use of its herbicides in its contracts with local growers of its GM seed.[365]

South Africa's commercialized seed production and distribution system has long been under the control of the private sector. Commercial seed systems in South Africa are skewed towards large-scale commercial production methods, whereas in the rest of Africa, only about 20% of grain seed is distributed through the commercial seed system while the remainder is saved and shared between farmers.[366]

In 1996, between 92 and 94.5% of the area planted with maize was represented by hybrid seed.[367] But South Africa's large-scale commercial maize market is highly specialized, and has come to rely heavily on the private sector for maize breeding. In 1998, for example, no open-pollinated maize varieties, but 68 hybrid maize varieties were commercially available. By 2000, after purchasing Carnia and Sensako, two of South Africa's largest seed companies (and cutting 25% of its workforce),[368] Monsanto controlled 45% of South Africa's maize seed market and almost the entire wheat seed market.[369] By 2001, Monsanto controlled 40% of the total seed market in South Africa.[370] There were an estimated 911 biotechnology projects underway in South Africa in 2003.[371] About 18% of the commercialized biotech products were plants, and another 8% were food and beverage products.

In 2004, Monsanto merged Carnia and Sensako (maize, soybean and sunflower seeds) under the Dekalb brand. (Dekalb was the world's first seed company to sell maize hybrids, and is one of the largest maize seed companies in the world). By 2005, Monsanto had at least 15 yellow maize, 11 white maize, 17 wheat, 4 soybean, and 5 sunflower varieties on the local market. Included in this number were 6 Bt maize varieties, 3 Roundup Ready maize varieties, and also Roundup Ready soybean varieties. In South Africa, Monsanto has licensed GM maize and soy technology to Pannar; maize technology to Pioneer Hi-Bred; and cotton technology to the Delta & Pinelands Company.[372] Using Monsanto's technology, Pannar was responsible for 112 (76%) of the GM maize field trials in South Africa by 1999. At the same time, Monsanto was conducting another 10 (7% of the total) of the country's GM maize field trials.[373]

Monsanto has 29 wheat varieties, with 'plant breeders rights'[374] on 21 of these.[375] The company also owns 36 yellow maize hybrid varieties, 18 white maize hybrid varieties, a smaller number of registered winter grain varieties (oats, rye, barley, triticale, lupins, lucerne and grain sorghum), and varieties of soybeans, sunflowers, dry beans and grasses (none of these varieties are genetically modified). However, Monsanto South Africa holds ownership of nine GM varieties of soybeans, 13 GM yellow maize varieties, and four GM white maize varieties.

In addition, Monsanto's recent international purchase of Seminis (one of the world's largest vegetable seed companies) gives Monsanto South Africa an entry point into the vegetable seed market, with nearly 60 vegetable and melon seed varieties registered by Seminis in the country. This gives Monsanto the chance to begin challenging Syngenta's dominance to date

361 EarthTrends, 2003. *South African Country Profile*. http://earthtrends.wri.org.
362 Kirsten, J and Gouse, M., 2002. *The Adoption and Impact of Agricultural Biotechnology Innovations in South Africa,* Working paper 2002-09. Dept of Agricultural Economics, Extension & Rural Development, University of Pretoria, p.4.
363 Wally Green, *personal communication,* 17 April 2005.
364 National Department of Agriculture. http://www.nda.agric.za/act36/AR/Herbicides.htm. Accessed March 2005.
365 Monsanto Technology Agreement for Bollgard, Roundup Ready and YieldGard seeds, 1998. http://www.mindfully.org/GE/Monsanto-Technology-Agreement-1998.htm.
366 ACB, 2005. Op. cit.
367 Hassan, R., Mekuria, M., and Mwangi, W., 2001. *Maize Breeding Research in Eastern and Southern Africa,* 1966-97, CIMMYT, p. 26.
368 Peter Turner, CEO of Monsanto South Africa, quoted in Louise Cook, 25 August 1999, *"Seed Firm to Lose Staff"* in Business Day, 25 August1999.
369 Cook, L., 14 December 2000. *Monsanto of the US Buys All of Sensako.* Business Day.
370 Contact Trust Summary of Environmental Affairs & Tourism Portfolio Committee Hearings on GMOs, 30 October 2001.
371 eGoli Bio, 2003. National Biotech Survey 2003, p. 5. http://www.pub.ac.za/resources/docs/egolibio_survey_2003.pdf.
372 Monsanto, 17 October 2005. News Release by Monsanto SA: *First Combined Trait Release in South Africa.*
373 Kirsten, J. and Gouse, M., 2002, Op. cit., p. 10.
374 In South Africa, plant breeders' rights rather than patents protect genetically modified seed varieties.
375 Registered variety information from National Department of Agriculture Registrar of Plant Improvement, http://www.nda.agric.za/variety/SAVL_Oct04.pdf.

