

Genetically modified maize in South Africa

Introduction

Genetically modified (GM) maize is big business globally. In 2011, farmers grew about 51 million hectares of GM maize.¹ Most of this production happened in the United States where the majority of GM crops are being grown. There are just four major GM crops grown in the world today and maize and soya make up the bulk of these.² We have been told that GM crops are the answer to world hunger but the majority of this maize is not grown for food. It is grown mostly for animal feed³ and shipped around the world by massive agricultural commodity trading companies such as Cargill, Archer Daniels Midland (ADM) and Bunge. These grain trading companies are some of the wealthiest corporations in the world. In 2010, these three companies together earned about 200 billion US dollars from trading maize, soya and other grain crops on the global market. Makes you wonder, do GM crops feed hungry people or hungry corporations?

South Africa is the 8th largest producer of GM crops globally. South Africa is the only country in the world that has allowed its **staple** food crop to be genetically modified. Maize is the staple food of South Africa and many other African countries.

No other African country has allowed the cultivation of any GM food crops. GM crops have been on the market in South Africa for almost fourteen years now, so we have had time to see if they have delivered what has been promised.

GM Maize in South Africa

In 1997, South Africa's young democracy agreed to a technology that the rest of the world was extremely cautious about – genetically modified crops. The first GM maize was planted in 1998 – this was Monsanto's insect resistant maize, called MON810 or "Yieldgard". Although this variety has been banned in eight European countries⁴



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because of environmental concerns, it is still cultivated in South Africa today. Altogether there are now eight varieties of GM maize available to farmers. In the 2010/2011 season, about 77% of all maize seed sold in South Africa was GM. This means that about 1.8 million hectares of GM maize were planted in that year.

Since the beginning of 2008, the South African government has granted close to 1200 permits for GM maize experimentation, cultivation, import and export.

There are very few companies involved in the GM seed market in South Africa. In other words, there is very little competition in this business. The three largest seed companies in the country – Monsanto, Pioneer Hi-Bred and Pannar seed – are in control of the local commercial market for GM seeds, worth more than R1.5 billion. In the case of GM maize, they own 84% of all registered varieties and were granted 76% of GMO permits granted. In fact, Monsanto is the biggest of these giants with a majority control over the GM market in South Africa. It owns almost all of the technology that goes into developing these seeds, and other companies need to pay Monsanto a license fee to use the technology. Farmers are deeply reliant on Monsanto. Monsanto dictates the kind of seed and technology farmers will use and sets the price of seeds.

Stacked varieties

The first GM maize that was planted in South Africa was a pest resistant variety (commonly known as Bt). The next variety that was brought onto the market was one that is 'herbicide tolerant' – it can survive poisons to control weeds. Today, more than half of the GM maize that is planted has both of these traits together – the GM maize is both pest resistant and herbicide tolerant. This is called a 'stacked variety'. There are currently 21 field trials (experiments in open fields) underway for new stacked GM maize varieties.



Stacked GM seeds tend to be more expensive when they come onto the market. For example, in 2010 a stacked GM maize seed was about 42% more expensive than a single trait maize seed. As explained above, when there is very little competition in the market farmers don't have a lot of choice about what to buy.

The other thing about these stacked varieties that is attractive to seed companies is that it extends ownership over the technology. GM seeds are always patented, meaning that no one may use the seed without the permission of the company that created them. This patent protection stays in place for twenty years. After that time the technology and knowledge that was used to create it becomes public property. When a company puts an old technology that is about to lose its patent into a seed with a new one, the old variety remains under patent protection. The company can then continue to collect royalties or license fees for a technology that should be public property.

The scientific community has very serious concerns about the safety of stacked GM varieties. They feel that these may be even riskier than single trait varieties because there are more genes being

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moved around. New safety guidelines are being drawn up at an international level to deal with stacked genes under the auspices of the Cartagena Protocol on Biosafety. Because the industry that develops these seeds is so powerful and wealthy, the technology is growing at a pace that is faster than our ability to understand and manage the risks. These companies are keen to pour money into research to develop GMOs, but are less keen to spend money on testing for and ensuring their safety.

Water Efficient Maize for Africa

One of the GM maize field trials currently happening in South Africa is for a “drought resistant” variety called MON 87460. The Bill and Melinda Gates Foundation, in partnership with Monsanto, have established a project called Water Efficient Maize for Africa (WEMA). WEMA also forms part of a huge US\$1,5 billion collaboration between chemical giant BASF and the Howard Buffet Foundation. Through this project, these actors aim to develop new maize varieties through both conventional breeding and genetic modification. They plan to offer the GM varieties they develop at a reduced price to small-scale African farmers – the GM seed will cost the same as conventional varieties. This project is being piloted in South Africa, Uganda, Kenya, Tanzania and Mozambique.

If you look behind the scenes you will see that money is the motivating force behind this project, not humanitarian assistance. In the bigger scheme of things, Monsanto and the German agro-chemical company BASF, have developed a partnership to bring “climate ready” crops to the market. Monsanto and BASF are set on donating 4 of their creations to the WEMA project. This is a very clever marketing strategy to get Africans to accept GMOs and to improve especially Monsanto’s image around the world. At the same time, the biotechnology machinery is also pushing African countries such as Tanzania, to relax its GMO laws in return for the drought tolerant maize. It is also interesting to note that the Gates Foundation invested heavily in Monsanto stocks in 2009.

