What is South Africa doing about genetically engineered crops?

The area under commercially grown genetically engineered (GE) crops has expanded rapidly in South Africa since 1997. South Africa is one of only six countries worldwide growing GE crops. It is also the only country in Africa growing GE crops commercially, and the only country in the world producing a GE crop as part of the staple food of its population – GE white maize.

South Africa now devotes an estimated 300 000ha to growing GE white and yellow maize, soybean and cotton. About 80% of the cotton grown in South Africa is GE. Field trials have been conducted on potatoes, wheat, canola, sugarcane, apple, eucalyptus, strawberry, sugar beet, tomato, and sweet potato to identify suitable GE varieties for commercial production.

This briefing tracks the introduction of GE in South Africa, and gives an overview of the regulatory framework of GE.

South African Agriculture

South African agriculture mirrors the high levels of inequality in the country. There is a large-scale industrialised commercial farming sector and a small-scale, labour intensive, low input sector where farming is often one of a number of livelihood strategies for poor rural households.

Commercial agriculture produces most of the food for the country and makes an important contribution to export earnings. Historically this sector has enjoyed considerable state support, which encouraged capital intensity and the concentration of land ownership. Following the recent withdrawal of this support the commercial sector has largely managed to compete internationally but it is heavily dependent on input suppliers and on financial institutions for capital investment, production credit and crop insurance.

Smallholder agriculture is largely confined to the former apartheid homelands. These areas remain home to a third of South Africa's population and 70% of the poor. Some emergent commercial farmers exist in these areas and a number of managed out-grower schemes produce cotton or sugarcane for the market. However, most small-scale farming contributes to the survival of poor rural households with any surplus sold on local markets to meet cash needs.

At present the uptake of GE crops is mainly in the commercial sector with some penetration into smallholder outgrower schemes. Commercial farmers are accustomed to buying seed and other inputs and the decision to buy GE seed is largely a question of perceived costs and benefits. The higher price of GE seed and the technology fees charged by suppliers have to be balanced against savings on chemicals and reduced management. However, as these briefings show, there are many other issues besides production costs – many of them with no clear answers at this stage – that socially and environmentally conscious farmers must consider before planting GE seed.

Most smallholder farmers save seed from the harvest for planting. Often this is open-pollinated seed including farmers' varieties adapted to local conditions, rather than hybrid commercial varieties. In contrast to these farmer varieties, most GE seed is based on the varieties used in industrialised countries. GE does not accommodate the conditions facing small-scale farmers including poor soils, drought and high input costs.

In South Africa, the uptake of GE crops amongst smallholder farmers has been limited to schemes where farmers receive a package of inputs and support, and loans from the Land Bank. Research supported by industry reports dramatic increases in yields of up to 220 per cent for smallholder GE cotton and maize farmers in South Africa. This research does not make it clear how much of the increase is due to the GE seed and how much is due to the package of inputs accompanying the seed. Despite the reported higher yields, these farmers risk getting trapped in a debt cycle if their crops fail and they are not able to repay their loans and buy seed again. This happened to the smallholder cotton farmers in Makhatini in the 2002-2003 season. Such dependence on outside inputs, compounded with potential environ-mental and health impacts, could have a disastrous impact on smallholder farmers on the edge of survival.

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Regulatory framework for genetic engineering

South Africa has never developed a policy on GE, nor included the public in any decision-making about GE activities in the country. The regulatory framework for GE in South Africa remains controversial and is widely considered to be inadequate and pandering to the needs of the biotechnology industry without taking into account the needs of farmers, consumers or the environment. The National Department of Agriculture is responsible for both promoting and regulating GMOs and biosafety, while the Department of Health (DOH) is responsible for labelling legislation and monitoring health impacts. The Department of Environmental Affairs and Tourism, the lead agent for biosafety and biodiversity, has been silenced by other more influential government departments and has almost no say over the impact of GMOs on the environment.

▶ *The GMO Act*

South Africa's Genetically Engineered Organisms (GMO) Act 15 of 1997 regulates the production and release of GMOs in the country and should address biosafety concerns. Regulations passed in 1999 cover permits, risk assessment, registration of facilities, public notification of a proposed trial or general release of GMOs, accidents, waste management and appeals. The Act relates to a number of other acts passed by the National Department of Agriculture and to the National Environmental Management Act 107 of 1998.