amongst the transnationals in the South African vegetable seed sector. Syngenta has 72 registered vegetable and fruit varieties. (Potatoes are likely to be the first GM vegetable crops to be commercialized in South Africa).[376]

Delta & Pine Land (D&PL) South Africa, a wholly-owned subsidiary of the multinational parent D&PL, licensed Monsanto's GM cotton technology for use in South Africa in 1993. In 1995, cotton seed for the first commercial release of Bollgard (insect protected cotton) in the US was produced by D&PL in South Africa and exported to the US for sale. D&PL has also crossed the technology into local varieties, and is the dominant player in the South African cotton seed market. Monsanto itself does not market GM cotton seed in South Africa, but benefits from licensing fees.[377]

It is suggested that South Africa has played a key role as a vector for GM cotton interventions in Africa, particularly through the dissemination of propaganda generated from the ostensible success stories of Bt cotton in the Makhathini Flats.

7.4.2 gm cotton on the makhathini flats

The Makhathini Flats in Maputoland, Northern KwaZulu Natal, South Africa is widely referenced and cited by US government agencies, Monsanto and the entire pro-biotechnology machinery as an African small farmer/GM success story.[378] What is crucial about the Makhathini Flats is that it is the place where the first smallholder farmers planted Bt cotton commercially in Africa.

In South Africa, cotton is relatively minor crop, and the combined value of lint and seed production is no more than 1% of the total value of agricultural output. Around 300 commercial farmers who grow on average 95% of South Africa's cotton dominate cotton production.[379] Small-scale farmers make up the rest, with an ever-decreasing share of the market: 4% in 2000/1, an 8% drop from 12% in the 1997/98 season. During a good year, about 3,500 small-scale farmers produce cotton and about 3,000 of them farm on the Makhathini Flats and surrounding area (KwaZulu Natal Province). The remaining farms are in the Tonga area (Mpumalanga Province).

Since the beginning in 1997, the South African government has been behind the introduction of Bt cotton as part of a public-private partnership. The Land Bank (funded by the national government) has also been heavily involved in providing financial support of 269 million Rand (US$43.5 million)[380] from 2002 onwards.) The provincial government has also supported Bt cotton as part of its 'Green Revolution' policy, including mechanization.[381] Thus, both the national and regional governments have injected money into supporting the expansion of Bt cotton in the area. Additionally, these farmers were provided with irrigation infrastructure, subsidized inputs, and a guaranteed market for their harvest by the local government and Vunisa Cotton (which works closely with Monsanto South Africa).

Monsanto embarked upon a crafty marketing exercise, telling farmers that "the muti is in the seed", 'muti' being the term used for traditional medicine in South Africa. The message being sent to farmers was that if they used the Bt cotton seeds they would be rewarded in multiple ways: better yields and funding to purchase farming equipment. For an impoverished community, this is more than enough incentive to use the seeds.[382]

The adoption rate of Monsanto's Bt cotton by the Makhathini farmers was initially very high: 90%, owing to support by the government and successful marketing by Monsanto. It was later discovered that farmers were given very limited choice of cotton varieties, as seed distributors offered only four varieties, three of which were GM, compared to 12 varieties offered nationally.[383]

However, with the passage of time, the total area planted by the Makhathini farmers declined from 276 hectares in 2000/01 to 193 hectares in 2001/02 and 180 hectares in 2002/03. In total, 66% of the farmers reduced the area planted with, or completely stopped planting, cotton. By the end of 2003, very few farmers planted cotton. By 2004, only 700 farmers delivered cotton at the ginnery - down from a total of 3,000 farmers planting cotton in 2000 - equivalent to a staggering 80% drop in farmers growing Bt cotton.[384]

376 ACB, 2005. Op. cit.
377 Ibid
378 Pschorn-Straus, E., April 2005. *Bt Cotton in South Africa: The Case of the Makhathini Farmers.* Biowatch South Africa, Seedling; Monsanto Interview, 2005. Op. cit.; ACB, 2005. Op. cit.
379 Hofs, J.L. and Kirsten, J., 2001. *Genetically Modified Cotton in South Africa: The Solution Rural Development?* Working Paper 2001-17, Department of Agricultural Economics, University of Pretoria and CIRAD.
380 Oricho, G., 2004. Report of the Acting Chief Executive Officer of the Land Bank to the Parliament of South Africa.
381 Linscott, G., 14 May 2002. *"Green Revolution gets a R10 million Boost"* in The Mercury.
382 Pschorn-Straus, E., April 2005. *Bt Cotton in South Africa: The Case of the Makhathini Farmers,* Biowatch South Africa, Seedling.
383 Ibid.
384 Ibid.

