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# South Africa - Republic of

# Agricultural Biotechnology Annual

# Biotechnology in South Africa

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**Report Highlights:**
The production area of Genetically Engineered (GE) crops in South Africa was unchanged in 2013, at 2.9 million hectares, making South Africa the eighth largest producer of GE crops in the world and by far the largest in Africa. South Africa hosted the Southern African Development Community (SADC) conference on biotechnology and biosafety in March. The conference recognized the role of biotechnology in ensuring food security, using South Africa as a case study after more than 15 years of biotechnology adoption. The conference also reached consensus that there is an urgent need for the harmonization of biosafety policies in the SADC region. There is still no finalization on GE labeling in South Africa.

## SECTION I: EXECUTIVE SUMMARY

South Africa is a net exporter of agricultural, fish and forestry products. The Netherlands (eleven percent of exports), the United Kingdom (nine percent of exports) and Zimbabwe (eight percent of exports) are the three major destinations of South Africa's agriculture, fish, and forestry products. South Africa's exports of agricultural, fish and forestry products to the United States were valued at US$289 million in 2013, a two percent increase from the previous year, and account for three percent of total agricultural exports by South Africa. Wine (US$69 million), nuts (US$42 million), and fresh fruit (US$59 million) were the major items exported to the United States.

South Africa's major partners for importing agriculture, fish, and forestry products are Argentina (which accounts for ten percent of imports), China (eight percent of imports), Brazil (eight percent of imports) and Indonesia (six percent of imports). Imports from the United States increased by ten percent to US$332 million in 2013 and represents five percent of South African imports of agriculture, fish, and forestry products. Dairy products (US$28 million), wheat (US$25 million) and planting seed (US$24 million) were the major products imported from the United States by South Africa in 2012.

South Africa possesses a highly advanced commercial agricultural industry based *inter alia* on first-generation biotechnologies and effective plant breeding capabilities. South Africa has been involved with biotechnology research and development for over 30 years and will continue to be the biotechnology leader on the Africa continent. The production area of GE crops in South Africa was unchanged in 2013, at the record level of 2.9 million hectares, making South Africa the eighth largest producer of GE crops in the world and by far the largest in Africa. Most South African farmers have adopted plant biotechnology and the benefits thereof. GE corn plantings represent 83 percent of total biotechnology plantings in South Africa, followed by GE soybeans (approximately 17 percent) and GE cotton (less than one percent). Almost 87 percent of corn plantings, 92 percent of soybean plantings and all cotton plantings in South Africa are grown from GE seeds. All of the GE events that are currently commercially produced in South Africa were developed in the United States. However, due to the fact that that the United States has approved corn events that are not yet approved in South Africa, United States commercial corn cannot be exported to South Africa.

South Africa has a National Biotechnology Strategy in place. This strategy is a policy framework, which aims at creating incentives for the biotechnology research and facilitates the adoption of biotechnology. The strategy also guarantees a stringent biosafety regulatory system, which ensures that biotechnology is utilized in a manner that causes minimum disruption to the environment, while addressing South Africa's sustainable development goals and imperatives. The Genetically Modified Organisms Act of 1997 (GMO Act), is the regulating framework that enables authorities to conduct scientifically-based, case-by-case assessment of the potential risks that may arise from any activity involving a particular GE product. The GMO Act also requires applicants to notify the public of a proposed release of GE products prior to the application for a permit of such a release. Apart from the GMO Act, biotechnology is also regulated through environmental and health related legislation.

South Africa's new Consumer Protection Bill came into effect in 2011. The new act requires virtually every product label in South Africa‘s food and beverage industry to be changed to comply

with mandatory GE labeling requirements. However, strong criticism from stakeholders in the food chains, due to the ambiguity and complexity of the issue, has resulted in the Department of Trade and Industry (DTI) appointing a task team to address the conflicts and confusion of the labeling regulation. A workshop, that would serve as a consultative forum with stakeholders to finalize the task team's proposed amendments on GE labeling, is scheduled to be held at the end of July in Pretoria.

In March 2014, South Africa hosted the Southern African Development Community (SADC) conference on biotechnology and biosafety. The three-day event brought together government and academic representatives in the biotech and biosafety sectors from the fourteen members of SADC. Other regional organizations like the Common Market for Eastern and Southern Africa (COMESA) and the New Partnership for Africa's Development (NEPAD), also attended the event to discuss the importance of biotechnology and biosafety harmonization in the region. The conference recognized the role of biotechnology in ensuring food security, using South Africa as a case study after more than 15 years of biotechnology adoption. The conference also reached consensus that there is an urgent need for the harmonization of biosafety policies in the SADC region.

In September 2013, South Africa hosted the annual multi-national Low Level Presence (LLP) meeting. Countries represented included, Brazil, Australia, Korea, Paraguay, Canada, Columbia, China and the United States. The number and complexity of genetically engineered crops being developed and cultivated worldwide is increasing annually. This situation threatens to increase the number of asynchronous and asymmetric approvals worldwide and, consequently, increase the risk of trade disruptions resulting from LLP of unapproved events in commercial channels. Hence, there is an immediate need to address the risk to trade arising from LLP occurrences as it can impact global food security. Recognizing the need for action the annual LLP meetings by concerned countries begin the development of a practical approach for the management of LLP globally that are science-based, predictable and transparent.

## SECTION II: PLANT AND ANIMAL BIOTECHNOLOGY

## CHAPTER 1: PLANT BIOTECHNOLOGY

## PART A: PRODUCTION AND TRADE

## (a) PRODUCT DEVELOPMENT

### Permits issued

Under South Africa's GMO Act, an Executive Council (EC), consisting of seven departments within the South African government, was established. The EC reviews all GE applications submitted in terms of the GMO Act and uses a case-by-case and precautionary approach to ensure sound decision-making in the interest of safety of the environment and the health of humans and animals. Most applications considered by the EC involve GE corn, soybeans and cotton and in most cases represent modifications and refinements of existing traits. The EC also evaluate applications for vaccine trials involving biotechnology.

South Africa has seen an increase in the submission of comments on GE permit applications from a wider audience of stakeholders and interested parties in recent years. These organizations include academic institutions, consumer forums, commodity organizations, provincial departments, and other stakeholder organizations representing the anti- and pro-GE movements.

A total number of 413 permits were issued in 2013, compared to 420 in 2012 and 387 in 2011. The majority of permits being issued were for the import and export of GE crops (see also Table 1). Imports focused mainly on commercially approved corn, soybeans and cotton for activities relating to planting, contained use, food and feed. In addition, imports also include GE HIV and tuberculosis vaccines for contained use in South Africa. The main exports permits issued included GE corn and to a lesser degree GE cotton primarily for contained use, planting activities and GE corn and soybeans exported as commodities for human and animal use. No event was approved for general release in 2013. In 2012, one stacked event was approved for general release, namely: TC1507 corn from Pioneer (refer to Table 5) that has herbicide tolerance and insect resistant traits. Three commodity clearances were also approved in 2013 (refer to Table 6), after safety assessments were completed. These approvals were for soybeans for importation and can be use as food, feed and processing.

**Table 1: Summary of GE permits issues in South Africa from 2008**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| **Exports** | 95 | 167 | 225 | 197 | 237 | 256 |
| **Imports** | 135 | 150 | 128 | 131 | 154 | 124 |
| **Trials** | 16 | 35 | 33 | 32 | 23 | 17 |
| **Contained use** | 2 | 7 | 6 | 3 | 2 | 13 |
| **Commodity clearance** | 24 | 0 | 0 | 24 | 3 | 3 |
| **General release** | 0 | 0 | 4 | 0 | 1 | 0 |
| **Total** | **272** | **359** | **396** | **387** | **420** | **413** |

In 2013, 17 field, or clinical trials permits were authorized, six less than in 2012. Table 2 summarizes the event, trait, product and company involved, of the permits issued from 2011 to 2013 (please refer to the Biotechnology Gain Report of 2011 for more detail on events that have been approved for trails prior to 2011). The products include corn, soybeans and cotton for evaluation of insect resistance and/or

herbicide tolerance and the long-awaited drought tolerance in corn as well as for the evaluation of GE sugar with altered sugar content and growth rate and starch enhanced cassava. Clinical trial permits were also issued for HIV and tuberculosis (TB) vaccines.

