FINAL OVERVIEW REPORT ON GM MAIZE IN SOUTH AFRICA FOR THE 2010/2011 SEASON

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Pretoria, 29 March 2011

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ACKNOWLEDGEMENTS

The author wishes to extend his appreciation to the Maize Trust that provided the funds for this survey and to all collaborators. Thanks are also due to Ms Jansen van Rijssen for assistance with graphics, Dr. Ferdi Meyer of BFAP, Grain SA, Agri SA and Hans Lombard for the media conference.

EXECUTIVE SUMMARY

The study has a *primary objective* of surveying and analyzing GM (genetically modified) maize production that can serve as a database for stakeholders in the food chain, consumer groups and government departments. An updated overview is presented on relevant regulatory developments and analysis of permits granted. Such information may be required for imports and exports, as well as serving local markets.

***The survey* is based on collating and analyzing actual maize seed sales data provided on a confidential basis by seed companies, convwerting sales to hectares planted according to seeding rates, and expressing GM areas in terms of percentages of total area planted as estimated by the Crop Estimates Committee.**

***Global GM* crop plantings increased by 10% to reach 148 million hectares grown by over 15 million farmers in 29 countries. The cumulative area under GM crops over 12 years stands at one billion hectares. The US remains the global leader, followed by Brazil, Argentina, India, Canada, China, Paraguay, Pakistan, and South Africa, the latter having moved from 8th to 9th position. Global GM maize planting covers 46.0 million hectares in 16 countries and represents 29% of all maize produced. The strongest growth in the US came from stacked traits.**

The South African GMO regulatory framework has become more complex and costly to all. The report covers a number of amendments to the GMO Act and draft standards for managing identity preservation and managing imported grain with events not yet approved in SA. DAFF is investigating handling of stacked genes, low level presence and adventitious presence of GM. The Consumer Protection Act has entered into force on 1st April and its mandatory labeling of GM goods in Section 24 (6) in the Act and relevant regulation 7 remains contentious. Labeling of all goods that are or contain genetically modified ingredients, and that are derived through genetic modification, will impact on agri-businesses and producers, and eventually on consumers. Links in the food-feed chain will be affected differently by costly labelling.

***South Africa* maintained its GM area at over 2.0 million hectares combined of the three crops: maize (1.7), soybeans (0.350) and cotton (0.015). Maize production fell below the anticipated planting due to low grain prices and an increase of soya beans. The GM share of planting decreased slightly more than the total area decline. Total GM maize planted came to 1.7 million hectares, 1.007 million white and 0.697 million yellow, with share of the total planting at 72% of total maize, 71% for white and 73% for yellow. Single insect resistance remained the dominant trait, though declined, at 46% of GM share, while stacked insect resistance and herbicide tolerance now stands at 39.4%, and herbicide tolerance alone remained at 14.6%. Cumulatively, total GM maize area from 2000 to 2010 harvest covered 10 million hectares, yielding crops of over 45 million tons of GM grain.**

Some 360 permits were granted in 2010 for export of GM commodity maize, import/export of GM seed and various other uses that include cotton, soya, vaccines, etc. GM maize for export since 2007 covered 4.8 million tons, imports 2.15 million tons, while GM maize seed exports for planting amounted to 32 932 tons and imports 9511 tons. Both trade sectors generated valuable foreign exchange.

Commodity clearance approvals since 2000 covered 8 genetic events but no new approvals were granted since 2004. Field trials are ongoing with drought tolerance and some 20 other new stacked gene combinations incorporating various insect resistance and herbicide tolerance genes.

Investigations on occurrence of incidence of tolerance or resistance in stalk borers to the Bt gene continued and steps are being taken to strengthen compliance with refugia and combining new Bt genes. A new cultivar with two Bt genes has been approved for general release.

The March media conference on global and South Africa GM crop status generated massive media coverage thanks to the professional presentation by the Deputy Minister of DAFF, Mr Pieter Mulder.

INTERIM OVERVIEW AND ANALYSIS REPORT ON GM MAIZE IN SOUTH AFRICA FOR THE 2010/2011 SEASON

1. INTRODUCTION

This survey has been funded on an annual application basis since 2006/7 season and continues to grow in issues covered. The objective remains to survey and analyze adoption of genetically modified (GM) maize by producers in South Africa in order to establish an updated database on GM plantings, available to maize industry stakeholders as a source of information. This information enables traders in maize grain and products to convey information to trading partners as may be required by customers, domestically and in other countries, and to comply with the Cartagena Protocol on Biosafety.

The report also covers updates on regulatory developments. These include new requirements for obtaining certificates on GMO status in consignments, registration of laboratories that conduct commercial GMO detection tests, strengthening of compliance with mandatory non-GM refugia areas, and publishing of amended Regulations that enabled the GMO Amended Act to enter into force on 26 February 2010. All of this impacts on seed companies, producers and grain traders.

Beneficiaries of this information include the following parties and their clients or colleagues:

AgriSA, GrainSA, grain traders, millers, silo industry, industrial processors, food and animal feed manufacturers and their clients, seed industry, CEC, SAGIS, SAGL, National Department of Agriculture, ARC, the GMO Secretariat, Executive Council, Advisory Committee, and the media.

Data in this report are based on reliable confidential statistics provided by biotechnology seed companies and cover hectares of GM maize planted and percentage of market with a breakdown per trait -- insect resistant (IR) or herbicide tolerant (HT) and stacked genes (IR/HR) -- shown separately for white and yellow maize, as well as historic data since year 2000 in order to highlight trends. An analysis of permits granted during 2007 is also included as maize seed and

grain imports and exports that are GM or may contain material of GM origin have trade relevance for the industry. Statistics are primarily based on commercial maize plantings. Additional information on smallholders adoption of GM maize is still being sourced.