The GMO Act contains a number of flaws. It does not make adequate provision for risk assessments, it imposes liability for environmental or other damage on the end user (farmer or consumer) rather than provider, and it does not allow for proper public input or oversight in permit granting procedures. The Act is essentially a mechanism to fast-track permits for field trials, commercial releases and the import and export of GE crops. It has permitted millions of tons of GE maize to enter the South African market from Argentina for animal and human consumption, without any safety assessments. Argentina has a limited market for this maize, as many countries will not buy it.

▶ *The Biotechnology Strategy*

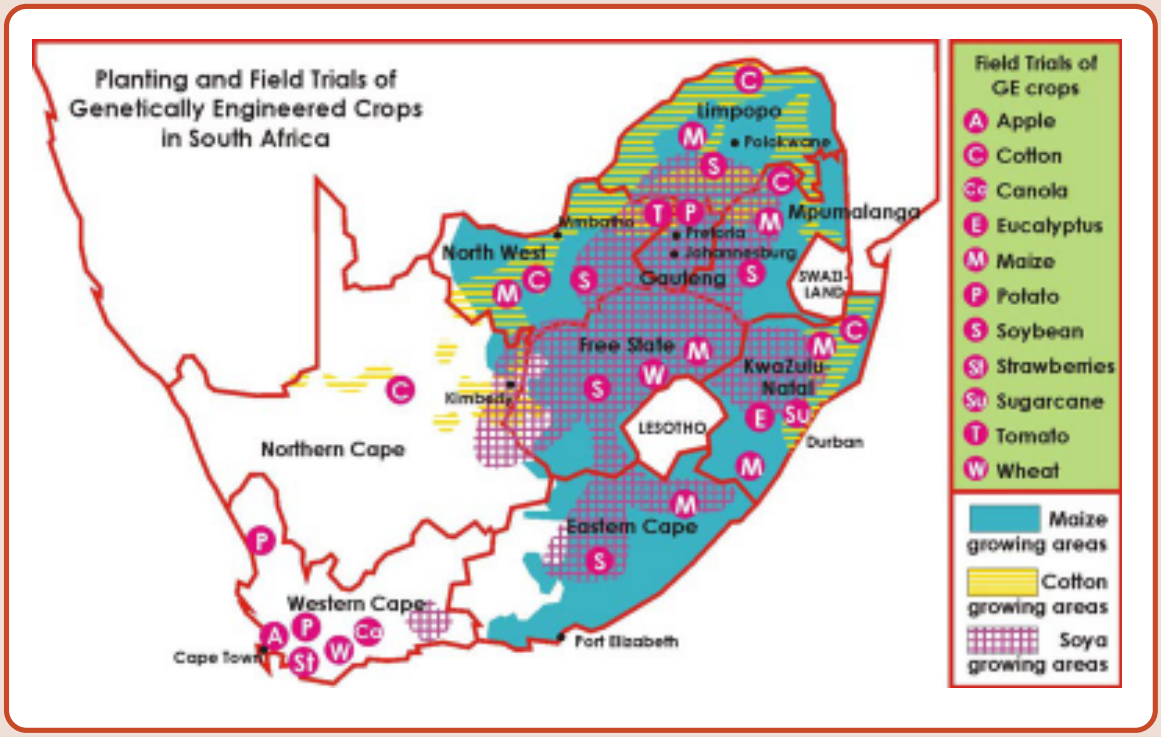
Although there is no national policy on Biotechnology, the Department of Arts, Culture, Science and Technology developed a National Biotechnology Strategy in 2001. The strategy recognises the risks – including gene transfer – which GMOs can pose to the environment and the impact that they can have on seed markets, biodiversity and ecosystems. However, its main premise is that biotechnology can lead to greater food security and environmental sustainability, and it advocates speeding up field trials and making South Africa the launching pad for GE crops in Africa. This is incompatible with the need to first establish a rigorous and transparent regulatory system and to implement the Cartagena Protocol on Biosafety, which took effect on 11 September 2003 and which South Africa has signed.