**Table 2: GE events approved for trial release from 2011 to 2013**

| Company | Event | Crop/product | Trait |
|---|---|---|---|
| **Monsanto** | MON87460 | Corn | Drought Tolerance |
| **Bayer** | Bollgard II x LLCotton25 | Cotton | Herbicide tolerance<br>Insect resistant |
| | Twinlink x GlyTol | Cotton | Herbicide tolerance<br>Insect resistant |
| | Bollgard II x GlyTol x LLCotton25 | Cotton | Herbicide tolerance<br>Insect resistant |
| | GlyTol x TwinLink x COT 102 | Cotton | Herbicide tolerance<br>Insect resistant |
| **Triclinium** | AERAS-402 | Vaccine | TB |
| | AERAS-422 | Vaccine | TB |
| | VPM1002 | Vaccine | TB |
| | OncoVEX | | |
| | Ad26.ENVA.01 & Ad35-ENV | Vaccine | HIV |
| | MVA85A | Vaccine | TB |
| **SASRI** | pihUMPS | Sugarcane | Increase yield & sucrose content |
| | pCel | Sugarcane | Increase cellulose content |
| | piHADK | Sugarcane | Increase yield & starch content |
| | piAGPase | Sugarcane | Decrease starch content |
| **Pioneer** | TC1507 | Corn | Insect resistant |
| | TC1507 x MON810 | Corn | Herbicide tolerance<br>Insect resistant |
| | TC1507 x MON810 x NK603 | Corn | Herbicide tolerance<br>Insect resistant |
| | PHP36827 | Corn | Insect resistant |
| | PHP37046 | Corn | Insect resistant |
| | PHP36826 | Corn | Insect resistant |

| | | | |
|---|---|---|---|
| | PHP37047 | Corn | Insect resistant |
| | DP-32138-1 | Corn | Male fertility<br>Pollen infertility |
| | PHP37050 | Corn | Herbicide tolerance<br>Insect resistant |
| | TC1507 x NK603 | Corn | Herbicide tolerance<br>Insect resistant |
| | TC1507 x 59122 x MON810 x NK603 | Corn | Herbicide tolerance<br>Insect resistant |
| | TC1507 x 59122 | Corn | Insect resistant |
| | TC1507 x 59122 x NK603 | Corn | Herbicide tolerance<br>Insect resistant |
| | 59122 | Corn | Insect resistant |
| | 356043 x 40-3-2 | Soybeans | Herbicide tolerance |
| | 305423 x 40-3-2 | Soybeans | Modified oil/fatty acid<br>Herbicide tolerance |
| | 305423 | Soybeans | Modified oil/fatty acid<br>Herbicide tolerance |
| | PHP37048 | Corn | Herbicide tolerance<br>Insect resistant |
| | PHP36676 | Corn | Herbicide tolerance<br>Insect resistant |
| | PHP36682 | Corn | Herbicide tolerance<br>Insect resistant |
| | PHP27118 | Corn | Insect resistant |
| **Wits** | SAAVI MVA-C TBC-M456 | Vaccine | HIV |
| | ALVAC | Vaccine | HIV |
| **ARC** | TMS60444 | Cassava | Starch enhanced |
| **Syngenta** | BT11 x MIR162 x TC1507 x GA21 | Corn | Herbicide tolerance<br>Insect resistant |
| **Dow AgroScience** | MON89034 x 1507 x NK603 | Corn | Herbicide tolerance<br>Insect resistant |

**Grapevines**

The South African wine and table grape industries are funding research to develop GE cultivars. The research is focused on the development of fungal and viral resistant vines and the metabolic engineering of grapevines towards enhanced environmental stress resistance and improved grape berry quality factors such as color and aroma. Several transgenic grapevine lines are being evaluated in greenhouse

trials. In 2006, the Institute for Wine Biotechnology at Stellenbosch University applied for a permit to perform the first GE grapevine field trials in South Africa. The objectives of the trial were to evaluate the morphology, growth, and fruit quality of the transgenic plants under field conditions. In September 2007, the Advisory Committee (AC) evaluated the application and a list of questions about the trials was referred back to the applicant. The applicant responded to those questions and the permit for field trials was finally approved in September 2009. Wine is one of the major agricultural products exported to the United States by South Africa, with an annual value worth around US$69 million. The wine industry and government, through the DTI and the National Research Foundation, have together invested about US$1.5 million in vine and wine biotechnology.

**Bt Potato**

The tuber moth resistant Bt potato, SpuntaG2, developed by the South African Agricultural Research Council (ARC) and Michigan State University was denied general release by the EC in 2009. The EC dismissed the application for a permit to release the potato on safety and economic grounds. The ARC appealed against the EC's decision in October 2009. The EC was informed that the appeal board has come to a decision on the ARC's potato appeal, but the decision is not yet being made available to the affected parties.

The potato, SpuntaG2, contains a gene from the soil bacterium Bacillus thuringiensis which acts like a built-in pesticide against the tuber moth (Phthorimaea operculella). The moth caused R40 million (US$5 million) of losses to the potato industry in 2008. Scientists had hoped the potato would allow farmers to use fewer pesticides, reducing costs and helping the environment.

The local potato industry, represented by Potatoes SA, stressed that, while they support GE innovations and understand the potential of GE to strengthen agricultural productivity, they felt the introduction of the Bt potato would negatively affect potato demand in South Africa. Potatoes SA is focusing on increasing potato consumption in South Africa, which has been falling over the past few years. It is not clear if the statement of Potatoes SA against the approval of the Bt potato had influenced the decision on the new GE trait.

**Cassava**

The ARC received authorization for field trials of a starch enhanced cassava variety in 2012. The main goal of this crop is to produce an industrial starch crop, as a means to improve jobs and income for South Africa and the region. USAID/South Africa obligated $800,000 over two years to this research and the initial focus was on further development and roll-out of a transgenic pest-resistant variety of cassava for use as industrial starch. The project is being managed by Michigan State University in collaboration with the CGIAR.

**Sugar**

The Variety Improvement Program of the South African Sugarcane Research Institute (SASRI) encompasses operational and research activities that facilitate the development and release of varieties with sucrose, yield, pest and disease, agronomic and milling characteristics that are desirable to both millers and growers.

Currently, modern biotechnological approaches are deployed to: enhance parental selection; deliver novel, desirable traits ('precision breeding'); develop systems for the rapid bulking and distribution of high-quality seed cane; and investigate the biological basis of sucrose accumulation in sugarcane, with a view to enhancing the process. While these research efforts are guided strongly by breeding imperatives, they are also informed by priorities determined within the Crop Protection and Resource Optimization programs. Research projects include:

- Analysis of transgenic sugarcane lines designed to test perturbed sugar metabolism.
- Drought tolerance induced in sugarcane by genetic modification.
- Overcoming transgenic silencing in sugarcane.
- Unlocking genetic variation in sugarcane for disease resistance.
- Improved nitrogen use efficiency through GE technology.
- Medium and long-term conservation of strategically-important transgenic germ plasma.

### Other Research

Research is continuing on corn, soybeans and cotton for evaluation of insect resistance and/or herbicide tolerance and the long-awaited drought tolerance in corn. The ARC is also busy on transgenic virus resistant selections of an ornamental bulb species, *Orinthogalum*, a type of hyacinth (Chinkerinchee or Sun Star).

## (b) COMMERCIAL PRODUCTION

### Corn

Corn is the main field crop produced in South Africa and is used for both human consumption (mainly, white corn) and animal feed (mainly, yellow corn). In 1997, the first GE corn event (insect resistant) was approved in South Africa and since then there was a progressive and steady increase in GE corn plantings. Table 3 illustrates the plantings of GE corn in South Africa over the past 8 years. GE corn plantings increased from 28 percent of total corn planted in the 2005/06-production year to 87 percent in the 2013/14 production year. Of the 2.4 million hectares of corn planted with GE seed in the 20013/14-production year, single Bt comprised of 29 percent, herbicide tolerant of 17 percent and the stacked variety (Bt and herbicide tolerant) of 54 percent (see also Table 4). White corn plantings in the 2013/14 production year were 1.6 million hectares of which 84 percent or 1.3 million hectares were planted with GE seed. Yellow corn plantings were 1.1 million hectares of which, 91 percent were planted with GE seed.

**Table 3: Planting of GE corn in South Africa over the past 9 years**

| | **Area planted '000 ha** | | |
|---|---|---|---|
| **Production years** | **White corn** | **Yellow corn** | **Total corn** |
| **2005/06** | | | |
| **Total** | 1,033 | 567 | 1,600 |
| **Biotech** | 281 | 175 | 456 |

| | | | |
|---|---|---|---|
| **% of total** | 27% | 30% | 28% |
| **2006/07** | | | |
| **Total** | 1,625 | 927 | 2,552 |
| **Biotech** | 851 | 528 | 1,379 |
| **% of total** | 52% | 56% | 54% |
| **2007/08** | | | |
| **Total** | 1,737 | 1,062 | 2,799 |
| **Biotech** | 975 | 588 | 1.563 |
| **% of total** | 56% | 55% | 56% |
| **2008/09** | | | |
| **Total** | 1,489 | 939 | 2,428 |
| **Biotech** | 1,046 | 642 | 1.688 |
| **% of total** | 70% | 68% | 70% |
| **2009/10** | | | |
| **Total** | 1,720 | 1,023 | 2,742 |
| **Biotech** | 1,212 | 666 | 1,879 |
| **% of total** | 71% | 65% | 69% |
| **2010/11** | | | |
| **Total** | 1,418 | 954 | 2,372 |
| **Biotech** | 1,007 | 696 | 1,704 |
| **% of total** | 71% | 73% | 72% |
| **2011/12** | | | |
| **Total** | 1,636 | 1,063 | 2,699 |
| **Biotech** | 1,126 | 747 | 1,873 |
| **% of total** | 69% | 70% | 69% |
| **2012/13** | | | |
| **Total** | 1,617 | 1,164 | 2,781 |
| **Biotech** | 1,316 | 1,055 | 2,371 |
| **% of total** | 81% | 91% | 85% |
| **2013/14** | | | |
| **Total** | 1,580 | 1,139 | 2,719 |
| **Biotech** | 1,323 | 1,041 | 2,364 |
| **% of total** | 84% | 91% | 87% |