2. METHODOLOGY AND APPROACH USED IN SURVEY

The survey goes through two stages so that information is refined with latest information available at each stage. Seed companies provide a confidential breakdown of seed sales per GM trait (Bt insect resistance, glyphosate herbicide tolerance, and stacked genes for both traits), per white and yellow maize, and per seed density used (6-8 kg/ha for drier Western and Northern regions, 10-12 kg/ha for Eastern and South-Eastern regions, and 20-25 kg/ha for irrigation farming. Seed is mostly sold on seed count basis in pockets containing 60 000 or 80 000 seeds and, in fact, seed count gives a more accurate picture of area planted to a pocket than mass as an average rate of 10 kg/ha may involve 25 000 to 35 000 seeds, depending upon seed size and shape.

This survey used data solicited during November 2010, then refined and re-assessed in July 2011, of GM maize plantings based on discussions and meetings with six seed companies that market GM seed (Pannar, Pioneer, Monsanto, Link Seed, Agricol, and Klein Karoo Saad that had acquired the seed division of Afgri). Syngenta licences their technology and assists in the survey but is itself not involved in seed marketing in South Africa. Estimated seed sales based on orders received and expectations of final sales, were supplemented by the CEC intention to plant survey and their subsequent adjustment of crops and areas planted, Grain SA's information on trends and risks of increased plantings, and personal comments obtained from interviews with leading farmers and maize industry experts. Despite many uncertainties, the general consensus was an expected decline in maize area by 8 - 14% expected from low grain prices. However, in the end the decline was some 4%. The most recent estimate (August 2011) puts the area at 2.372 million ha. As GM area declined more than the total area planted to maize, data from seed companies were re-assessed and sales in number of

pockets compared to 2009 sales and in relations to expected sales data provided in November 2010.

Major crop planting has become increasingly difficult to predict due to climate and producer prices. The 2010 planting season was no exception as maize planting declined while soya beans exceeded expectations.

Table 1 below shows a comparison between the early November survey on GM maize adoption and the final survey conducted in July.

TABLE C

COMPARISON OF NOVEMBER 2011
WITH JULY 2011 SURVEY (HECTARES X MILLION)

Hectares / %	Grain / trait	Nov survey	July survey	% Change
Area planted (CEC est)	White	1.522	1.414	- 6.8%
Area	Yellow	0.946	0.542	+ 0.8%
TOTAL	White + Yellow	2.470	2.372	- 4.0%
GM area	White	1.140	1.007	- 11.6%
Area	Yellow	0.759	0.696	- 8.3%
TOTAL	White + Yellow	1.890	1.704	- 10.3%
GM % of area	White	74.8%	71.0%	
GM % area	Yellow	80.2%	73%	
GM% of TOTAL	White + Yellow	76.9%	71.8%	
GM trait % of GM area	White Bt	50.7%	49.3%	
GM trait %	White HT	8.5%	9.9%	
GM trait %	White Bt/HT	41.3%	40.8%	
GM trait of GM area	Yellow Bt	38.8%	41.4%	
GM trait %	Yellow HT	20.7%	21.3%	
GM trait%	Yellow Bt/HT	40.5%	37.3%	
Hectares GM 2000 - 2011	White	5863	5729	
“ Ha GM	Yellow	4215	4154	
“ Ha TOTAL	White + Yellow	10078	9883	

NOTE: The survey and analysis released during March 2011 in Pretoria, and scheduled to harmonize with the ISAAA release of their global biotech crop status media conferences, used the November statistics on South Africa. Therefore, some differences are present between that release and this report, as can be expected as this report is based on audited sales data of seed companies and most recent crop estimates of the CEC.

3. GLOBAL ADOPTION OF GM MAIZE

Annual overviews are compiled by ISAAA (the International Service for the Acquisition of Agri-Biotech Applications), an international non-profit organization. These overviews are released by way of international media conferences and published as Briefs. Salient points from the 2010 Brief 41 (C. James, 2010, "Brief 42: Global Status of Commercialized Biotech/GM Crops: 2010", available in executive summary format on www.isaaa.org) are updated from 2008 as follows:

- **Global cumulative GM area planted since 1996 for the first time reached 1 billion ha.**
- **GM crop area increased from 134 million hectares in 2009 to 148 million.**
- **These crops were planted by 15.4 million farmers in 29 countries, 90% million being smallholder farmers.**
- **For 2009, the USA leads with 66.8 million ha, followed by Brazil 25.4, Argentina 22.9, India 9.4, Canada 8.8, China 3.5, Paraguay 2.6, Pakistan 2.4, South Africa 2.2, and Uruguay 1.1 million ha . The remaining 19 countries (in order of magnitude) are Bolivia, Australia, Philippines, Myanmar, Burkina Faso, Spain, Mexico, Colombia, Chile, Honduras, Portugal, Czech Republic, Poland, Egypt, Slovakia, Costa Rica, Romania, Sweden, and Germany.**
- **Developing countries planted 48% of total GM area.**
- **In addition to the 29 countries growing GM crops, another 30 have approved products from biotech crops for import as food and/or feed, and/or for trial planting.**
- **Soybean remained the major GM crop (73.3 million ha = 81% of global 90 million ha), followed by maize (46 million ha = 29% of global 158 million ha), cotton (21 million ha =**

64% of global 33 million ha) and canola (7 million ha = 23% of global 31 million ha).

- **The major trait was herbicide tolerance at 68% share of total 148 million ha GM, followed by double and triple stacked traits at 32 million ha (22%), and insect resistance at 21%. GM maize with eight genes stacked for different insect resistance and herbicide tolerance went commercial in US and Canada.**
- **Cumulative farmer benefits for 1996 - 2009 were estimated US$ 65 billion, and pesticide savings amounted to 356 000 MT active ingredients.**
- **Most growth in adoption now comes from developing countries, driven by Bt cotton in China and India, and soybeans in Brazil. India is field testing vegetables (brinjal, cabbage, cauliflower, okra, potato) and agronomic species (cotton, maize, sorghum, groundnuts, rice). China is field testing GM petunia, tomato, papaya, sweet peppers, poplar, rice, and maize.**

GM maize global production took place on 46 million ha (29% of global maize) with the five lead countries US, Brazil, Argentina, South Africa, and Canada, followed by another 11 countries.