▶ *The Labelling Legislation*

In contrast to the quick adoption of GE foods into the mainstream, labelling legislation has taken years to develop, and the Department of Health finally published regulations in January 2004. These regulations stipulate that labelling of GE foods is voluntary, with the onus resting on those food producers who want to market their products as GE-free to ensure segregation, testing and labelling. Consumers and food producers have to bear the cost of having GE-free, labelled food, with neither the biotechnology company, nor the government having any responsibility or liability in this matter.

▶ *The Biodiversity Act*

South Africa's recently promulgated Biodiversity Act provided an important opportunity for the Department of Environmental Affairs and Tourism to have oversight on the impacts of GMOs on biodiversity. However, only through concerted public pressure was a weak clause included that could, at the discretion of the Minister, trigger an environmental impact assessment for GE crops. The process to develop the Act showed clearly how corporate interests are closely tied to the interest of certain government departments, and how such interests are riding roughshod over our Constitutional rights to a safe and healthy environment.



Farmers

The commercial planting of GE crops in South Africa is limited to maize, cotton and soybeans. Maize is the largest single crop planted in South Africa, accounting for between 10 and 20 per cent of total agricultural value. In 2004, GE maize accounted for 35% of the total crop. Farmers have expressed some concern about the market for GE maize and some districts have opted to remain GE free. Cotton is a relatively small crop in South Africa by world standards and local production only meets 50% of local demand. Cotton has seen the largest uptake of GE seed with Bt cotton accounting for around 80% of the crop. Production levels of soybeans are also relatively small and SA is a net importer. GE uptake is estimated to be about 30%.

GE seed costs about 60-100% more than other seed and farmers have to pay a technology fee to the companies that own the patents on the gene for using the seed. Farmers must also sign a contract that binds them to only use the seed for a single season, and to not distribute or sell it. In the case of soybean most farmers cannot afford to buy seed every year and therefore plant saved seed. The contract accommodates this practice on condition that farmers pay a technology fee each year that they use saved seed.

Seed saving is still widely practiced in South Africa, especially by smaller farmers (see table below). Open Pollinated Varieties are not encouraged by either the Agricultural Research Council or the National Department of Agriculture and this trend is likely to continue because all the registered open-pollinated white maize varieties appear on the list of 'undesired cultivars' published by the National Chamber of Milling.

The Volume of Field Crop Saved Seed in the Former Homelands and Former RSA, 2000

	Former Homeland Areas			Former RSA		
	Saved seed Tons	Total production Tons	% saved	Saved seed Tons	Total production Tons	% saved
Maize for grain	118,537	1,288,934	9.2	15,081	12,502,122	0.1
Green maize	8,751	289,500	3.0	419	162,293	0.3
Grain sorghum	409	11,651	3.5	-	771,987	0.0
Wheat	9	142	6.3	23,058	3,078,196	0.7
Dry beans	2,582	93,379	2.8	9	41,792	0.0
Soya beans	193	4,169	4.6	-	41,895	0.0
Groundnuts	269	12,273	2.2	-	169,979	0.0
Sunflower seed	11	181	6.1	-	418,706	0.0

Source: StatsSA, Small and Large Agriculture, 2000.

Supply chain

Farmers are generally unconcerned about what happens to their crop after sale, and it is mainly those who process and sell GE-free crops who are concerned about segregation, identity preservation and labelling to certify that a product does not contain GMOs.

The general view is that GE crops are used for animal feeds. However silo managers indicate that it is not general practice to separate GE and non-GE crops and that this is only done when specifically requested by clients. For example Specialised Protein Products (SPP), a Denel subsidiary that processes soybean ingredients for the general foods, dairy and processed meat industries believes that the soybeans it uses are GE free. When approached by Biowatch the managers of two silos that supply SPP could not guarantee that the soybeans they supplied to SPP were GE free. Although they store soybeans for SPP separately no tests are conducted when the soybeans are delivered to ascertain whether they are GE free.

Exporters, such as Louis Dreyfuss, contract farmers to plant GE free maize and go to great lengths to ensure that their product stays GE free right through the supply chain until it reaches their buyers in Japan or the EU. For fear of contamination, farmers in the Mpumalanga province have declared their area GE-free.