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In the final analysis of farmer income, a study found that only four farmers of a total sample of 36 had made a profit. The total loss of these 36 farmers came to US$83,348, and most of them had accumulated massive debt. In a 2004 interview, a Land Bank official said that the debt figure for the whole area totalled just over US$3 million, owed by 2,390 farmers, an average of US$1,322 per farmer. Around 80% of the farmers had defaulted on their loans.[385]

Unfortunately, there is no empirical evidence in the form of financial records that would allow for a comprehensive analysis of crop yields and living standards before and after GM cultivation. Substantive claims as to the success of GM cotton in the Makhathini Flats by GM corporations such as Monsanto are thus both irresponsible and unjustified. A further critical factor is that the drop in international cotton prices has forced the Makhathini farmers to question the choice of GM cotton as a viable cash crop. In sum, what has emerged clearly is that Bt cotton did not help the Makhathini farmers crawl their way out of poverty. Indeed, the problems faced by resource-poor farmers in Africa are complex and cannot be addressed by quick techno-fixes.

7.5 conclusions

Transnational companies are targeting cotton production areas in Africa for the introduction of GM cotton. The challenge for Africa is not only to resist this imposition, but also to find ways in which African people can reassert control over the political and economic processes that unfold in their name but seldom to their benefit.

Despite Monsanto promoting the advantages of GM as a solution for the world's poor and hungry,[386] the case study of South Africa clearly illustrates that commercial farmers are by far the largest consumers of GM technology. In the case of cotton, which is suggested to offer a cash crop solution to small and micro-scale subsistence level farmers, the experiences of the farmers in the Makhathini Flats suggest that this is an oversimplification of a far larger development issue and that GM is not the panacea that it purports to be.[387] As suggested by a 2004 ACB study, "While improving productivity for other cash crops may raise incomes for some farmers and help to alleviate poverty, in the case of cotton, rising productivity under current market conditions is more likely to further depress prices."[388]

In short, small and micro-scale farmers in Africa will be unable to effectively compete on the open market without additional inputs (as was established by the Makhathini experience and as is suggested by the ISAAA Brenner report).[389]

While improving productivity for other cash crops may raise incomes for some farmers and help to alleviate poverty, in the case of cotton, rising productivity under current market conditions is more likely to further depress prices. Uniform seed varieties genetically altered for conditions in other countries and parachuted in are not likely to solve the problem of poverty amongst West African cotton growers.

In order to avoid the short-sighted solutions offered by a reliance on technology alone, it has been suggested that a number of criteria ought to be used to determine the utilization and application of GM in Africa: "Agricultural research must generate site-specific varieties to accommodate different conditions of production. The self-expressed needs of poor farmers should lead research. The most cost-effective technologies need to be prioritized and chosen. Environmental sustainability requires that not only the second generation effects of the Green Revolution (for example, damage caused by pesticide use) be considered, but also impacts on soil fertility. Institutional sustainability must be addressed."[390]

De Grassi, who conducted an in-depth study of South Africa's smallholder cotton farmers, determined that the introduction of Bt cotton failed to meet the above criteria. He suggests rather that the "technology is uniform and imposed from outside without full information being provided (partly because there is no information on its long-term effects on the environment and social organization)."[391]

The inescapable conclusion is that GM is not a cure all, but may in fact be exacerbating the conditions of poverty and hunger that it is supposed to be alleviating in Africa. The collective changes that have occurred in the South African context since the introduction of GM in the early 1990s should serve as a warning about the kind of agricultural market integration corporations like Monsanto are seeking to establish in Africa. These changes have been shown to strengthen the grip of large corporations on the formal South African economy, at the expense of those who are most in need of access to it, the small and micro-scale rural farmers.

385 Ibid.
386 Monsanto interview, 2005. Op. cit.
387 ACB, 2005. Op. cit.
388 Greenberg. S., 2004, pp. 12-13.
389 Brenner, C., 2004, p. xvii.
390 Greenberg. S., 2004, pp. 12-13.
391 Ibid.

eight a decade afterwards: lessons learned

a decade afterwards: lessons learned

8.1 monsanto's strategies

Monsanto is responsible for around 90% of all GM traits used around the world. It has more GM product applications for commercial release than any other company, either directly or indirectly through licensing agreements with local seed companies. One of the company's current priorities is to expand and gain new markets for its GM crops. Monsanto's ambitious plans, if achieved, will have profound implications for the world's food supply, for the environment, for consumers and, in particular, for developing countries.

8.1.1 expanding the gm seed frontier

Monsanto is at the forefront of constantly pushing for regulatory clearance for its GM products in various countries, in order to maximize profits from the GM seed business.

Towards the end of the 20th century, the seed industry in North America became highly concentrated, with oligopolistic competition among and between a few large firms. In 2005, after acquiring Seminis, Monsanto became not only the global leader in GM crops, but the largest seed company in the world.