The US remained the major maize producer by far and GM maize comprised 86% of maize area, with fastest growth coming from triple stacked traits. Brazil commenced with three GM maize hybrids in 2008 and by 2009 planted 5 million ha or 38% of its total maize area. Eleven genetic modifications (“events”) have been approved for release. Maize production in Argentina declined to 2.58 million ha in favour of soybeans and 83% of this maize is GM of which 50% is stacked traits. Nine events have been approved.

The global trends are shown in Figure 1, Figure 2 and Figure 3 below.

FIGURE 1

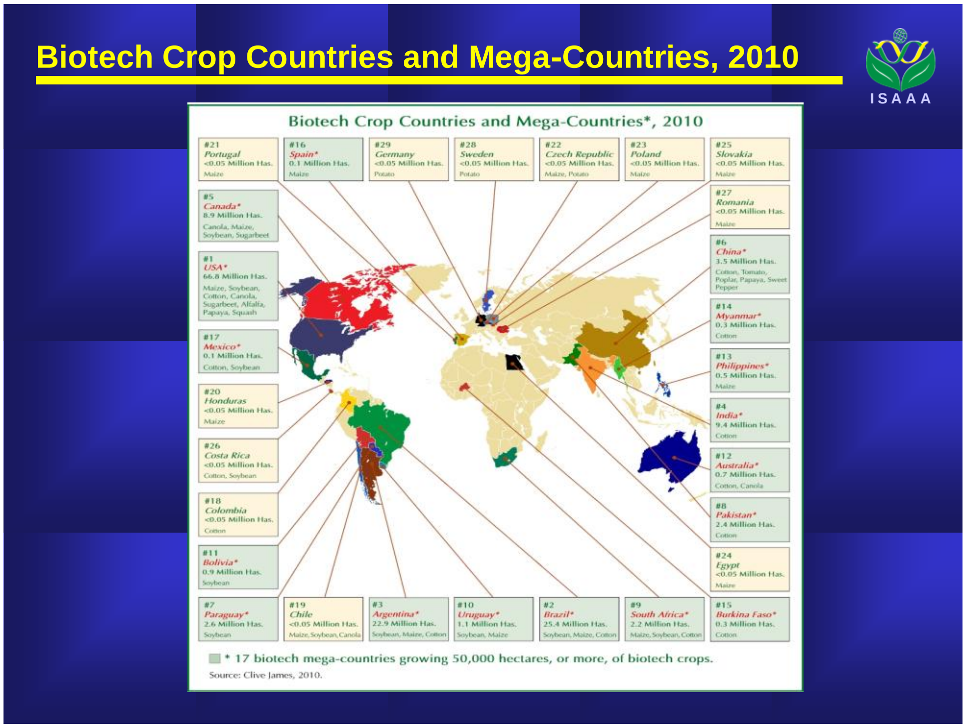


FIGURE 2

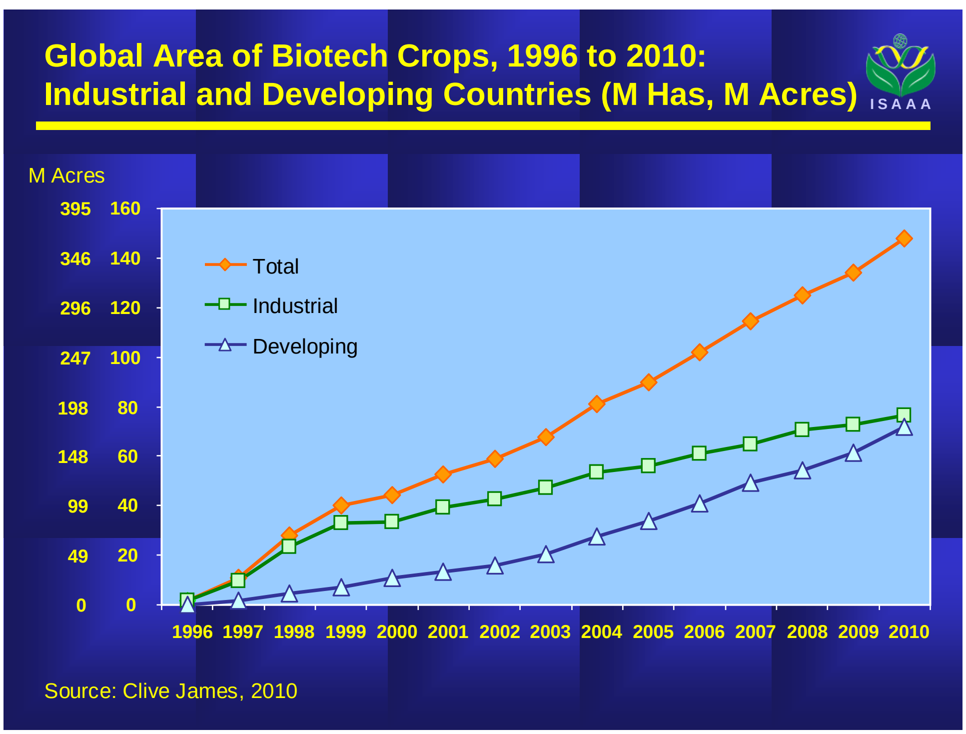
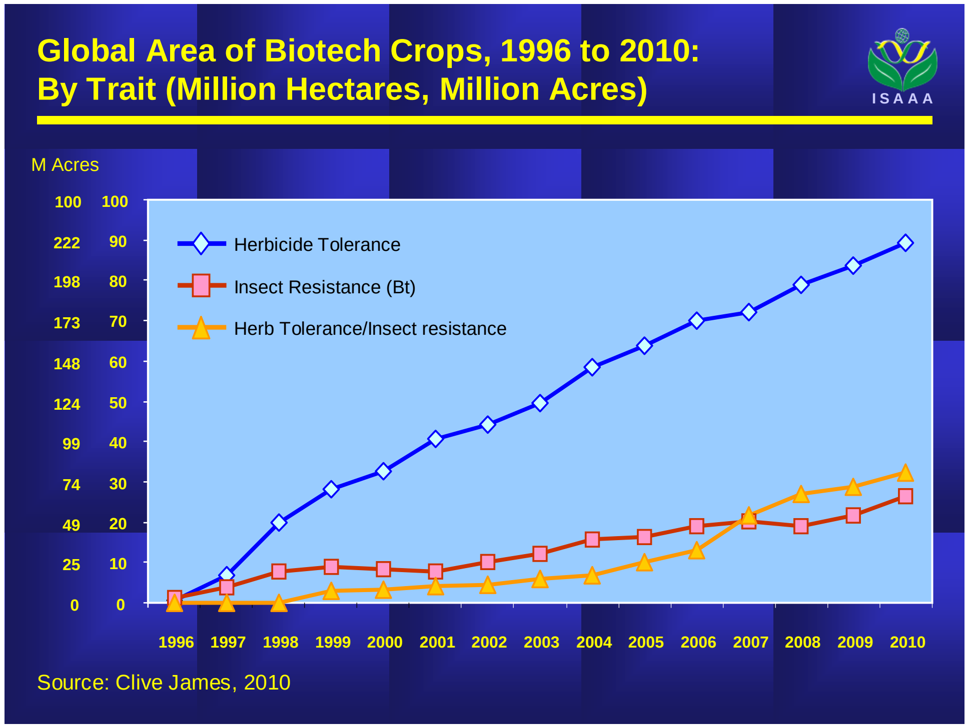