**Source:** FoodNCropBio supported by the Corn Trust

**Table 4: Percentage of the GE corn crop planted with the different traits the past 9 years**

| Production year | White corn | Yellow corn | Total corn |
|---|---|---|---|
| **2005/06** | | | |
| **% Insect Resistant** | 79 | 61 | 72 |
| **% Herbicide Tolerant** | 21 | 39 | 28 |
| **% Stacked** | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| **2006/07** | | | |
| **% Insect Resistant** | 84 | 72 | 80 |
| **% Herbicide Tolerant** | 16 | 28 | 20 |
| **% Stacked** | 0 | 0 | 0 |
| **2007/08** | | | |
| **% Insect Resistant** | 71 | 69 | 71 |
| **% Herbicide Tolerant** | 22 | 27 | 24 |
| **% Stacked** | 6 | 4 | 5 |
| **2008/09** | | | |
| **% Insect Resistant** | 66 | 63 | 64 |
| **% Herbicide Tolerant** | 17 | 18 | 17 |
| **% Stacked** | 19 | 19 | 19 |
| **2009/10** | | | |
| **% Insect Resistant** | 81 | 49 | 70 |
| **% Herbicide Tolerant** | 10 | 23 | 14 |
| **% Stacked** | 9 | 28 | 16 |
| **2010/11** | | | |
| **% Insect Resistant** | 50 | 39 | 46 |
| **% Herbicide Tolerant** | 9 | 21 | 13 |
| **% Stacked** | 41 | 41 | 41 |
| **2011/12** | | | |
| **% Insect Resistant** | 46 | 44 | 45 |
| **% Herbicide Tolerant** | 10 | 20 | 14 |
| **% Stacked** | 44 | 36 | 41 |
| **2012/13** | | | |
| **% Insect Resistant** | 36 | 34 | 35 |
| **% Herbicide Tolerant** | 9 | 24 | 16 |
| **% Stacked** | 55 | 42 | 49 |
| **2013/14** | | | |
| **% Insect Resistant** | 31 | 26 | 29 |
| **% Herbicide Tolerant** | 13 | 23 | 17 |
| **% Stacked** | 56 | 51 | 54 |

**Source:** FoodNCropBio supported by the Corn Trust

The long term trend in corn production indicates South Africa is producing more corn on less area (see Figure 1). The main reasons for this trend are more efficient and effective farming methods and practices, the use of less marginal land in the corn production systems, better seed cultivars, and the adoption of biotechnology. Figure 2 illustrates another remarkable trend, where the average corn yield almost doubled over the past 20 years in South Africa. Indications are that this trend of producing more corn on fewer hectares will continue in future.

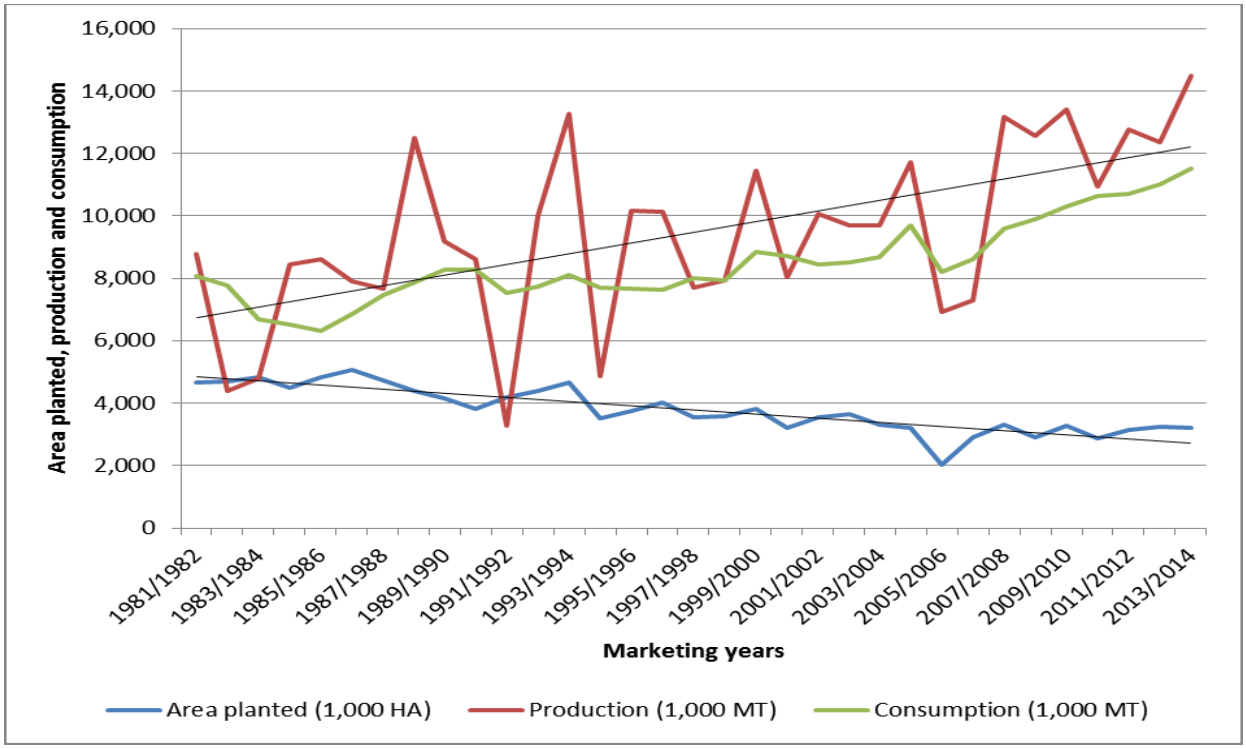


**Figure 1: The trend in corn production and consumption in South Africa since the 1980's**

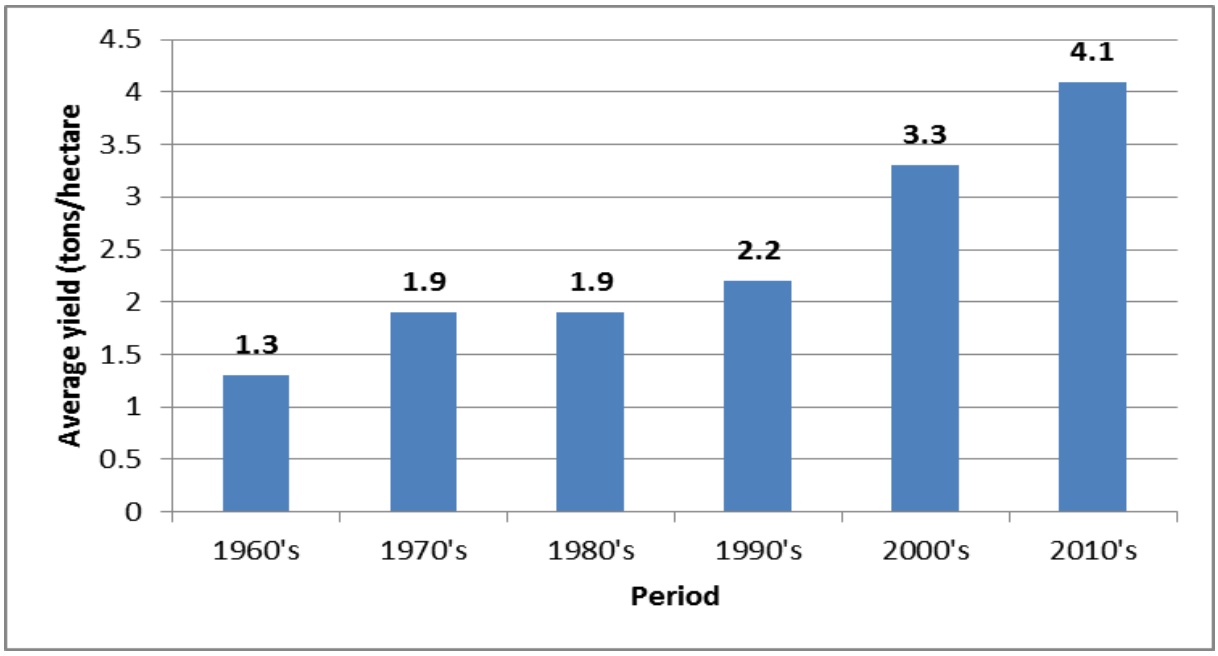


**Figure 2: Trends in the average corn yields in South Africa**

**Soybeans**

GE soybeans were first approved for commercialization in South Africa in 2001; by 2006, 75 percent of

the soybean crop grown was GE. In the 2013/14 production season the area planted with soybeans reached 502,900 hectares of which 92 percent were planted with GE seeds. The area planted with soybeans in South Africa increased almost 5-fold the past ten years (see also Figure 3). Many South African producers are now recognizing the value of soybeans in a crop rotation system with corn and, in addition, the production of soybeans is made relatively easier with the GE cultivars that are available in South Africa. With the increase in soybean crushing capacity, indications are that this upward trend in soybean plantings will continue in the future. South Africa invested an estimated R1 billion (US$100 million) the past few years on expanding its soybean processing capacity, due to increased soybean production and to replace soybean meal imports. As a result, about 1.2 million tons of additional oilseed processing capacity has been created, bringing South Africa's current total oilseed capacity to an estimated 2.2 million tons per annum.