Monsanto's estimate of a 25% annual growth up to 2008 is largely based on the rapid adoption of GM seeds throughout the world. The company aims to displace conventional seeds with its patented GM varieties, particularly in soy, corn, canola and cotton. It is striving for a world in which the only agriculture is genetically modified, and predicts that "full adoption of GM crops globally would result in income gains of US$210 billion per year within the next decade, with the largest potential gains occurring in developing countries at a rate of 2.1 percent gross national product per year".[392]

In practical terms, this means that Monsanto's marketing strategy will continue to promote the transformation from conventional to GM seeds. In this scenario, and particularly within the context of Monsanto's dominant seed position, there will be significant implications for farmers in terms of choice and availability of alternatives to what Monsanto has prioritized. Farmers and civil society groups in the US and Africa have already observed that the availability of conventional seed is sometimes reduced in favor of GM crops.

The more hectares that are converted into GM crops around the world, the greater the price per share, and the more Monsanto will benefit. Over the next two years, Monsanto plans to convert at least 100 million acres of the currently available 300 million acres of conventional corn to GM corn. If this happens, Monsanto predicts that it could double its profits by adding over US$2 per share of incremental run-rate earnings. A similar analysis can be made for cotton and soybeans. For cotton, Monsanto calculates that by cultivating 20 million acres more it could increase profits by $0.80 per share of incremental earnings, and in soybeans, 40 million acres more would represent $0.40 more per share in earnings.[393]

For soy, Monsanto has targeted the world's main producers and exporters: the US, Argentina, Brazil, and Paraguay. While the penetration of Monsanto's Roundup Ready soy was quick in the US and Argentina, regulatory barriers have prevented its debut in Brazil and Paraguay for many years. For maize, Monsanto's main targets are Latin America and Europe; for cotton, the company has targeted India, South Africa, and other Asian countries. While maize imports from the US to Europe have dropped dramatically since the adoption of GM crops, Monsanto's latest investment previsions of November 2005 describe Europe as a potential market, and envision the potential uptake of over 13 million hectares of European maize cultivation over the next five years.

8.1.2. monsanto's assault on regulatory and policy regimes

Within the paradigm of converting hectares of conventional crops by introducing GM traits in as many countries as possible, Monsanto's offices around the world are doing what they can to fulfil the company's predictions and ambitions. Monsanto and the biotech industry's use of their influence to overcome regulatory hurdles and prevent the adoption of adequate biosafety regimes is well documented. Monsanto has used bribery to gain acceptance of its crops and to obtain regulatory approval; evidence of this has been found in Indonesia, for example, where an investigation by the US Securities and Exchange Commission revealed that over US$700,000 in bribes was paid to at least 140 current and former Indonesian government officials and their family members between 1997 and 2002, financed through the improper accounting of Monsanto's pesticides sales in Indonesia.

392 Monsanto, 2005. *World at a Glance.* Conversations about Plant Biotechnology. http://www.monsanto.com/biotech-gmo/biotech-gmo_world.pdf
393 UBS, 2004. Op. cit.

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The US regulatory system, which is based on the substantial equivalence principle and in which GM crops do not require specific regulation, was designed by biotech industry lawyers. As the former official responsible for agricultural biotechnology at the US Food and Drug Administration affirmed: "in this area, the US government agencies have done exactly what big agribusiness has asked them to do and told them to do". In Brazil, it has been verified that a lawyer who worked for Monsanto played an important role in the implementation of a weak biosafety law in the country.

8.1.3 first contaminate, then legalize

Monsanto's products have also penetrated and contaminated areas where the planting of GM crops was forbidden. In Brazil, despite a ban on planting GM soy between 1998 and 2003, the widespread contamination of crops in the south of the country led to the temporary authorization of the 2003 GM soy harvest by the government. In Paraguay, where a ban on GM soy planting was also in place, the de facto contamination led to the authorization of GM soy in 2004. In India, despite the lack of authorization for the commercial release of Bt cotton, contamination was detected in 2002, leading to the approval of GM cotton some months later.

8.1.4 unethical and irresponsible advertising

Monsanto has used unethical and irresponsible media and advertisement campaigns to gain the confidence of farmers. The National Commission of Indian Farmers has reprimanded biotech companies for their "aggressive advertisement". Intensive marketing through local newspapers, local meetings and television advertisements, using popular actors in some cases, has been undertaken in several Indian states. In Brazil, Monsanto launched an educational program in schools in April 2005, which was eventually halted by the Minister of Culture following public opposition.

Monsanto and pro-biotech organizations are renowned for using so-called 'small farmers' to attest to the success of GM crops. One of the best known is Buthelezi, who is promoted around the world as a poor farmer but in reality appears to be a wealthy South African farmer from the Makhatini Flats. Buthelezi even made an appearance at the launch of the US complaint against the EU at the World Trade Organization in 2003.