FIGURE 3



4. SOUTH AFRICAN REGULATORY SYSTEM

4.1 *The GMO Act and GMO Amendment Act*

The GMO Act of 1997 regulates all activities dealing with genetic modification in all organisms. Major amendments in the Act and amended regulations entered into force in 2010 and comprise insertions to cover requirements of the Cartagena Protocol on Biosafety that deals with transboundary movement of live modified organisms that may pose a potential risk to the environment. Regrettably, DAFF did not use the technical definition of a GMO. As contained in the Protocol, and this may lead to ambiguous assessments. Decision making is vested in an Executive Council comprising a representative from each of six government departments.

Some changes in the text also changed the approach in the original Act, for example

- **The 1997 Act is based on responsible promotion and application of the technology while limiting possible harmful consequences while the amended Act has its focus on risks and hazards.**
- **Biosafety in the new Act is defined as setting levels of safety to *avoid* risks whereas its new regulations speak of *managing* potential risks.**
- **Decision making in the Council has moved from a majority vote to *consensus by all* members (confused with unanimity?). What if one member is absent as happens periodically?**
- **Several departments have been changed or merged in 2010 so that the composition of the Council does not comply with the Act.**
- **Socio-economic considerations have been added as a requirement but it seems that benefits receive scant attention.**
- **The required environmental impact assessment (EIA) is defined as "process to assess potential impact on the environment". The Wikipedia definition of EIA is basically the same: "assessment of possible positive or negative impact" whereas the definition by the International Impact Assessment Association speaks of "the process of identifying, predicting, evaluating, and mitigating the biophysical, social and other relevant effects prior to major decisions being made". Despite these definitions, positive impacts seem to receive negligible, if any, attention by the Department of Environmental Affairs.**
- **These few comments are listed to highlight the concern that the system has moved away from a balanced approach.**

Other new legislation will involve amendments to almost all agricultural Acts that may include the GMO Act, and already covers a new Plant Breeders' Rights Act and PBR policy, as well as the Plant Improvement Act. Inputs were made into drafting of the PBR policy and this document has been approved recently by the Department of Agriculture, Forestry and Fisheries, as well as by Cabinet.The impact on GMO seeds and crops is uncertain. Likewise, the amended Plant Breeders' Right Act has been approved by both DAFF and Cabinet but was never submitted for external inputs. Publication of the final Bill is awaited. In terms of considering new policies and guidelines in assessing GMOs, the GMO Executive

Council is examining modalities for stacked genes, and isolation distances between GM and non-GM fields. Also under discussion, are low level presence (LLP) of unapproved genetic events in grain and food products and adventitious presence (AP) of GM in non-GM products (unavoidable co-mixing) and what standards should be set. It is not clear to what extent LLP and AP at this stage involve discussions with stakeholders and following of international progress in this regard. To some extent this is being covered in present DoH and DTI consumer protection regulations.

4.2 ***Other departmental legislation***

The Department of Trade and Industry, through the South African National Standards, had drafted standards for *identity preservation* (SANS 10385-200) so that GMO and non-GMO products can be separated throughout the production and supply chain. This system has not yet been formally approved. In view of a virtual moratorium over some six years on approval for import of commodities that may contain genetic modifications not yet approved in South Africa, SANS has spent more than two years to develop standards (SANS 910ED1) for *managing imports* of such commodities. The final text has been reduced to some basic guidelines but contains conflicting wording in that some paragraphs use *minimizing* spillage while others use *avoiding* spillage.

The latest development on the *Consumer Protection Bill* Article 24(6) and its regulations is that the Act entered into force on 1 April 2011 as *Act 68/2008*, with regulations becoming effective after six months. Many inputs have been submitted in respect of the Act since 2008, and the draft Regulations since 2010 that call for mandatory labeling of "genetically modified goods", which will undoubtedly have cost implications thoughout the food chain and be difficult to truthfully comply with and be monitored by DTI.

Article 24(6) reads

"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".

The Act and regulations contain a great many uncertainties, complications and added costs for the food/feed chain, and consumers. It will impact differently on different links in the food – feed chain. My personal analysis is summarized below:

Regulation 7: "Product labeling and trade descriptions: genetically modified organisms.

7(1): In this regulation a "genetically modified organism" means a genetically modified organism as defined in section 1 of the Genetically Modified Organisms Act, 1997 (Act no. 15 of 1997), and "genetic modification" has a corresponding meaning.

7(2): This regulation applies to goods approved for commercialization by the Executive Council for GMOs established by section 3 of the GMO Act, 1997.

7(3): For purposes of section 24(6) of the Act, and subject to subregulation (4) and (6), this regulation applies to all goods referred to in subregulation (2) which contain at least 5 percent of genetically modified organisms, irrespective of whether such making or manufacturing occurred in the Republic or elsewhere, and to marketing material in respect of such goods.