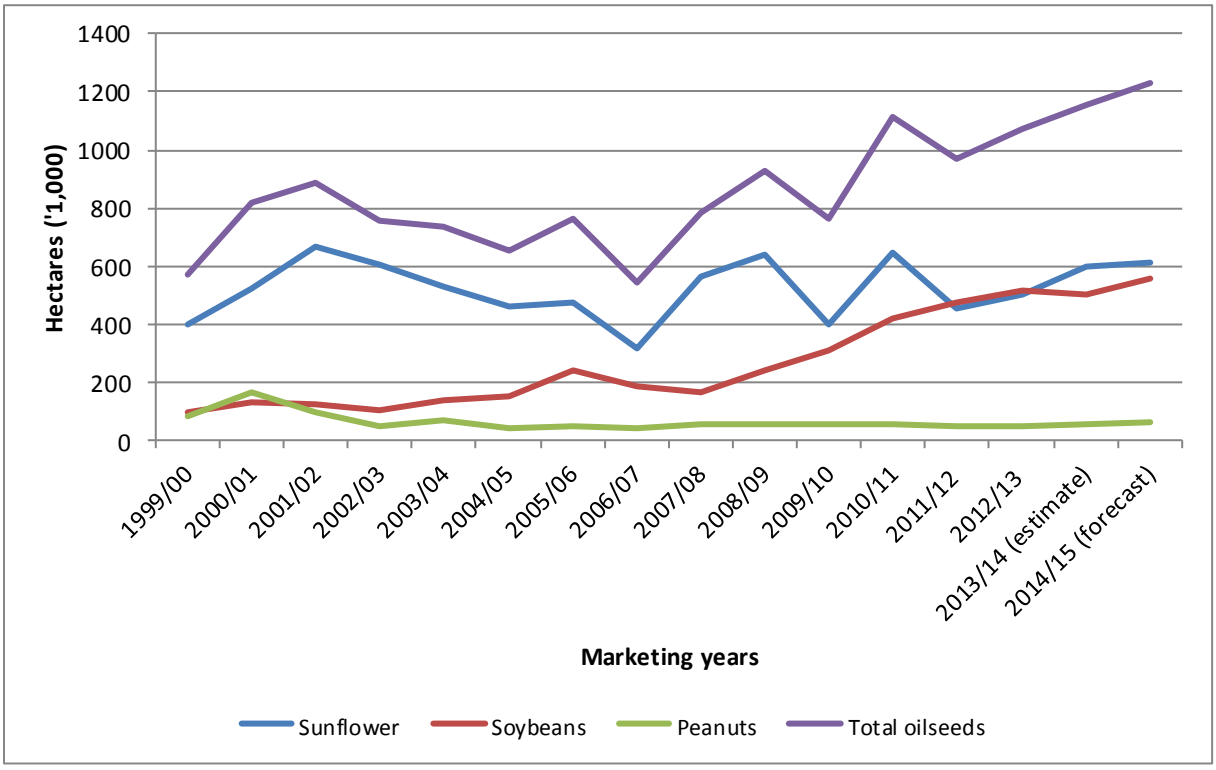


**Figure 3: Trends in the area planted with oilseeds in South Africa since 2000**

## Cotton

Bt cotton was the first GE crop variety to be grown commercially in sub-Saharan Africa. Early adopters were small-scale farmers in the Makhatini Flats in Kwazulu-Natal, South Africa, who have been growing the crop since 1998. Cotton planting declined to 8,000 hectares in the 2013/14 production season, from 11,000 hectares in the 2012/13 production season. The decline in hectares planted was mainly due to decrease cotton prices, while corn and soybean prices were higher. All cotton plantings in South Africa are GE with the stacked variety representing more than 95 percent of total cotton planting.

## (c) EXPORTS

South Africa is the major exporter of corn on the Africa continent and a large percent of South African corn exports are destined for countries in Africa. South Africa exported more than 6.3 million tons of corn the past three years and after a massive corn crop of 14.5 million, exports in the 2014/15 MY could reached 3 million tons. South Africa exports both white corn and yellow corn, with Japan (596,315 tons yellow corn), Mexico (190,097 tons white corn) and Taiwan (166,360 tons yellow corn) being the largest deep-see export markets in the 2013/14 MY. Almost a million tons of corn was exported to South Africa's neighboring countries e.g. Botswana, Zimbabwe, Lesotho, Mozambique, Swaziland and Namibia in the 2013/14 MY.

South Africa's trade in oilseeds is mainly directed to the imports of oil and protein meal, however, in the 2012/13 MY, South Africa exported a small amount of 15,000 tons of soybeans, destined mainly for the premium tofu markets of Malaysia. Exports of soybeans are expected to drop to zero in the 2014/15 MY, as local production is expected to only match the current local crushing capacity in the next five years.

## (d) IMPORTS

South Africa is not a major importer of corn and only imported around 80,000 tons of corn from Ukraine in the 2013/14 MY. However, due to the fact that countries such as the United States, Argentina and Brazil have approved corn events that are not yet approved in South Africa, imported corn from these countries is not authorized to enter into South Africa. South Africa is not opposed in principle to these events, but any events that have not made it through the regulatory approval process of South Africa cannot be imported. As a result, South Africa, if needed, imports corn from countries that do not produce GE crops, such as, Zambia and certain countries in Europe.

## (e) FOOD AID RECIPIENT COUNTRIES

South Africa is not a recipient of food aid and is expected to stay a net exporter of agricultural products in the near future. However, food aid destined to Lesotho, Malawi, Swaziland, Zambia and Zimbabwe ordinarily passes through the port of Durban, South Africa's major port. In order for the shipment to pass through South Africa, the GMO Registrar's Office requires several measures, including, an advance notification so that proper containment measures can be taken and a letter from the recipient country stating that it accept the food aid consignment and that it is known that it contains GE products.

# PART B: POLICY

## (a) REGULATORY FRAMEWORK

### Historical context

In 1979, the South African government established the Committee on Genetic engineering (SAGENE). SAGENE comprised of a group of South African scientists and was commissioned to act as scientific advisory body to the government and paved the way for the uptake of GE in food, agriculture, and medicine. In 1989, on the advice of SAGENE, the first GE experiments in open field trials took place. In January 1994, a few months before South Africa's first democratic elections, SAGENE was given legal powers to "advise any Minister, statutory or government body on any form of legislation or controls pertaining to the importation and/or release of GE products". As a result, SAGENE was task to draft a GMO Act for South Africa. A draft GMO bill was published for public comment in 1996 and passed by the Parliament in 1997. Nevertheless, the GMO Act only came into effect in December 1999, after regulations to bring the Act into effect were promulgated. In this interim period, SAGENE continued to act as the key "regulatory body" for GE products, and under its auspices granted permits to allow Monsanto to commercialize GE cotton and GE corn seed. In addition, 178 permits were granted for a variety of open field GE trials. Once the GMO Act came into effect, SAGENE ceased to exist and was replace by an Executive Council, established by the GMO Act.

**The GMO Act of 1997**

The GMO Act of 1997, and its accompanying Regulations, is administrated by DAFF. Under the GMO act a decision-making body (the EC), an advisory body (the Advisory Council (AC)) and administrative body (the GMO Registrar) was established to:

- Provide measures to promote the responsible development, production, use and application of GE products;
- Ensure that all activities involving the use of GE products be carried out in such a way as to limit possible harmful consequences to the environment, human, as well as, animal health;
- Give attention to the prevention of accidents and the effective management of waste;
- Establish mutual measures for the evolution and reduction of the potential risks arising from activities involving the use of GE products;
- Lay down the necessary requirements and criteria for risk assessments;
- Establish appropriate procedures for the notification of specific activities involving the use of GE products.

This GMO Act of 1997 was modified by cabinet in 2005 to bring it in line with the Cartagena Biosafety Protocol (CBP) and again in 2006 in order to address some economic and environmental concerns. These amendments to the GMO Act were published and gazetted on April 17, 2007 and came into effect in February 2010, after the Regulations were published. The GMO Act, as amended, does not change the pre-existing preamble, which establishes the general ethos of the legislation namely, to subsume the need for biosafety with the imperative to promote GE development.

The amendments to the GMO act make it clear that a scientifically based risk assessment is a prerequisite for decision-making and also authorizes the EC to determine if an environmental impact assessment is required under the National Environmental Management Act. The amendments also add specific legislation to allow socio-economic considerations to factor into decision-making and make those considerations significantly important in the decision-making process.

The amendments also create at least eight new provisions dealing with accidents and/or unintentional

transboundary movement. These provisions have been motivated by the spate of contamination incidents that have occurred worldwide involving unapproved GE products. A new definition of "accident" has been created to capture two types of situations: one dealing with unintentional transbondary movements of GE products and the other, unintentional environmental release within South Africa.

In summary: The existence and application of the GMO Act and its amendments provides South Africa with a decision-making tool that enables authorities to conduct scientifically-based, case-by-case assessment of the potential risks that may arise from any activity involving a particular GE product.

**The Executive Council**

The EC functions as an advisory body to the Minister of Agriculture, Forestry and Fisheries on matters relating to GE products, but more important is the decision-making body that approves or rejects GE applications. The EC is also empowered to co-opt any person knowledgeable in the field of science to serve on the EC to provide advice.