ISAAA has used similar 'grassroots' strategies: they supported the work of the so-called Asian Regional Farmers' Network (ASFARNET), which claimed to be a network of farmers from India, the Philippines, Indonesia, Thailand, Malaysia and Vietnam. A background check on these 'farmers' cast some doubt on their professions: Dr. Banpot, the 'farmer' from Thailand, is a high-profile pro-GMO scientist from a public research institution in Thailand, and the 'farmer' from the Philippines, Edwin Paraluman, heads a local irrigators' association in General Santos City but does not appear to belong to any farmers' organization.[394]

farmers: the new biotech pawns

"Buthelezi was by Zoellick's side when the Trade Secretary formally announced a US WTO case against EU restrictions on GM imports. A month later, the Administrator of USAID, Andrew Natsios, described Buthelezi before a Congressional panel on plant biotechnology in Africa. [...] The Council for Biotechnology Information calls him a 'small farmer', and others describe his life as 'hand-to-mouth existence'. Administrator Natsios described him as a 'small farmer struggling just at the subsistence level'. However, independent reporters have revealed that, with two wives and more than 66 acres, he is one of the largest farmers in Makhathini, and chairs the area's farmers' federation encompassing 48 farmers' associations."

Source: *De Grassi, 2003.*

8.1.5 challenging farmers' rights: the fight over royalties

In the United States, Monsanto has established a very tough collection regime for royalties on its GM products. The royalty is collected in the form of a 'technology fee', or surcharge for the GM trait, which is paid at the point of seed purchase. This surcharge represents 30% or more of the price of the seed. Farmers are supposed to sign a 'technology use agreement' upon seed purchase stipulating that they are prohibited from saving any GM seed from their harvest for replanting. This 'intellectual property protection' criminalizes the age-old practice of seed saving, the farmer's most fundamental right. In many cases, however, farmers

394 *Personal communication between FoEI and Neth Dano,* Third World Network, Philippines, October 2005.

who never saw or signed this agreement have been sued for violating it, their signatures forged by seed dealers. In other cases, farmers who did not save or replant GM seed have found their fields contaminated with GM traits through cross-pollination from neighboring fields or GM seed blown from trucks.

This system aggressively challenges the fundamental rights of farmers around the world: if farmers reuse seeds without paying technology fees, they risk being taken to court and fined. This is the case even if they have not used the seed and their crops have been contaminated through cross-pollination or other means. Thousands of farmers have been investigated by Monsanto: some have settled, but others have landed in court. Most of the farmers who end up in court face a very unbalanced situation, as their legal resources are far less than those of the multi-billion dollar company. In many cases, these farmers cannot afford any legal representation whatsoever and must stand alone in trial against Monsanto.

Since 2003, Monsanto has focused on implementing these intellectual property right practices at the global level. One important reason for this push is Monsanto's need to replace the reduction in revenues from its Roundup Ready herbicide. Since Roundup went off-patent in 2000, the company has been forced to slash its prices to meet competition from generic makers of glyphosate (the active ingredient of Roundup) in Europe and China. With shrinking profits from its chemicals and Roundup Ready sales, and fierce price competition from China and Europe, the company is trying to bring in as much money as possible in the form of royalties derived from its GM traits division, which requires US-like intellectual property laws.

The company's first targets have been the main adopters of GM crops in South America, and several temporary agreements have been reached in Paraguay, Uruguay and some Brazilian states. Monsanto is making deals based on different approaches: collecting royalties either at the time of purchase of GM seeds, or at the delivery of the harvested crop, or both. The company is dealing directly with farmers' organizations, as well as with grain elevators. It is also lobbying for changes in national regulatory regimes, for example in Uruguay, in order to replace farmers' rights to freely save and reuse seeds with new mechanisms to allow private contracts that impose restrictions on such rights.

No deal has yet been made in Argentina, where the government is strongly opposed to this approach. Miguel Campos, the Argentinean Secretary of Agriculture and a strong supporter of GM crops, points out that Monsanto has made a good deal of money in the country and should not impose itself unfairly on Argentine farmers: "The great beneficiary of this has been Monsanto. Argentina has been the launching point for the use of this technology in the continent. This has allowed Monsanto to make advances in other countries."

In June of 2005, Monsanto launched a new phase in its campaign by filing lawsuits against the shipment of Argentine soybean products to the Netherlands and Denmark. The company is claiming the possible infringement of its Roundup Ready patent rights in Europe due to the presence of this gene in imported products derived from GM soybeans.

The controversy over royalties has also been ignited in Asia after complains from farmers. At the beginning of January 2006, the Andhra Pradesh government filed a petition against Mahyco-Monsanto before the Monopolies and Restrictive Trade Practices Commission for what it considered an "exorbitant" royalty collection for Bt cotton. The Minister of Agriculture of Andhra Pradesh, Mr. N. Raghuveera Reddy, said that "The company - Monsanto - is compelling cotton farmers at gun point to pay the extra amount, even as it collected lesser and variable royalties in other countries."[395]

The increasing power of Monsanto in the seed industry, strengthened by looming corporate intellectual property rights systems for collection of royalties, constitutes a major threat to farmers' rights worldwide. In the countries in which such regimes have been adopted, experience shows that farmers who choose to cultivate non-GM varieties have no legal protection against contamination, and can be sued for the non-intentional presence of transgenic DNA in their crops.