Retail and Consumers

Internationally GE-sensitivity is mainly in the consumer market but South African consumers are generally not GE-sensitive. However, white maize flour (mealie meal) is now about 2.5% GE and many food products include GE components. At present there is no consumer pressure on millers to keep GE and non-GE grain separate and there are no requirements on processors and manufacturers to label GE products. Some manufacturers such as South African Breweries and African Products insist on GE free maize, as does Afgri Milling that supplies Kellogg's. Woolworth's is the only retailer that has undertaken to label all GE-containing foodstuffs. Other companies, such as Pick & Pay and Nestle have refused to respond to consumer sensitivities around GE food and will not label. Nestle has taken a definitive pro-GE stance.

The lack of any requirements to label GE-containing foodstuffs denies consumers the right to choose what they eat. If no controls are put in place transgenic flows and reduction in crop diversity could deny consumers the possibility of choosing between GE and non-GE containing foodstuffs in the future. This would also make organic farming, as it is currently understood impossible.

A huge concern for South Africa is the extent to which a company like Monsanto has monopolised the seed market. If it were not for a failed bid to buy Pannar, a local company with about 50% share of the seed market, Monsanto would completely dominate both the wheat and maize seed markets in South Africa. Delta & Pineland and Monsanto dominate the cottonseed market owning all of the GE technology. Syngenta is currently driving hard to get a slice of this market. Once seed suppliers control the market it will be possible for them to increase prices and this will have an impact on the prices that consumers pay for foodstuffs and other products that use raw materials derived from agriculture.

Research and development

Although South Africa is leading the way in Africa in introducing GE crops, research into genetic engineering is a small industry in South Africa. Multinational biotechnology companies with a presence in South Africa are driving research and development and they have also acquired a significant share of the domestic seed and agricultural input markets. Most agricultural GE research is done on contract to the multinationals by universities and parastatals, in particular the Centre for Scientific and Industrial Research and the Agricultural Research Council. At present research is being done on a range of grains, field crops, vegetables and fruit crops with the focus on resistance to insects and viruses and some work on drought and heat resistance. In the private sector, Pannar, Monsanto and Pioneer Hi-Bred are all involved in GE research, especially into maize varieties.

Funding is a major problem given the high costs involved in biotechnology research and development. In the private sector most of the technology is developed outside South Africa and local work here is limited to adapting crops to local conditions. Work in the public sector focuses on commercially viable products. The government's biotechnology strategy has allocated R300 million over three years to support the development of the local biotechnology industry, but no funding has been allocated to risk management. National research institutions rely mainly on industry funding with the result that many local scientists working on these issues become handmaidens to industry and little work gets done on the impacts and risks of GMOs.

Conclusion

In South Africa, the recent introduction of most GE crops and the lack of publicly available results of risk assessments make it difficult to establish the benefit and/or risks to growers and consumers. Independent and locally grounded environmental, social and health impact studies are crucially important to undertake but all evidence points to the virtual absence of such studies in South Africa. International research has shown that genetic pollution is certain, and that the effect of this may become economically and environmentally damaging in a number of ways including a reduction in the seed diversity of crops, essential for human survival. Given this and in the light of patchy international evidence of benefits, South Africa should adopt a precautionary approach to GE crops rather than become a dumping ground and experimental field for crops not welcome in most other countries. Public sector research needs to be reoriented to support the development of alternative forms of production and distribution that allow for economic and social inclusion, that promote low-input agriculture, that bolster appropriate support services for small farmers, and that rely less heavily on remote technological developments driven solely by profit and control. In doing so it would support an approach to agriculture that puts people first, not profits.

References

This briefing paper is mainly based on interviews with roleplayers in industry and government. Other key references include:

1. *Department of Agriculture. Plant Genetic Resources, GMO Permits. www.nda.agric.za*
2. *Department of Agriculture. 1999. Genetically Modified Organisms Act No 15 of 1997. Pretoria.*
3. *Statistics South Africa. 2002. Report on the Survey of Small and Large Agriculture, August 2000.*

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