7(4): Any good or ingredient or component to which subregulation (3) applies may not be produced, supplied, imported or packaged unless a notice meeting the requirements of section 22 of the Act is applied to such goods or marketing material, as the case may be, in a conspicuous and easily legible manner and size stating, without change, that the good or component "contains genetically modified organisms".

7(5): If goods listed or contemplated in subregulation (2) are intentionally and directly produced using genetic modification processes, the goods or marketing material, as the case may be, must be labeled, meeting the requirements of section 22 of the Act, without change, must be labeled "Produced using genetic modification".

7(6): A notice meeting the requirements of section 22 of the Act, must state that a good or ingredient or component contains genetic modified organisms unless such good or ingredient or component contains less than one percent genetically modified organisms.

7(7) Notwithstanding the provisions of subregulation (6) a notice meeting the requirements of section 22 of the Act may state that the level of genetically modified organisms contained in the good or ingredient or component to which subregulation (2) applies is less than 5 percent.

7(8): If it is scientifically impractical or not feasible to test goods contemplated in subregulation (2) for the presence of genetically modified organisms or ingredients, a notice meeting the requirements of section 22 of the Act must be applied to such goods or marketing material, as the case may be, in a conspicuous and easily legible manner and size, stating "May contain genetically modified ingredients".

7(9): This regulation does not amend or repeal or detract from any other regulation applying to product labeling or trade description of genetically modified organisms under or in terms of any other legislation, nor do any such legislation detract from or prejudice this regulation.

7(10): This regulation will come into effect six months after commencement of the Act.

NOTES:
Section 24(6) defines the scope of mandatory labeling as genetically modified ingredients and components. Regulations 7 adds genetically modified organisms in subregulations (3), (4), (6), (7), (9). One may challenge whether GMOs should be labelled.

Subregulation 7(5) dictates mandatory labeling for "Produced using genetic modification". The scope of section 24(6) is "goods", not processes used in manufacturing a good. Reference to section 22 of the Act is irrelevant as section 22 deals with Codex standards for how to label, not what to label. It can be questioned why this requirement had been inserted only at the final amendment stage of the Regulations as it had been absent from the approved Act section 24(6) and from texts of the Regulations during revision stages.

Regulation 7(9) states clearly that the Act and Regulations do not detract or amend or repeal other similar regulations. Yet, in a private discussion, a DTI official stated that the CPA overrides other similar legislation.

5 STATUS OF SOUTH AFRICAN GM MAIZE

5.1 *The permit system*

Approvals under the GMO Act are based on application for and issuing of permits. The latest list includes the following activities:

Registration of facilities, trial release into the environment, commodity clearance, contained use, general release, import for contained use, import for general release or commodity clearance, import for trial release into the environment, import for contained use or use as food, feed or processing, export for intentional release into the environment, commodity use for food, feed or processing, time extension for GMO activities. In addition, these applications have to be accompanied by an affidavit. For exports, a GMO lab test certificate is required and a letter from importing country that it will accept the consignment. Only two labs are recognized by the Department of Agriculture (DAFF) for testing samples and issuing a GM certificate.

Granting of a permit for any GMO activity does not mean that the activity will be executed in the month or year or in quantity approved. Some 348 permits for maize were granted for the year 2010 Exports of GM containing maize commodity grain accounted for 60 permits, while only one permit for import of 30 000 tons was approved. GM seed exports for planting covered 60 permits excluding permits for trials, multiplication or contained use. Seed imports for commercial planting amounted to 1 707 tons, also excluding permits for other applications. Other permits dealt with GM cotton, GM soya beans, GM vaccines and others. GM maize and GM seed trade data are contained in section 5.2 below.

5.2 GM seed and commodity trade.

There is always a delay between granting of a permit and actual import or export for both seed and grain. The following statistics indicate that both GM maize seed and GM maize grain have developed into substantial foreign currency earners for their respective industries. It is also clear that the South African producers and grain traders have developed alternative markets while traditional African grain importers dither on the GM issue.

TABLE 2

TRADE IN GM SEED FROM 2007 TO 2011
(EXPRESSED IN METRIC TONS)

Year	Imports	Exports
2007	1106	1509
2008	5581	3430
2009	598	7760
2010	1707	8763
2011 Jan – Jul	429	11470
TOTAL	9511	32932

TABLE 3

TRADE IN GM MAIZE: PERMITS GRANTED FOR IMPORTS/EXPORTS (IN MILLION METRIC TONS)

Year	Imports	Exports
2007	1.900	Nil
2008	0.226	0.197
2009	Nil	Nil
2010	0.030	2.520
2011: Jan - July	Nil	2.088
TOTAL	2.156	4.805

The DAFF permits will not match the SAGIS data due to time lags between permits and exports, and also as the DAFF permits are compiled by calendar year, whereas the SAGIS year runs from April to end of March. The consensus between these two sets is that exports of GM commodity maize have substantially increased.

TABLE 4

MAIZE TRADE: SAGIS DATA ON MAIZE EXPORTS
(IN MILLION METRIC TONS)

Year	White	Yellow	Total
2007/2008	0.400	0.072	0.472
2008/2009	1.897	0.266	2.163
2009/2010	1.408	0.262	1.670
2010/2011	1.049	1.017	2.066
2011 Apr – Jul	0.552	0.265	0.817
TOTAL	5.306	1.882	7.188

5.3 *GM maize cultivars on the official plant breeders rights list and the official variety list.*

There are 2318 cultivars protected under the South African Plant Breeders' Rights Act. The official PBR list contains the names of 231 maize cultivars of which 109 or 47% are GM. The list also includes conventional cultivars and a small number of conventional open-pollinated varieties. The GM trait breakdown is 51 (47%) single Bt, 31 (28%) single herbicide tolerant RR, and 27 (25%) stacked genes for both traits. The list does not separate white from yellow. It is not uncommon that 20% of the list makes up 80% of seed sales as many are old ones being phased out and new ones being introduced.