Monsanto's June 2005 property rights claim over soy cake from Argentina signals that the company believes that it has proprietary rights over transgenes not only in its patented seeds but in products derived from these seeds. This is a strong warning of the risks involved in allowing a multi-billion dollar company to continuously expand its crop model. In order to obtain what it considers 'adequate' benefits, Monsanto will need to progressively increase its control over the seed, food, and feed supply of any country in which its products are introduced, to the detriment of the nation's farmers.

395 The Telegraph, 1 January 2006. *Monsanto faces Royalty Heat.* Calcutta, India; The Hindu Business Line, 2 January 2006. *AP Government moves against Monsanto on Bt Cotton Royalty.*

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8.2 environmental, social and economic impacts

The biotech industry claims that GM crops in the US have provided "significant yield increases, significant savings for growers, and significant reductions in pesticide use".[396] But as the case studies in this report show, a significant number of studies by independent scientists demonstrate that yields from GM varieties are lower than, or at best equivalent to, yields from conventional crops, contradicting the biotech industry's claims to the contrary. Reduced yields are found with Roundup Ready soy in particular.

Furthermore, independent studies have demonstrated not only that pesticide reduction claims are unfounded, but that GM soy has dramatically increased pesticide use, particularly since 1999. This increase in pesticide applications will be exacerbated by the widespread adoption of Roundup Ready crops around the world. By 2005, six different weeds had reportedly become resistant to Roundup in many countries, not to mention a long and growing list of weeds that have developed a degree of tolerance sufficient to require applications of other, often more toxic, herbicides.[397] The decreasing efficacy of Roundup is largely due to the overuse of this single herbicide as the key method for managing weeds on millions of hectares.[398] This underscores the fallacy of the 'one size fits all' approach so prevalent in modern-day farming.

In Argentina, the intensification of soy production has been associated with a decline in soil fertility and soil erosion. It has been predicted that Argentinean soils will be infertile in 50 years if current rates of nutrient depletion and soy production continue. At the same time, soy has displaced other crops such as legumes, fruits, and cattle, which has serious consequences for the country's food sovereignty.

The introduction of GM soy has also contributed to the acceleration of land concentration in Argentina, favoring the establishment of large holdings and the disappearance of smaller farms.[399] During the 1990s, the number of farms in the Pampas declined from 170,000 to 116,000, while their average size doubled.[400] 14 million hectares are calculated to be in debt to banks and big companies.

In 2005, Brazil suffered a drought that caused a 72% reduction in soybean yields in Rio Grande do Sul, where Roundup Ready had been widely adopted. The president of the Rio Grande do Sul seed association explained that crop losses were 25% higher for GM soy than for conventional soy, and the governor of Matto Grosso -which produces 25% of the national soybean crop - announced that the state would not plant GM crops the next year. In the current context, recent reports from Brazil confirm that GM soybean uptake in the country for the 2006 harvest season has been much lower than the 50% uptake forecasted by optimistic industry analysts.[401]

In Paraguay, soy cultivation expels thousands of small farmers from their land each year. Human rights violations and forced evictions of peasant communities by soy landlords have been documented in recent years.

396 Monsanto, 2003. *Proxy Statement 2004*, p. 23. http://www.monsanto.com/monsanto/content/media/pubs/2004/2004proxy.pdf; Carpenter, J. and Gianexsi, L., February 2001. *"Why US Farmers have Adopted Genetically Modified Crops and the Impact on US Agriculture"* in AgBiotechNet, vol. 3. http://www.ncfap.org/reports/biotech/agbiotechnet.pdf

397 Benbrook, C., 2004. Op. cit, p. 7.

398 Delta Farm Press, 2005. *No Quick Cures for Glyphosate-resistant Weeds.* http://deltafarmpress.com/news/050927-glyphosate-resistant/; Business Journal, 24 September 2005. *Major Yield Losses and Harvest Headaches.* http://bjournal.com/2005/content/article_views.php?ID=756&Author=56. Professor Tom Mueller, University of Tennessee weed scientist, said that *"Palmer pigweed that is not killed by glyphosate will cause major yield losses and harvest headaches for soybean, cotton and other row crop producers. [...] It is essential to use more than one herbicidal mode of action on your fields."*

399 Desafíos Urbanos, 2005. *La Nueva Protesta Social Campesina en el Norte y el Oeste de Córdoba ante los Desalojos Generados por la Ofensiva de los Sojeros.* Año 10, n° 50. CECOPAL, Argentina.