The EC is made up of representatives of different departments within the South African government. These include:

- DAFF
- Department of Water and Environmental Affairs
- Department of Health
- DTI
- Department of Science and Technology
- Department of Labor
- Department of Arts and Culture

Before making a decision regarding GE applications, the EC is obliged to consult with the AC. The AC is represented on the EC through its chairperson. Decision-making by the EC is on the basis of consensus by all the members and where no consensus is reached, the application before the EC will be considered as having been refused. For this reason it is essential that all representatives on the EC have significant knowledge on biotechnology and biosafety.

**The Advisory Council**

The AC consists of ten scientists who are appointed by the Minister of Agriculture, Forestry and Fisheries. The EC has input in the appointment of members of the AC and has recently changed a number of the members, following protest by civil society that some members of the AC were also members of the pro-GMO lobby group, Africabio and ex-SAGENE members.

The role of the AC is to provide the EC advice on GE applications. The AC is further supported by subcommittee members representing an extended pool of scientific expertise from various disciplines.

The AC together with the subcommittee members is responsible for the evaluation of risk assessments of all applications as it relates to food, feed and environmental impact and submit recommendations to the EC.

**The Registrar**

The Registrar, who is appointed by the Minister of Agriculture, Forestry and Fisheries, is in charge of the day-to-day administration of the GMO act. The Registrar acts on the instructions and conditions laid down by the EC. The Registrar is also responsible for examining applications to ensure conformity with the Act, issuing of permits, amending and withdrawing of permits, maintaining a register and monitor all facilities that are used for contained use and trail release sites. Figure 4 illustrates the GE application process in South Africa.

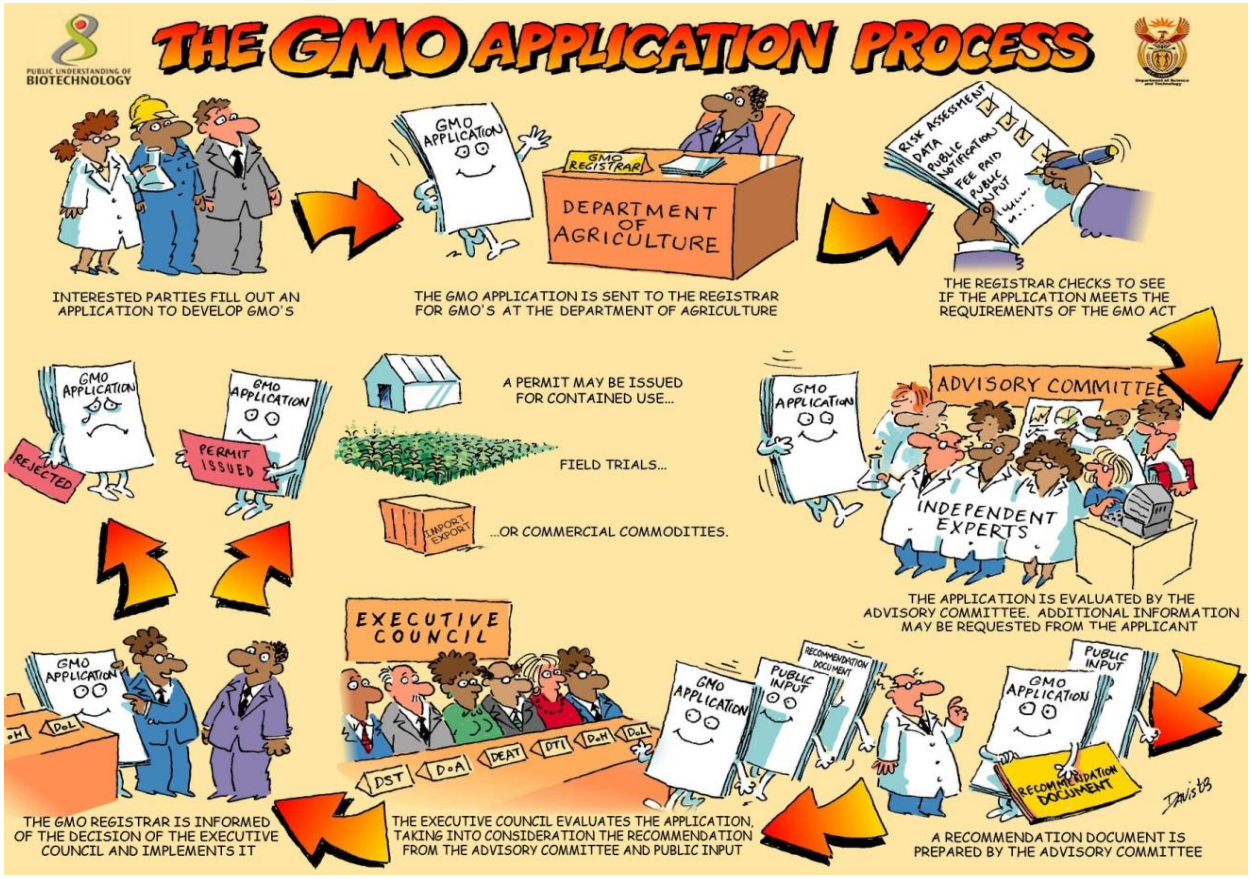


**Figure 4: The GE application process in South Africa**

**Other regulations that impact on GE products in South Africa**

**The National Environmental Management Biodiversity Act**

The National Environmental Management Biodiversity Act (Biodiversity Act) of 2004 was established to protect South Africa's biodiversity from specific threats and includes GE products as one of those threats. Section 78 of the act gives the Minister of Environmental Affairs the power to deny a permit for general or trial release applied for under the GMO Act, if the GE product may pose a threat to any indigenous species or the environment.

Under the Biodiversity Act a South African Biodiversity Institute (SANBI) was also established. SANBI is tasked to monitor and report regularly to the Minister of Environmental Affairs on the impacts of any GE product that has been released into the environment. The legislation requires reports on the impact of non-target organisms and ecological processes, indigenous biological resources and the biological diversity of species used for agriculture.

**Consumer Protection Act**

Health regulations published in 2004, largely follow Codex Alimentarius scientific guidelines. These regulations mandate labeling of GE foods only in certain cases, including when allergens or human/animal proteins are present, and when a GE food product differs significantly from a non-GE equivalent. The rules also require validation of enhanced-characteristic (e.g., "more nutritious") claims for GE food products. The regulations do not address claims that products are GE-free.

However, on April 24, 2009, the President of South Africa signed a new Consumer Protection Bill into law. Implementation of the Act, however, was delayed for some time as the legislation generated significant comments from the private sector over the basis of many provisions and uncertainty over how the Act would be enforced. The new Consumer Protection Bill require virtually that every product label in South Africa's food and beverage industry to be changed.

On April 1, 2011, DTI published regulations in the Gazette that brought the Consumer Protection Act (68/2008) into force. The regulation came into effect six months (October 1, 2011) after the commencement of the act. The primary purpose of the law is to prevent exploitation or harm of consumers and to promote the social wellbeing of consumers.

However, the approved Consumer Protection Act has the following section which states that all products containing GE material must be labeled [Section 24(6)]:

> *(6) Any person who produces, supplies, imports or packages any prescribed goods must display on, or in association with the packaging of those goods, a notice in the prescribed manner and form that discloses the presence of any genetically modified ingredients or components of those goods in accordance with applicable regulations.*

According to the act:

- All food containing more than five percent GE ingredients, whether produced in South Africa or elsewhere, needs to carry the declaration which states, "contains at least five percent genetically modified organisms'' in a conspicuous and easily legible manner and size.
- Those products that contain less than five percent of GE ingredients may be labeled "Genetically modified content is below five percent".
- If it is impossible or not feasible to test goods for the presence of GE traits, the product must be labeled "may contain GMO ingredients".
- Less than one percent – maybe labeled as "does not contain genetically modified organisms".

The DTI views the labeling of GE products solely within the context of the consumer's right to obtain the facts needed to make an informed choice or decision about food. Thus, it is not about human health, safety or quality issues.

Additionally, the new Act includes a significant change to product liability, where a consumer no longer has to demonstrate that a producer was negligent before receiving compensation for injury. The new legislation puts the burden of proof on the producer or supplier, meaning that a consumer can sue almost any producer or supplier for harm or injury that is the result of a failed, defective, or unsafe product. Almost every supplier needs to comply with the bill, even if the supplier does not reside in South Africa. Foreign producers who sell products through a South African agent for use in South Africa are also included under the bill.

In May, 2012, Business Unity South Africa (BUSA) organized a meeting with the Commissioner of the Consumer Protection Act to discuss the current challenges pertaining to the regulations of the Act. The intention was also to initiate the establishment of future dialogues and collaboration to address pertinent limitations of the regulations, including GE labeling.