The Variety List contains the following breakdown for maize cultivars:

- **White cultivars = 145 conventional hybrids, 53 GM hybrids, 27 Open-pollinated, High-lysine hybrids, and 3 High –lysine OPV, with a total of 235.**
- **Yellow cultivars = 118 conventional hybrids, 91 GM hybrids, 3 open-pollinated, and 13 high-lysine hybrids, with a total of 235.**

Breeders and producers need to understand that modern maize hybrids are protected as intellectual property under plant breeders' rights, patents on the unique genetic modification, and trade marks on the unique company name and GM seed designation, as well as under contract law that forms part of the sales agreement.

5.4 *Intellectual property rights*

Modern biotech cultivars are protected by plant breeders' rights in terms of the Plant Breeders' Rights Act (15/1996 as amended); patent rights under the Patents Act but only for specific claims such as novel gene constructs, vectors, promotors, bacterial phages as carriers for the novel genes, and others; and trade marks under the Trade Marks Act. Breeders' rights exclusive protection under the UPOV Convention 1991 has been extended from 15 to 20 years for plant varieties and from 20 to 25 years for fruit and forestry trees. The Convention in Article 15(2) provides for farmers to retain harvested material for re-use for planting on his own farm to produce another crop (the farmer's privilege exemption), subject to not violating the breeder's basic rights – a rather vague exemption that member states have to define for themselves. Patent rights protection ends after 20 years but trade marks continue as long as the owner pays annual duties.

A recent review by L. Miller and D. Kershen shows the conundrum with use of farm-saved seed of GM cultivars. The technology owner is held responsible for several conditions attached to approval for commercial use that include enforcement of refugia planting and monitoring of possible weed and target insect resistance. However, after 20 years PBR and patents run out and farmers, breeders and other seed merchants may continue to propagate and sell GM seed. Technology owners and seed companies try to manage this by way of contractual agreements attached as a condition of sale. Two conundrums arise from farm-saved seed: first, who is now accountable in terms of conditional release to maintain monitoring, extension services to farmers and submitting annual reports to government? Secondly, by having a contractual clause not to use the GM cultivar for further breeding has implications for the farmer, another breeder and the owner of the technology. It will be an expensive option to expect courts to make decisions on this issue.

One should take note that our Plant Breeders' Rights Act is being amended and a PBR policy being drafted, and both will have to deal with the farmer's privilege parameters.

5.5 ***GM maize genetic events approved for commodity clearance***

Commodity clearance enables grain traders to import grain containing the same or different genetic events from those approved in SA. However, the GMO Executive Council has not approved new applications for such clearance since 2004 and the recent SANS standards may bring an end to this moratorium. The following approvals have been granted:

- **2001: Bt176 insect resistance**
- **2001: T25 herbicide tolerance**
- **2002: Bt 11 insect resistance, herbicide tolerance**
- **2002: GA21 herbicide tolerance**
- **2002; NK603 herbicide tolerance**
- **2002: TC1507 insect resistance, herbicide tolerance**
- **2003: MON810 x GA21 insect resistance, herbicide tolerance**
- **2004: MON810 x NK603 insect resistance, herbicide tolerance**

The official list above seems to miss MON 810 approved in 1997.

The moratorium on import of commodities with genetic modifications not yet registered in South Africa has been in place for some six years. Informal information is that the Executive Council has decided to remove this barrier.

5.6 ***Maize genetic events approved for general commercial release***

The list of approved events for general conditional commercial release does not imply that such GM cultivars are presently being planted. It takes time to incorporate the genetic modification into locally adapted cultivars and build up seed supplies.

- **1997: Mon810 insect resistance**
- **2002: NK603 herbicide tolerance**
- **2002: Bt11 insect resistance plus herbicide tolerance**
- **2007: MON810 x NK603 insect resistance, herbicide tolerance**
- **2010: MON89034 two stacked Bt genes for insect resistance**
- **2010: MON89034 x NK603 stacked insect resistance, herbicide tolerance (comprising two Bt genes and herbicide tolerance)**

- **2010: GA21 herbicide tolerance**
- **2010: Bt11 x GA21 insect resistance, two genes for herbicide tolerance**

NOTE: The DAFF website contains no updates on minutes of the Executive Council meetings since 2010 so latest approvals for commercial release are not in the public domain.

5.7*Approved maize field trials with new GM combinations*

New insect resistance genes and herbicide tolerance genes or existing genes put into new hybrid combinations, and various stacked combinations of these novel genes, will serve to counteract development of target insect resistance and weed tolerance to herbicides, and also enable the producer to apply biotech management with various GM traits combined in cultivars relevant for his specific farm situations. Field trials approved during 2009 and 2010 are as follows:

- **MON8740, MON 8934, MON8934 x NK603, MON810 x Mir162,**
- **Bt11 x GA21, GA21, TC1507 x MON810, TC1507 x MON810 x NK603, TC1507 x Mir162, TC1507 x MON810 x Mir162,**
- **Pioneer59122, Pioneer98140, Pioneer98140 x MON810, Pioneer98140 x TC1507 x MON810.**
- **There is also a range of modifications approved for trials but the event identifiers – such as above -- have not been released.**

5.8 *Commercial status of GM maize planting in 2010/2011 season*

The analysis was based on an initial estimated 2.47 million ha maize planting, comprising 1.522 million white and 0.946 million yellow, and recently amended on a basis of 2.372300 million hectares planted (1.418 white and 0.954 yellow).

Due to a decline in maize area planted in 2010/2011, GM maize area also declined to 1.7 million ha or 72% of total maize, and the decline was more than for reduced maize area. Maize grain prices were at a low level and farmers moved to soya beans ans sunflower, apart from

replacing some GM maize with conventional where insecticide spraying was done via overhead irrigation. In some cases there was shortage of stacked gene seed.

The GM area was made up of single Bt gene of 784 893 ha or 46% of total GM, 248 080 ha or 14.6% single herbicide tolerance and 670 628 or 39.4% stacked traits.

White maize planting comprised 1.008 million ha which is 71% of total white area. Single Bt trait accounted for 496 791 ha or 49.3% of total white GM, single herbicide tolerance at 99 490 ha or 9.9% and stacked traits at 410 901 ha or 40.8% of total white GM.

Yellow maize area comprised 696 419a or 72% of total yellow area. Of the GM area, 288 102 ha or 41.4% was single Bt, 148 509 ha or 21.3% single herbicide tolerance trait, and 259 727 ha or 37.3% stacked traits.