400 Pengue, W., 2005. Op. cit.

401 ASA, 19 December 2005. *GM Soy Seed Usage Slows In Brazil.* International Marketing - Weekly Update.

8.3 who benefits from gm crops?

The GM crops that have been commercialized during the last decade, from 1996 to 2005, have been oriented towards maximizing benefits for the agribusiness and seed industries that control GM traits and the chemical products associated with GM crops. In ten years, the commercialization of just two GM traits - herbicide tolerance and insect resistance - have dominated the market in three major crops: corn, soybeans and cotton.

Over 70% of the total global GM crop area is herbicide tolerant; the rest is insecticide resistant, namely Bt. Most of those crops are earmarked for animal feed or for heavily processed products. In the case of Argentina, only 2% of all GM soy stays in the country; the rest is exported, primarily to Europe and China, for animal feed and other highly processed products.

The feed industry, the main recipient of GM products, has already expressed its lack of preference for GM over conventional soy. The European feed industry stated in 2005 that there is "no direct advantage from the presence of residues of herbicide resistant genes in the products they buy. The industry is therefore not prepared to pay for the use of this technology." (See Chapter 2).

GM products also do not offer advantages to consumers, as they are neither cheaper nor better quality. Even the French biotech industry has stated that the GM crops currently available in the market do not benefit consumers. There are clearly no environmental benefits to GM agriculture, as seen by the fact that the most widely planted herbicide-tolerant varieties increase pesticide use substantially. Furthermore, soy expansion is driving small farmers off the land, fostering the emergence of huge mega-farms, and contributing to deforestation.

Neither have GM crops done anything to ease hunger in the world, despite the continual use of this argument by the biotech industry to promote GM crops. First, GM crops are overwhelmingly grown in and/or exported to the world's rich nations. Second, they are fed primarily to animals for meat production and consumption by the well-to-do in the US, Europe, Japan and other wealthy nations. By and large, the poorer farmers of the world cannot afford to purchase imported soybean meal or maize (whether GM or not) to feed their livestock. While GM maize might be exported to some extent to poorer countries for direct human consumption, it offers absolutely no advantage over conventional corn; indeed, Bt corn's insecticidal toxin has not been adequately reviewed to assess its potential impacts on human health. Third, the reduced yields associated with GM crops shrink rather than expand the world's available feed/food supply. In any case, hunger and malnutrition are ultimately caused more by poverty, lack of access to land, illiteracy and poor health care than by deficient agricultural production techniques.

So then, who does benefit from the GM revolution? Taking into account the way in which GM crops have been introduced, the beneficiaries to date are obvious: big agribusiness and the biotech corporations that 'own' the GM seeds and traits. Secondly, some large farmers in exporting countries have received some benefits, although these appear to be more related to greater ease of production and the ability to cover more acres as opposed to an increase in profits per hectare. On the other hand, small farmers in several developing countries - Argentina and Paraguay in particular - have been evicted from their lands by large landowners to make room for a huge expansion in soybean cultivation - most of it GM - for export to mainly richer nations. To the extent that GM crops like Roundup Ready soy facilitate expansion of monocultures, they also reduce a nation's food diversity and security, as seen most dramatically in the case of Argentina.

Soy in South America.

eight a decade afterwards: lessons learned

8.4 time to get serious! the need for independent evaluations of gm crops and truly sustainable agricultural approaches

The evaluation of the impacts and the performance of GM crops is a highly complex field, and comprehensive and independent evaluators are required in order to be able to provide an objective analysis. Unfortunately, many governments and international bodies such as the UN Food and Agriculture Organization appear to base their analyses on the work of organizations like ISAAA and other industry-oriented organizations that have contributed to the GM crop hype.

In 2003, ISAAA claimed that "the three most populous countries in Asia - China, India, and Indonesia (total population 2.5 billion and a combined GDP of over US$1.5 trillion), the three major economies of Latin America - Argentina, Brazil and Mexico (population 300 million and a GDP of $1.5 trillion), and the largest economy on the continent of Africa, South Africa (population 45 million and GDP of $130 billion) are all officially growing GM crops for the benefit of their combined population of 2.85 billion with a total GDP of over $3 trillion."

In order to evaluate the validity of such a claim, a series of structural, regulatory, and economic aspects related to the geographical, political, and scientific context of the country and region in which a particular GM crop is to be adopted must be taken into account. Furthermore, a comprehensive assessment of the performance of GM crops requires a full description of short, medium and long-term impacts, whether they be negative or positive. ISAAA's analysis only extols the benefits, without referring to any of the negative impacts derived from the introduction of GM crops. This raises many questions: if so many millions of small farmers from India are benefiting from GM crops, as ISAAA claims, how can the 2005 ban by the government of Andhra Pradesh on the first three varieties of Bt cotton be explained? How does ISAAA account for the protests and complaints by hundred of farmers about the failures and problems associated with Bt cotton in the District of Warangal, and the negative reports from the Department of Agriculture in Maharastra? If half a million people were lifted out of poverty in Indonesia thanks to Bt cotton, as ISAAA claims, why did Monsanto abandon the commercialization of Bt cotton there in 2003? How does ISAAA explain the poor performance of Bt cotton in South Sulawesi? And why did Indonesia disappear from ISAAA's map of countries cultivating GM crops in 2004 without any explanation?