The BUSA delegates tabled the following concerns regarding GE labeling to the Commissioner:

- The inclusion of GE labeling in the Consumer Protection Act is not necessary as it is already covered by regulations No. R25 of the Foodstuffs, Cosmetics and Disinfectant Act, Act No. 54 of 1972, administrated by the Department of Health;

- To adhere to the current regulations regarding GE labeling will increase the cost of food and impact negatively on the consumer and household food security;

- The current regulations referred to "genetically modified organisms" as defined in Section 1 of the GMO Act, Act No. 15 of 1997. The current commercially approved "genetically modified organisms" in terms of the latter are corn, soybeans and cotton. Inevitably, downstream products are not covered and therefore the existing regulations might not be applicable;

- The regulations are vague and pose interpretation challenges. There are varying degrees of interpretations by various industries in an attempt to solicit compliance mechanisms;

- There are currently only a few laboratories in the country and these would be unable to absorb the pressure of testing every batch from the farm gate and throughout the value chain.

The Commissioner replied by acknowledging the inherent challenges pertaining to definitions and interpretations of the existing GE regulations, as well as, disparities leading to the final draft. As a result, the Commission has been collaborating with the Departments of Health, Agriculture, Forestry and Fisheries, Trade and Industry and Science and Technology in an effort to develop more sensible guidelines on GE labeling. A task team to address the conflicts and confusion of the labeling regulations was then appointed. On June, 20, 2014, the DTI announced that a workshop that would serve as a consultative forum with stakeholders to finalize proposed amendments on GE labeling, will be held on July, 25, 2014.

**(b) APPROVALS**

Table 5 illustrates all the GE events that have been approved for general release by South Africa under the GMO Act of 1997. This means these events can be used for commercial plantings, for food and/or feed and the importation and exportation of these events are allowed. All the GE events that are currently commercially available in South Africa were developed in the United States. These events are present in three crops namely, corn, soybeans and cotton. The last event that was approved for general release was in 2012, namely, event TC1507 corn from Pioneer that has herbicide tolerance and insect resistant traits.

**Table 5: GE events approved for general release in South Africa**

| Company | Event | Crop | Trait | Year approved |
|---|---|---|---|---|
| Pioneer | TC1507 | Corn | Insect resistant Herbicide tolerant | 2012 |
| Syngenta | BT11xGA21 | Corn | Insect resistant Herbicide tolerant | 2010 |
| Syngenta | GA21 | Corn | Herbicide tolerant | 2010 |
| Monsanto | MON89034xNK603 | Corn | Insect | 2010 |

| | | | | |
|---|---|---|---|---|
| | | | resistant Herbicide tolerant | |
| Monsanto | MON89034 | Corn | Insect resistant | 2010 |
| Monsanto | Bollgard II x RR flex (MON15985 x MON88913) | Cotton | Insect resistant Herbicide tolerant | 2007 |
| Monsanto | MON88913 | Cotton | Herbicide tolerant | 2007 |
| Monsanto | MON810 x NK603 | Corn | Insect resistant Herbicide tolerant | 2007 |
| Monsanto | Bollgard RR | Cotton | Insect resistant Herbicide tolerant | 2005 |
| Monsanto | Bollgard II, line 15985 | Cotton | Insect resistant | 2003 |
| Syngenta | Bt11 | Corn | Insect resistant | 2003 |
| Monsanto | NK603 | Corn | Herbicide tolerant | 2002 |
| Monsanto | GTS40-3-2 | Soybeans | Herbicide tolerant | 2001 |
| Monsanto | RR lines 1445 & 1698 | Cotton | Herbicide tolerant | 2000 |
| Monsanto | Line 531/Bollgard | Cotton | Insect resistant | 1997 |
| Monsanto | MON810/Yieldgard | Corn | Insect resistant | 1997 |

In Table 6, GE events that have received commodity clearance are indicated. The events cover five crops, namely, corn, soybeans, cotton, rice and rape seed. Commodity clearance means the importation of these events for the use as food and/or feed are allowed. In 2013, three new soybean events received commodity clearance and so far in 2014, five new corn events from Syngenta received commodity clearance.

**Table 6: GE events with commodity clearance**

| Company | Event | Crop | Trait | Year approved |
|---|---|---|---|---|
| Syngenta | BT11 x 59122 x MIR604 x TC1507 x GA21 | Corn | Insect resistant Herbicide tolerant | 2014 |
| Syngenta | BT11 x MIR604 x TC1507 x 5307 x GA21 | Corn | Insect resistant Herbicide tolerant | 2014 |
| Syngenta | BT11 x MIR162 x MIR604 x TC1507 x 5307 x GA21 | Corn | Insect resistant Herbicide tolerant | 2014 |
| Syngenta | MIR162 | Corn | Insect resistant | 2014 |
| Monsanto | MON89034 x MON88017 | Corn | Insect resistant Herbicide tolerant | 2014 |
| Monsanto | MON87701 x MON89788 | Soybeans | Insect resistant Herbicide tolerant | 2013 |
| Monsanto | MON89788 | Soybeans | Herbicide tolerant | 2013 |
| DowAgrowScience | DAS-44406-6 | Soybeans | Herbicide tolerant | 2013 |
| DowAgrowScience | DAS-40278-9 | Corn | Herbicide tolerant | 2012 |
| BASF | CV127 | Soybeans | Herbicide tolerant | 2012 |
| DowAgrowScience/ Monsanto | MON89034 x TC1507 x NK603 | Corn | Insect resistant Herbicide tolerant | 2012 |
| Syngenta | MIR604 | Corn | Insect resistant | 2011 |
| Syngenta | BT11 x GA21 | Corn | Insect | 2011 |

| | | | | |
|---|---|---|---|---|
| | | | resistant Herbicide tolerant | |
| Syngenta | BT11 x MIR604 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Syngenta | MIR604 x GA21 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Syngenta | BT11 x MIR604 x GA21 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Syngenta | BT11 x MIR162 x MIR604 x GA21 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Syngenta | BT11 x MIR162 x GA21 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Syngenta | BT11 x MIR162 x TC1507 x GA21 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Pioneer | TC1507 x NK603 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Pioneer | 59122 | Corn | Insect resistant | 2011 |
| Pioneer | NK603 x 59122 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Pioneer | 356043 | Soybean | Herbicide tolerant | 2011 |
| Pioneer | 305423 | Soybean | Higher oleic acid content Herbicide tolerant | 2011 |
| Pioneer | 305423 x 40-3-2 | Soybean | Higher oleic acid content Herbicide | 2011 |

| | | | | |
|---|---|---|---|---|
| | | | tolerant | |
| DowAgroScience | TC1507 x 59122 | Corn | Insect resistant Herbicide tolerant | 2011 |
| DowAgroScience | TC1507 x 59122 x NK603 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Bayer | LLRice62 | Rice | Herbicide tolerant | 2011 |
| Bayer | LLCotton25 | Cotton | Herbicide tolerant | 2011 |
| Monsanto | MON863 | Corn | Insect resistant | 2011 |
| Monsanto | MON863 x MON810 | Corn | Insect resistant | 2011 |
| Monsanto | MON863 x MON810 x NK603 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Monsanto | MON88017 | Corn | Insect resistant | 2011 |
| Monsanto | MON88017 x MON810 | Corn | Insect resistant | 2011 |
| DowAgroScience & Monsanto | MON89034 x TC1507 x MON88017 x 59122 | Corn | Insect resistant Herbicide tolerant | 2011 |
| Monsanto | MON810 x NK603 | Corn | Insect resistant Herbicide tolerant | 2004 |
| Monsanto | MON810 x GA21 | Corn | Insect resistant Herbicide tolerant | 2003 |
| Pioneer Hi-Bred | TC1507 | Corn | Insect resistant Herbicide tolerant | 2002 |
| Monsanto | NK603 | Corn | Herbicide tolerant | 2002 |
| Monsanto | GA21 | Corn | Herbicide tolerant | 2002 |
| Syngenta | Bt11 | Corn | Insect | 2002 |

| | | | | |
|---|---|---|---|---|
| | | | resistant | |
| AgrEvo | T25 | Corn | Herbicide tolerant | 2001 |
| Syngenta | Bt176 | Corn | Insect resistant | 2001 |
| AgrEvo | Topas 19/2, Ms1Rf1, Ms1Rf2, Ms8Rf3 | Oilseed rape | Herbicide tolerant | 2001 |
| AgrEvo | A2704-12 | Soybean | Herbicide tolerant | 2001 |

***Notes:*** *Excludes events that have obtained general release clearance before commodity clearance; the events can be used for importation as food or feed*

**(c) FIELD TESTING**

Please refer to Table 2.

**(d) STACKED EVENT APPROVALS**

South Africa requires an additional approval for GE seeds that combine two already approved traits, such as herbicide tolerance and insect resistance. This requirement means that companies effectively need to start from the beginning of the approval process for stacked events, even when the individual traits have already been approved. The EC has reconfirmed in its first meeting of 2012, that each stack event must be subjected to a separate safety assessment as per the GMO Act. Currently, six stacked events (insect resistant and herbicide tolerant), four for corn and two for cotton, have been approved for general release in South Africa.

**(e) ADDITIONAL REQUIREMENTS**

No additional seed registration is required in South Africa after GE seed was approved for general release. Seed Certification is also voluntary, except for specific varieties listed in the Plant Improvement Act and on request of the breeder or owner thereof.

**(f) COEXISTENCE**

Coexistence has not been an issue that has necessitated the introduction of specific guidelines or regulations in South Africa. The government leaves the management of the approved GE field crops to the farmers. South Africa also does not currently have a National Organics Standard in place.