Small-scale farmers in Lutzville in the Northern Cape, where the WEMA experiment is growing, submitted a formal objection to the drought tolerant GM maize field trials. This was done under the Right to Agrarian Reform for Food Sovereignty Campaign, assisted by the Surplus People Project. These small-scale farmers also held a protest to show their opposition to GMOs. In their written objection, the farmers complained that they had not been consulted about the trials taking place in their area where in fact they are practising agro-ecological farming methods. A major concern they raised was that Monsanto’s patent-protected seeds would undermine seed and food sovereignty.

The Food Sovereignty Campaign also complained about the role of the parastatal institution, the Agricultural Research Council (ARC) that is conducting the trials on behalf of Monsanto. The campaign felt that this was “advancing the agenda of multinational corporations like Monsanto that negatively impact on farmers”. They called on the South African government to redirect their activities to support alternative and more appropriate production systems like agro-ecology.

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Import and export of bulk shipments of GMOs

South Africa is both an importer and exporter of bulk shipments (commodities) of GM grain that are traded for food, feed and processing. Until recently, South Africa was importing a lot of GM commodities. For example, in 2007 South Africa imported more than two million tons of GM maize from Argentina. These maize imports are mostly for animal feed. In 2010 South African maize farmers produced a record maize crop – a surplus of 4 million tons. This put an end to commodity imports for the moment as farmers tried desperately to sell the maize they had produced. In 2010 and 2011 the government granted permits to export 5.6 million tons of GM maize to Mexico, Europe, the Middle East and Asia. Mexico is the Centre of origin of maize, yet it now imports GM maize from South Africa. In 2010 South Africa also started exporting GM maize to other African countries for the first time, including to Kenya. The export created a scandal in Kenya, when Kenyan officials claimed they didn't know the shipments were GM.

Maize in our food

South Africans have been eating GM maize without their knowledge since 2000. This is a staple food for the majority of the population – milled and cooked into a stiff porridge called pap or eaten on the cob. It bears repeating that no other country in the world has allowed its staple food to be genetically modified! Maize is also found in a wide variety of breakfast cereals, for example, cornflakes and Pronutro. A huge variety of additives, colourants and flavourants used in processed food are made from maize, for example xanthum gum and dextrin.

In June 2012 the African Centre for Biosafety (ACB) had four products tested for GM content. All of them contained very high levels of GM maize but were not labelled!

- Futurelife Energy Meal contained 100% GM maize
- Impala maize meal contained 66% GM maize
- Wheat free pronutro contained 90% maize
- Cerelac Honey infant cereal (Nestle) 77%

The Consumer Protection Act has been in force since October 2011 – it states that all GM food with over 5% GM contents must be labelled. See the ***Labelling of genetically modified food in South Africa*** factsheet for more information on why this is not happening.

GMO maize not working in farmers' fields

The South African National Biodiversity Institute (SANBI) is the government body responsible for monitoring the impact of GMOs on biodiversity. In 2010 SANBI published its first research report on the controversial Monsanto insect resistance GM maize called MON810. This research was carried out in partnership with the Norwegian government under a project called the Environmental Biosafety Cooperation Project (EBCP). One of the aims of the study was to develop guidelines for monitoring the impact of GMOs growing in the country. GMOs have already been growing here for the last fourteen years, so again, we can see how the development of monitoring and safety measures always lags way behind the development of GMOs. This is very worrying.



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The SANBI study found that insects are beginning to develop resistance to the Bt toxin engineered into this maize. In other words, the GMO is not doing the job! Evidently, the toxins being produced in the GM maize plant is not killing the pests but instead, is acting like a vaccination against it.

SANBI also found that the GM maize, and the exact same variety that has not been genetically modified, react differently to the same environmental conditions. This contradicts claims made by the biotech industry that GM crops are exactly the same as conventional varieties.

These findings have, however, not been compelling enough for the South African government to impose severe restrictions on or ban the growing of Bt maize. Instead, the blame for the insect resistance has been placed on the farmers for not planting refugia. One wonders if commercial farmers have difficulty in planting refugia, how the government can expect small farmers to do so?

References and notes

Unless noted otherwise, information in this factsheet comes from the in-depth publication by the African Centre for Biosafety, “**Hazardous Harvest: Genetically modified crops in South Africa, 2008 – 2012**” available at <http://www.acbio.org.za/images/stories/dmdocuments/Hazardous%20Harvest-May2012.pdf>

- 1 James, C. (2011). **Global Status of Commercialized Biotech/GM Crops: 2011**. ISAAA Brief No. 43. ISAAA: Ithaca, NY.
- 2 In 2011 the most popular GM crops grown worldwide were soya (47%), then maize (32%), cotton (15%) and canola (5%). *ibid*
- 3 Over 40% of all the grain grown in the world is now used to feed animals. In the United States maize is also produced for agrofuels. Vaness – ref for this is hazardous harvest
- 4 Austria, Hungary, Greece, France, Luxembourg, Bulgaria, Germany and Poland (Sewell, A. 07/07/2012. Poland imposes ban on Monsanto MON810 genetically modified maize . Digital Journal. <http://digitaljournal.com/article/322551> accessed 13 August 2012
- 5 ACB 2011. Water Efficient Maize for Africa: pushing GM crops onto Africa. <http://www.acbio.org.za/images/stories/dmdocuments/WEMA-Pushing%20GMO%20crops.pdf> accessed 13 August 2012

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