The fact that problems such as these are so often ignored by people in power is a testament to the mania for agricultural biotechnology in some circles. This uncritical enthusiasm for agriculture biotech is fostered by a sophisticated and well-funded public relations effort on the part of the biotech industry, which spends US$50 million per year to promote its products in ways that are often deceitful and unethical. It is also, unfortunately, fostered by the desperate search for silver bullet solutions so common in areas suffering serious rural decline.

As suggested by the many problems with GM crops outlined above, there is an urgent need for a serious independent analysis of proposed biotech 'solutions' to the agricultural problems facing farmers, particularly in developing countries. Even more important, agricultural officials should always begin their analysis with the specific problem to be solved or improvement to be made, not with a single proposed (biotech) solution. A full range of non-biotech approaches should also be evaluated. For instance, the innovative 'push-pull' system of maize cultivation in Africa accomplishes all that Bt maize can, but offers much more, and at much lower cost. This system involves intercropping maize with plants that repel or 'push' insect pests out, together with a border row of another plant that attracts or 'pulls' the same pests out of the field. Besides insect protection, the intercropped plants repel weeds, and can be harvested to feed livestock. The low cost and added benefits make the 'push-pull' system a much better choice than GM insect-resistant maize.

This is just one example, and many others could be mentioned: bio-control of cassava mealybug in Africa, for instance, rescued Africa's staple crop from almost certain devastation in the 1980s, and saved millions of African lives. Today, scientists would probably rather tinker with cassava genes in hopes of coming up with an 'insect-resistant' GM cassava. In many cases, basic infrastructure improvements such as all-weather roads, or decent fencing, can do more to help farmers than any crop modification can.

8.5 conclusion

The future of who controls our food hangs in the balance. Monsanto will target major food and feed markets over the coming years in order to expand its global 'genetic footprint' of GM crops. The biotechnology industry as a whole continues to amass control over the food supply through the purchase of seed companies, the acquisition of patents on GM crops and genes, and the persecution of farmers for alleged patent infringement. The aggressive push in South America to adopt new regulatory mechanisms for imposing technology fees is a clear attempt to export North American practices at the global level.

Monsanto and other biotech companies continue to exercise extraordinary influence over governments and their regulatory apparatuses, ushering poorly tested and potentially hazardous products through weak approval processes. Bribery has been used as a tool to overcome environmental risk assessment hurdles, and unethical and immoral media campaigns have been waged. These are all troubling developments that bespeak a profound disconnection between the profit-driven goals of agribusiness and the clear desires of citizens around the world for healthy, sustainable food systems.

Yet there is also much reason for hope. The biotech industry has failed to introduce new second generation GM crops with consumer benefits as planned. After 30 years of research, only two modifications have made it to the marketplace on any scale. The industry's plans to introduce third generation crops engineered to produce experimental drugs and industrial compounds have also been defeated. Understandably, these so-called pharma and industrial GM crops have aroused considerable controversy among citizens and food companies. The biotech industry also seems to be running out of new ideas, with a decline in the number of GM crop field trials and a return to conventional breeding for some of its most promising new crops. Finally, the most vibrant sector of the food industry continues to be organic agriculture, which prohibits the use of transgenic technologies. These developments are clear signs that genetic modification does not need to be the future of food.

The range of possible food futures is suggested by a recent white paper from the US Department of Agriculture's pro-biotech Advisory Committee on Biotechnology and 21st Century Agriculture.[402] Despite its flaws, which include some of the mistaken assumptions that we have critiqued in this report, the paper outlines three scenarios for the future of GM crops: Rosy Future, Continental Islands and Biotech goes Niche. The latter scenario in particular acknowledges the clear possibility that transgenic plant technologies will fade in importance as technical difficulties in the development of multi-gene traits and consumer rejection continue to block the introduction of new GM varieties. On the other hand, the successful products of organic agriculture and smart non-transgenic breeding approaches that employ our expanding knowledge of genomics (e.g. marker-assisted breeding) are eagerly accepted by consumers around the world. The future of food is ultimately a democratic decision that should involve each and every one of us.

Latin American farmer in a corn field.

402 *Preparing for the Future*, USDA Advisory Committee on Biotechnology and 21st Century Agriculture, May 2005. http://www.usda.gov/agencies/biotech/ac21/reports/scenarios-4-5-05final.pdf

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