**(g) LABELING**

The mandatory labeling of GE products as stipulated in South Africa's Consumer Protection Act that came into law on April 1, 2011, is on hold. Strong criticism from stakeholders in the food chains, due to the ambiguity and complexity of the issue, has resulted in DTI appointing a task team to address the conflicts and confusion of the labeling regulation. A workshop that would serve as a consultative forum with stakeholders to finalize proposed amendments on GE labeling by the task team will be held on July, 25, 2014.

As a result, the only label requirement currently for GE products is South Africa falls under the Foodstuffs, Cosmetics and Disinfectant Act. This Act mandates labeling of GE foods only in certain cases, including when allergens or human/animal proteins are present, and when a GE food product differs significantly from a non-GE equivalent. The rules also require validation of enhanced-characteristic (e.g., "more nutritious") claims for GE food products. The regulations do not address claims that products are GE-free.

## (h) TRADE BARRIERS

DAFF mandates that only approved GE events are allowed into South Africa under the GMO Act. The South African regulatory procedures for approving GE plants sometimes take longer than those in supplier countries. Differences in the speed of authorizations lead to situations where products are approved for commercial use outside South Africa but not within South Africa. These asynchronous approvals result in severe risks of trade disruption since South Africa applies only one percent tolerance for the presence of unauthorized (in South Africa) biotech events in food and feed.

## (i) INTELLECTUAL PROPERTY RIGHTS

Biotechnology companies operating in South Africa follow essentially the same procedure for collecting technology fees as in the United States. This policy generally works because South Africa is a signatory to the Trade-Related Aspects of International Property Rights (TRIPS) agreement of the WTO. Trade sources relate that cotton and corn are such that farmers have to buy new seed every year. Farmers sign a one-year licensing agreement, and the technology fee is included in the price of the bag of seed for these crops. Soybeans are more difficult. Technology developers try to collect the fee from the farmers when they deliver the harvest to the terminal. This fee can be difficult to collect because soybeans are open-pollinated so seed need not be purchased each year. Also farmers often use soybeans for on-farm feed so it might never enter commercial circulation. This challenge is not unique to South Africa, but rather is due to the intrinsic nature of the soybean.

## (j) CARTAGENA PRODTOCOL RATIFICATION

South Africa has signed and ratified the CPB. The primary responsibility for implementing the CPB has shifted from the Department of Environmental Affairs to DAFF. CPB implementation is meant to be gradual, and accordingly DAFF's implementation will be in phases, with the most significant issues being handled first. South Africa, under the leadership of DAFF's GMO Regulatory Office, has modified its GMO Act to comply with the CPB.

## (k) INTERNATIONAL TREATIES/FOR A

South Africa is a signatory member of *inter alia*:

- The Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization (WTO-SPS)
- Codex Alimentarius Commission (Codex)
- International Plant Protection Convention (IPPC) of the Food and Agricultural Organization (FAO)

South Africa as a member of the IPPC undertakes to:

- Implement common and effective measures on national and international level to prevent the importation and distribution of pests of plants and plant products
- Promote the methods for the control of pests
- Establish legal, technical and administrative measures necessary to achieve the goals of the Convention.

**(l) RELATED ISSUES**

There are no other issues related to plant biotechnology that are not captured under the current headings.

**(m) MONITORING AND TESTING**

In South Africa, approved GE commodities are imported through a permit system under the GMO Act (1997). This system only applies to living GE organisms and processed commodities are not regulated unless considered to have health considerations. However, no routine GE detection is performed on GE imports or non-GE imports to ensure that unapproved events are not present.

**(n) LOW LEVEL PRESENCE POLICY**

South Africa hosted the annual multi-national LLP meeting on September, 19 and 20, 2013. Countries represented included, Brazil, Australia, Korea, Paraguay, Canada, Columbia, China and the United States. The number and complexity of genetically engineered crops being developed and cultivated worldwide is increasing annually. This situation threatens to increase the number of asynchronous and asymmetric approvals worldwide and, consequently, increase the risk of trade disruptions resulting from LLP of unapproved events in commercial channels. Hence, there is an immediate need to address the risk to trade arising from LLP occurrences as it can impact global food security. Recognizing the need for action the annual LLP meetings by concerned countries begin the development of a practical approach for the management of LLP globally that are science-based, predictable and transparent.

At the meeting, Foreign Agricultural Services (FAS) Administrator, Phil Karsting, reiterated that to ensure global food security agriculture production would need to increase through an increase in productivity and that biotechnology is going to play a critical role in that. He also emphasized the importance of international trade in agriculture commodities to combat global food security and that governments and the private sector need to work collaboratively to address the impact of LLP on trade.

South Africa's regulation for Low Level Presence (LLP) is only one percent. However, if the product is milled or otherwise processed there is usually no importation problem.

## PART C: MARKETING

### (a) MARKET ACCEPTANCE

On the production side, South African farmers can be divided into two categories, namely, commercial and small/emerging farmers. GE products have a wide appeal with both groups with 87 percent of corn, 92 percent of soybeans and all cotton being planted with GE seeds. Each group appreciates that GE crops use fewer inputs and have generally higher yields. Subsistence farmers also find GE crops easier to manage than traditional or conventional hybrid varieties.

On the consumption side, South Africa uses about 11 million tons of corn annually, of which about half (mainly white corn) is used for human consumption. Yellow corn is mainly used for animal feed. The commercial demand for corn for food increased on average by two percent per year the past 15 years, while the commercial demand for feed corn increased on average by three percent per year (see also Figure 5). Projections are that this marginal increases in demand will continue in the 2014/15 MY, as South Africa's economy is expected to grow by less than three percent in 2014 and 2015, due to labor unrest, upward inflationary pressures and electricity constraints.

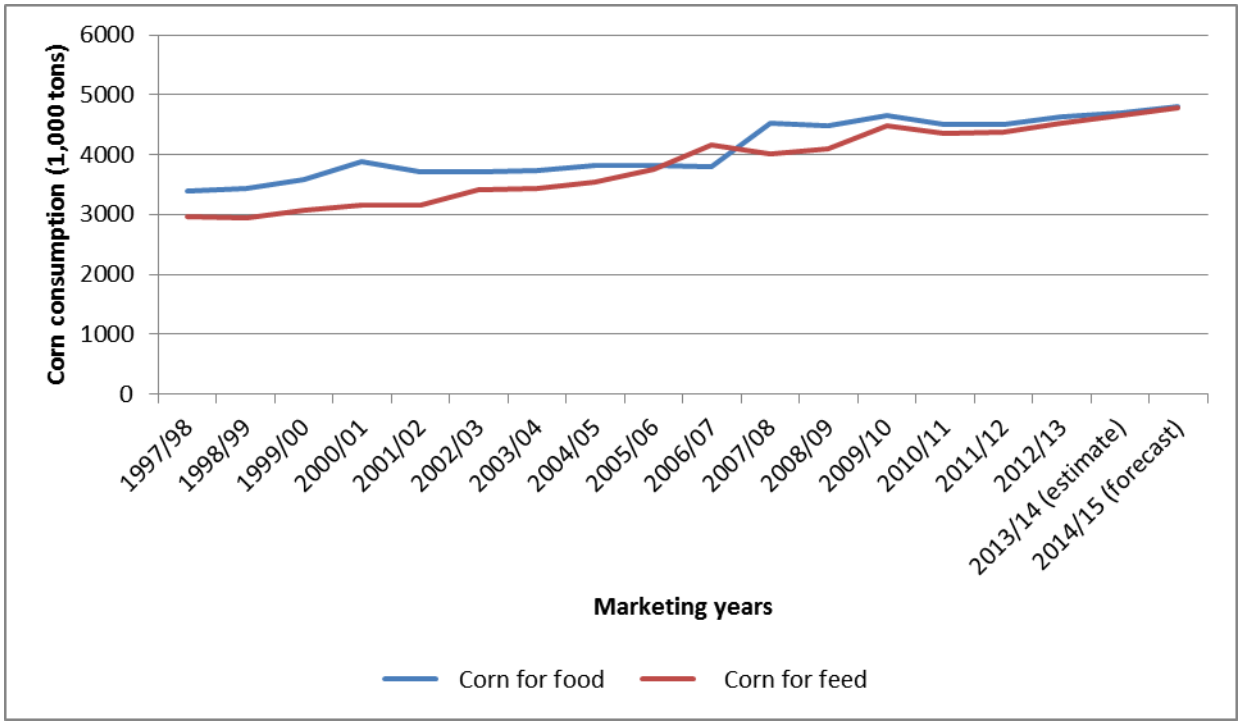


**Figure 5: The commercial consumption of corn in the food and feed markets of South Africa since the 1997/98 MY.**

## (b) PUBLIC/PRIVATE OPINIONS

A survey conducted by the Department of Science and Technology's Public Understanding of Biotech organization, shows that most South Africans have no knowledge of biotechnology. This finding is not surprising given that most South Africans are more concerned with the price of food than with how it was grown. What is interesting is that despite this lack of understanding, an average of 57 percent indicated that different applications of biotechnology should continue.

Although South African scientists are the leaders in biotechnology on the African continent, the survey showed that the term "biotechnology" means nothing to 82 percent of the general public. A similar proportion is unaware of the meanings of 'genetic engineering', 'genetic modification', and 'cloning'. The study, in which researchers interviewed 7,000 people in the language of the participant's choice, was designed to be representative of the adult population of South Africa. It reveals that even among the few South Africans who were aware of biotechnology, most were indifferent to it.