Since year 2000, some 10 million ha GM maize had been planted which yielded a cumulative 45 million tons of GM grain.

The adoption trends are shown in Fig 1 and 2 in the Annex. Historic data by traits for white, yellow and combined maize are contained in tables 5, 6 and 7 below.

TABLE 5: AREA PLANTED TO GM WHITE MAIZE
2000-2010 HARVEST YEARS BY TRAITS (HECTARES x 1000)

YEAR	Bt	HT	Bt + HT	TOTAL
2000	0	0	0	0
2001	0	0	0	0
2002	6	0	0	6
2003	60	0	0	60
2004	144	0	0	144
2005	142	5	0	147
2006	221	60	0	281
2007	712	139	0	851
2008	696	218	61	975
2009	660	160	226	1046
2010	984	117	111	1212
2011	497	99	411	1008
TOTAL	4122	798	809	5729

TABLE 6: AREA PLANTED TO YELLOW MAIZE
2000-2011 HARVEST YEARS BY TRAITS (HECTARES X 1000)

YEAR	Bt	HT	Bt + HT	TOTAL
2000	3	0	0	3
2001	59	0	0	59
2002	160	0	0	160
2003	176	0	0	176
2004	197	0	0	197
2005	249	14	0	263
2006	107	68	0	175
2007	391	137	0	528
2008	406	159	23	588
2009	376	159	107	642
2010	326	153	187	666
2011	288	149	260	697
TOTAL	2738	839	577	4154

TABLE 7: TOTAL AREA PLANTED TO GM MAIZE
2000-2011 HARVEST YEARS BY TRAITS (HECTARES x 1000)

YEAR	Bt	HT	Bt + HT	TOTAL
2000	3	0	0	3
2001	59	0	0	59
2002	166	0	0	166
2003	236	0	0	236
2004	341	0	0	341
2005	391	19	0	410
2006	328	128	0	456
2007	1103	276	0	1379
2008	1102	377	84	1563
2009	1036	319	333	1688
2010	1305	270	340	1915
2011	785	248	671	1704
TOTAL	6855	1637	1428	9920

Note: Bt = insect resistance; HT = herbicide resistance, Bt + HT = stacked traits

5.9 ***Smallholder farmer adoption of GM maize***

Sales to smallholder and subsistence farmer totalled just over 4 000 hectares planted, substantially less than in 2009. The major deterrents are cost of sale and service per unit of sale, difficulty in getting buyer to sign agreement on refugia planting and enforcing same, and National Credit Act regarding sale to clients who may not be able to pay loans. Sales to black farmers who have entered commercial farming are not indicated separately but form part of standard sales – a commercial farmer is a commercial client.

5.10 ***Incidence of potential stalk borer resistance to Bt maize***

Monitoring of continued outbreaks of potential insect resistance has been assigned to GM seed companies who are required ti submit an annual report to DAFF. In addition, several monitoring and impact studies have been conducted by North West University in association with ARC and others. The first stacked Bt genes with added herbicide tolerance has been approved in 2010 for commercial release while a range of other cultivars with various stacked combinations is in the second year of field trials. Also in field trials are hybrids with stacked genes for tolerance to different herbicides. The author had been advised by Grain SA during a phone call that no cases of weeds resistance to glyphosate herbicide in GM crops have been reported. Extensive use in vinyeards and wheat of same herbicide over many years in the Western Cape has led to resistance manifesting in wild ryegrass and ramenas. A working group on weed tolerance had been established in that region.

Various local and international scientists are engaged in investigating genetic nature of tolerance or resistance or target insects to the Bt bio-insecticidal protein.

6. MEDIA COVERAGE

The March 2011 media conference on global status of GM crops, including an overview of the SA status, received widespread coverage

on 4 TV networks, radio, printed media, and websites. This event benefited from the presentation by the keynote speaker, the Hon. Mr Pieter Mulder, Deputy-Minister for Agriculture, Forestry and Fisheries. Support by the Maize Trust was included in all media interactions. A more complete media report is contained in Annexure 2.

END ==

Report submitted by

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ANNEXURE 1

Figure 1: Trends in South African GM maize hectares 2000-2011 harvest years

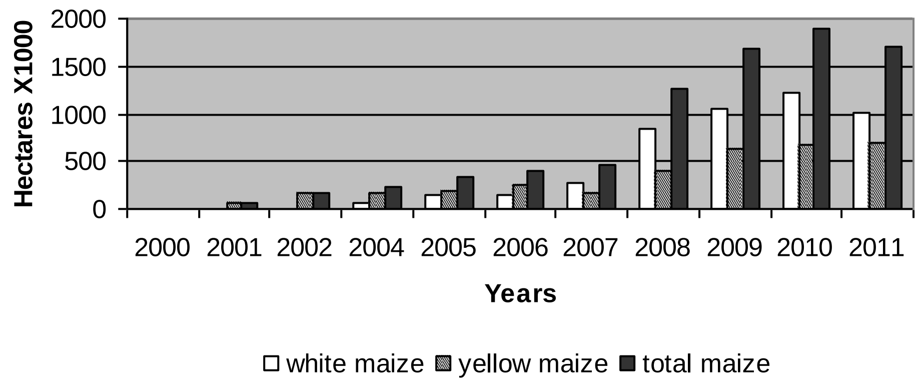
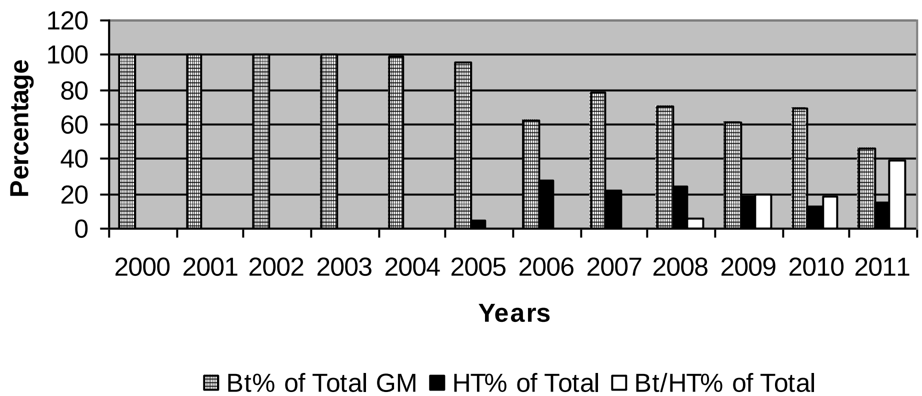


Figure 2: Trends in South African GM maize as percentage of total GM by trait 2000-2011 harvest season



ANNEXURE 2.