When asked who they most trust to tell the truth about biotechnology, 24 percent of interviewees said universities, 19 percent said the media, and 16 percent said the government. Respondents were even less likely to trust consumer groups, environmental organizations, religious groups, or the biotechnology industry. The survey concluded that South Africa needs better science communication about biotechnology so that people can have a clearer picture of how it affects their lives.

## (c) MARKETING STUDIES

Please refer to the following studies:

http://csis.org/files/publication/100701_Cooke_AfricaGMOs_WEB.pdf;

http://upetd.up.ac.za/thesis/available/etd-11222005 110807/unrestricted/00dissertation.pdf;

http://etd.uovs.ac.za/ETD-db/theses/available/etd-10042011-094627/unrestricted/MarxGM.pdf;

The first study was conducted in 2010 and studied the difference in debate in Zambia, Kenya and South Africa on GE crops, while the second study looked at consumer perceptions and market segmentation of GE white corn in South Africa. The third study investigated the monitoring of GE food products in South Africa.

# PART D: CAPACITY BUILDING AND OUTREACH

## (a) ACTIVITIES

Below, the activities that have been carried out by FAS/Pretoria in the region since 2012 are listed. These activities are implemented usually through AfricaBio. AfricaBio is a non-governmental, non-political and non-profit biotechnology organization based in South Africa that advocates for stakeholders in the research and development, production, processing and consuming sectors. The bulk of its funding comes from the private sector. USAID and other United States organizations also provide periodic funding to Africabio for training and capacity building activities and for the production of biotechnology informational materials.

**FAS/Pretoria presents U.S. Biotech Experience to South African Parliament (March 6, 2012):** FAS/Pretoria, as part of a panel of speakers, was invited to brief the South African Parliamentary Portfolio Committee on Agriculture on the United States experience with biotechnology adoption. Unexpectedly, the Portfolio Committees for Rural Development, Health, and the Environment also attended. This marked the first time FAS/Pretoria had addressed the Parliamentary committees that oversee the priorities and budgets of their respective departments for biotech-related rule-making. Senior Agricultural Attaché, Corey Pickelsimer, presented the United States experience with biotechnology adoption, which included the regulatory framework developed for approving genetically engineered crops and animals in the United States, and emphasized the need for a regulatory framework that is based in sound-science. After presenting to Parliament, the group travelled to the Stellenbosch University, Institute for Plant Biotechnology where they met with local professors to discuss biotech

research in South Africa. Funding for this activity came from Department of State.

**FAS/Pretoria presents at ISAAA press briefing (March 8, 2012):** FAS/Pretoria Senior Agricultural Attaché, Corey Pickelsimer, participated in the International Service for the Acquisition of Agri-Biotech Applications (ISAAA) press release to more than 30 representatives of media and invited guests from various embassies based in Pretoria, South Africa. Dr. Klaus Ammann, a noted expert and keynote speaker, predicted the future of biotechnology as being driven by bio-fortification, or traits that benefit consumers through improved nutrition and other consumer-oriented benefits. This event was funded, in part, by the Department of State Economic Bureau Biotech Outreach Program.

**Biotechnology Outreach with Emerging Farmers (March 9, 2012):** Minister Counselor, Ross Kreamer, and Senior Agricultural Attaché, Corey Pickelsimer, attended the Emerging Farmer Day, a biotechnology outreach activity organized by AfricaBio, where Pickelsimer was invited to make opening remarks. In his remarks, Pickelsimer discussed the link between biotech adoption and increasing yields and cited yield improvements that have occurred in South Africa since the adoption of biotechnology in the mid to late 1990s. Furthermore, he emphasized the need for governments not to limit farmer's access to the technology, as it has been proven safe for consumers and the environment. This event was funded, in-part, by the Department of State EB Biotech Outreach Program.

**AfricaBio Business Lunch meeting (August, 31, 2012):** Between August 29 and September 4, Jerry Norton, the World Agricultural Outlook Board's (WAOB) chair of the Interagency Commodity Estimates Committee (ICEC) for grains visited South Africa to participate *inter alia* as keynote speaker at business lunch meeting, organized by AfricaBio in collaboration with FAS/Pretoria. Participants at the business lunch meeting included government officials, farmers, delegates from seed companies, academics and other stakeholders. More than 60 people attended the function. Jerry presented on the effect biotechnology crops have had on trade since the late 1980's. The discussion took place during a time where Africa has turned the corner in terms of biotechnology and a clear sense of urgency is seeing the several countries in the region including Mozambique, Kenya, Malawi, and Uganda.

**Figure 6: Minister Counselor Ross Kreamer, Jerry Norton, and executive members of AfricaBio during the business lunch**

**SADC meeting on biotechnology and biosafety (November 28 – 29, 2012):** In November 2012, a Southern Africa Development Community (SADC) meeting on biotechnology and biosafety were held. The United States Department of Agriculture (USDA) funded the participation of some of the regulators. The objective of the meeting was to discuss emerging issues on biotechnology and biosafety and the establishment of an enabling environment that facilitates the development and implementation of regional policies for the safe and responsible use and trade on products derived from agricultural biotechnology. The SADC biotechnology and biosafety policy harmonization process has being stalled since the early 2000 and SADC Member States do not have a common approach to biotechnology and biosafety. This creates challenges on trade, food aid and the handling of trans-boundary movement of GE commodities. The meeting reached consensus that there is a great need for the harmonization of biosafety policies in the region. The meeting proposed a SADC-wide conference to discuss policies changes.

**Biotechnology outreach to the South African Parliament (February 25 -27, 2014):** FAS/Pretoria Senior Agricultural Attaché, Pickelsimer, presented on the benefit of biotechnology to smallholder farmers as part of a State Department funded biotechnology outreach activity, February 25-27. The biotechnology outreach came on the heels of a petition by the African Center for Biosafety (ACB) to overturn South Africa's approval of the importation of 2,4-D corn, a decision made in 2012. The tone of the outreach was notably more positive than an earlier FAS/Pretoria presentation to parliament, which was considered a huge success, in spite of speaking immediately after the ACB petition, which could have artificially raised concerns about biotechnology.

**SADC conference on biotechnology and biosafety (March 3 – 5, 2014)**: AfricaBio, in collaboration with South Africa's Department of Agriculture, Forestry, and Fisheries (DAFF), the United States Department of Agriculture (USDA), and other international partners, co-hosted the Southern African Agri-Biotech and Biosafety Conference. The event focused on Smart and Sustainable Agriculture in Southern Africa: Meeting Future Food Needs. The three-day event brought together government and academic representatives in the biotech and biosafety sectors from 14 SADC members. In addition, regional economic communities like Common Market for Eastern and Southern Africa (COMESA) and the New Partnership for Africa's Development (NEPAD) attended the event to discuss the importance of biotech harmonization in the region. The conference recognized the role of biotechnology in ensuring food security, using South Africa as a case study after more than 15 years of biotechnology adoption. The conference also reached consensus that there is an urgent need for the harmonization of biosafety policies in the SADC region. However, a number of critical issues still need to be addressed by the SADC Secretariat, which remains a huge challenge.

## (b) STRATEGIES AND NEEDS

The South African government generally supports the use of biotechnology products. Transgenic varieties of cotton, corn, and soybeans are approved for commercial planting. Agricultural biotechnology holds wide appeal for South African small scale and commercial farmers as they recognize the financial benefits of fewer inputs and potentially higher yields.

FAS/Pretoria's program uses South Africa as an example of a country that accepts and uses agricultural biotechnology successfully when doing outreach activities in the region. South Africa's GE adoption story is key in FAS/Pretoria's regional biotechnology strategy. The participation of South African researchers, officials, and experts in USDA funded outreach activities as speakers and participants, adds a type of credibility to the biotechnology picture that the United States story alone could not attain. To continue strengthening the South African agricultural biotechnology position by implementing a sustained and deliberate outreach strategy will contribute significantly to harmonizing the regional biotechnology system and lead to less trade disruptions overall.

FAS/Pretoria's short term goals for biotechnology in Southern Africa include:

- To seek opportunities for additional resources through the State EB biotech program, EMP funding, and other available funding sources to raise awareness of the benefits of biotechnology and the development of science-based regulatory systems in Southern Africa.

- To improve USDA-DAFF coordination within the like-minded group, including within SADC, to promote harmonized and science-based rule-making on innovative agricultural technologies.

- To continue facilitate the harmonization of biotechnology rule-making in the SADC region.

Regulatory stabilization and streamlining should be a focal point to capacity building activities in South Africa. These activities could include:

- Regular interaction and information exchange with regulators on GE issues.
- Regular interactions with portfolio committees in parliament.

Additionally, outreach to small scale farmers on the benefits of biotechnology should also be a focus. Expanding this outreach to include consumer groups and the general public could achieve greater understanding and acceptance of biotechnology.

## CHAPTER 2: ANIMAL BIOTECHNOLOGY

Animal biotechnology also falls under the GMO Act of 1997, and any application will have to be approved by the EC. However, no animal biotechnology has been applied for review, in South Africa, at this stage. The Directorate of Biosafety in DAFF is proactive and is in the process of developing a framework for risk assessments regarding animal biotechnology.