MEDIA COVERAGE REPORT BY HANS LOMBARD (MORE COVERAGE OBTAINED AFTERWARDS)

PAGE 1 OF 4

ISAAA 2010 REPORT: SOUTH AFRICA - MEDIA CONFERENCE held on 3 March 2011

PRINT MEDIA COVERAGE as at 1 June 2011

Printed Articles – Title *(Original in Afrikaans)*	Publication Name	Publication D
Modified crops boost to yields	Business Day (daily)	4 March 2011
SA using more GM crops for food ***(SA gebruik al meer GM gewasse)***	Beeld Business (daily) Volksblad Business (daily) Burger Business West Cape (daily) Burger Business East Cape (daily)	4 March 2011 4 March 2011 4 March 2011 4 March 2011
Mulder enters GM crops saga	Star Business (daily) Cape Times Business (daily)	4 March 2011 4 March 2011
SA way ahead in GM crops	The Times (daily)	4 March 2011
Let science speak on GM crops	Sowetan (daily)	4 March 2011
2.2 million ha of GM crops in SA	Pretoria News (daily) Pretoria News Business (daily)	4 march 2011 4 March 2011
GM crops increasing in SA ***(GM-gewasse neem toe)***	Burger (daily)	4 March 2011
77% maize in SA is GM ***(77% mielies op SA lande GM)***	Beeld (daily)	4 March 2011
Keep emotions level over GM crops	Star (daily)	4 March 2011
Africa following SA lead on GM	Business Day (daily)	4 March 2011
More GM crops being planted	Midland News (weekly)	11 March 201
More GM crops planted in SA ***(Al meer GM gewasse in SA geplant)***	Landbouweekblad (weekly)	18 March 201

ISAAA 2010 REPORT: SOUTH AFRICA - MEDIA CONFERENCE held on 3 March 2011

PRINT MEDIA COVERAGE as at 1 June 2011

Printed Articles – Title *(Original in Afrikaans)*	Publication Name	Publication D
SA biotech crops on the rise	Farmer's Weekly (weekly)	18 March 201
GM crops gaining ground ***(GM-gewasse wen vinnig veld)***	Volksblad (daily)	25 March 201
SA farmers urged to embrace GM	Sunday Argus (weekly) Sunday Independent (weekly) Sunday Tribune (weekly)	3 April 2011 3 April 2011 3 April 2011
GM plantings reach for the sky ***(GM-aanplantings skiet hoogte in)***	Senwes Scenario (monthly)	April 2011
Global status of commercial crops	DAFF News (monthly) Nufarmer (monthly	April 2011 May 2011
Global GM crops: where does SA stand? ***(Globale GM-gewasse: waar staan SA?)***	SA Grain (monthly)	May 2011
No problem with GM technology ***(Geen problem met geen-technologie)***	Dairy Mail (monthly)	May 2011
Biotech crops gain 100 000 ha in SA	Afgriland (bi-monthly)	May/June 201

1 149 200 5 943 200 R924 780

ISAAA 2010 REPORT: SOUTH AFRICA - MEDIA

Electronic Coverage – Article Title	Web Site	Date of Posting
GMO crop area in SA rises	Mail & Guardian Online Sharenet Online Forexyard Online Trade Arabia Online Reuters Online Times Live Online Fin24 Online Citizen Online Foodstuff SA Online	3 March 2011 3 March 2011 3 March 2011 3 March 2011 3 March 2011 3 March 2011 3 March 2011 3 March 2011 3 March 2011
2010 biotech crops up by 100 000 ha	Business Live Online Seedquest Online Futurespros Online Agrifica Online	3 March 2011 3 March 2011 4 March 2011 8 March 2011
Let science speak on GM crops	Times Live Online AlgoaFM Online	3 March 2011 3 March 2011

CONFERENCE held on 3 March 2011

ELECTRONIC MEDIA COVERAGE as at 1 June 2011

ADDITIONAL ELECTRONIC MEDIA COVERAGE

- Several regional and national radio stations as well as a number of national television news bulletins carried the story, reaching an estimated minimum of 14 million people. Dr Wynand van der Walt did two interviews with the national radio network, the South African Broadcasting Corporation (English and Afrikaans), arranged by Hans Lombard.

- Agri TV, the country's prime television programme for the agricultural industry, twice screened an interview with Mr Wally Green, CEO of AfricaBio, arranged by Hans Lombard.

- In the majority of cases, the print media featuring the report also included coverage in their online news sites.

- The South African Department of Agriculture, Forestry and Fisheries posted the Minister's presentation on its official website.

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ISAAA 2010 REPORT: SOUTH AFRICA - MEDIA CONFERENCE held on 3 March 2011

TOTAL CIRCULATION OF PRINT MEDIA TO DATE (1 June 2011)
1.149 million

APPROXIMATE TOTAL READERSHIP OF PRINT MEDIA TO DATE
5.943 million
(Excluding electronic media coverage: radio/television/internet, estimated to be 17 million)

EQUIVALENT ADVERTISING VALUE (SA RAND) OF PRINT MEDIA TO DATE R924 780
(Excludes electronic media)

ESTIMATED EQUIVALENT ADVERTISING VALUE (SA RAND) ELECTRONIC MEDIA R1.7 million

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TOTAL EQUIVALENT ADVERTISING VALUE (SA RAND)
R2.6 million minimum

TOTAL POPULATION OF SOUTH AFRICA
49 million

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1 June 2011

END >>>>>>>>>>>>>>>>>>>>>>>>>>>>>