CASE STUDY: SOUTH AFRICA'S TRACEABILTY AND SEGREGATION SYSTEMS FOR GM GRAINS

BRIEFING PAPER

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During 13-17 March 2006, the Parties to the Cartagena Protocol Biosafety ("Biosafety Protocol") will try, after several previous unsuccessful attempts, to craft minimum standards for a global segregation, traceability and accountability system to apply to the cross border movement of bulk shipments of genetically modified (GM) grain. The mechanisms of such a system will depend on the manner in which the Parties will ultimately resolve the provisions relating to Article 18(2)(a) of the Biosafety Protocol. Article 18(2)(a) deals with the detailed requirements and documentation that must accompany bulk shipments of GMOs, also known in Biosafety Protocol parlance as "living modified organisms that are exported/imported for direct use as food, feed and processing." (LMO FFPs).

At the last Meeting of the Parties to the Biosafety Protocol (MOP2) held in Montreal during June 1995, Brazil and New Zealand, acting in the interests of the Cartel of multinational grain traders such as Cargill, Louis Dreyfuss, Arthur Daniel Midlands etc. as well as the biotechnology industry, were not willing to entertain any negotiations on Article 18(2)(a) and stubbornly insisted that the current status quo be maintained, namely, that LMO FFPs should be accompanied by documentation that merely states that the "shipment may contain" GMOs.[1] In other words, that bulk shipments of grains that are bought, sold and transported around the globe by these multinational companies need not abide by any global standards for segregation, traceability and accountability.

Currently, shipments in the course of international trade in commodity grains can consist of:

- mixtures of non-GM grains where the same commodity has been genetically modified (e.g. a shipment containing only non GM maize);
- approved GMOs (several varieties, e.g. one shipment containing GM maize events, Bt11, T25, MON810 and Bt176, commercially approved in the country of export and not in several/most/all of the countries of import);
- a mixture of non-GMO cultivars where the same commodity has not been genetically modified (e.g. shipments of wheat);

[1] For a comprehensive analysis of COP MOP2, see Lim Li Ching and Lim Li Lin *Brazil, New Zealand block decision on documentation of GMOs*, Third World Network www.biosafetyinfo.org

- bulk shipments of non-GMOs mixed with GMOs (e.g. wheat plus GM canola) and
- GM shipments containing unapproved GMOs (e.g. Bt 11 maize contaminated with unapproved GM Bt 10 maize). This will also include exports of GM varieties mixed together in bulk shipments, and exported to countries that have not approved one or more of the individual GM varieties.

The COP MOP will meet for a third time in Curitiba, Brazil 13-17 March 2006, to resolve the issue. South Africa is a Party to the Biosafety Protocol and an importer of hundreds of thousands of tons of GM maize from Argentina, and an exporter of GM seeds, and bulk shipments of grain to various countries in Africa and elsewhere. A brief look at how South Africa is dealing with issues of segregation, traceability, testing and detection methods, identity preservation systems (IPS), is extremely instructive to inform the impending negotiations in Brazil.

South Africa's labelling legislation dealing with GM foodstuff

The labelling of genetically modified food serves an important function of providing the public with information. However, its value also lies in its biosafety function regarding the traceability of GMO from farm to plate, risk management and monitoring, product recall in the event anything goes wrong and concomitant issues of liability and redress. South Africans have been consuming GMOs and GM products, including maize, a staple food, without their consent and knowledge for several years.

On the 16th January 2004, seven years after South Africa began commercially growing GM crops and three years after it approved the commercial growing of GM white maize, the Department of Health published *Regulations Relating to the Labelling of Foodstuffs Obtained Through Certain Techniques of Genetic Modification*. These Regulations were made in terms of section 15(1) of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act, No.54 of 1972). These Regulations not only seriously flout the South African consumer's right to choose, but places consumers at great risk.

The South African labelling regulations adopt the United States model where the use of GM techniques *per se* is not itself a trigger for labelling. These regulations do not apply to the GM foods currently imported, marketed and released in South Africa (or elsewhere in the world for that matter). It is only when there is a 'significant difference' in the final food that labelling is required. The circumstances where this is considered to be significantly different is if there are human/animal genes; allergens; requires different cooking; or has altered nutritional composition. There are no GM foods currently commercialised that would fall within this scope. Therefore, South African consumers will be given no choice over the current generation of GM foods.

GM animal feed have thus also been excluded from the scope of the Regulations.

Furthermore, the Regulations have also excluded foodstuff derived from animals fed on GM feed, from its scope, such as the meat of animals as well as products such as milk and eggs. [2]

A QUIET TRANSFORMATION IN FAVOUR OF FOOD SAFETY, PROTECTION OF EXPORT MARKETS

Unbeknown to the public, a quiet revolution has been taking place within the food industry in South Africa. This transformation is categorised by the following:

(a) the establishment of systems by grain handlers such as OKT, SANWES etc. to segregate GM maize from non GM maize for the purposes of enabling South African companies such as African Products (Pty) Ltd to export GM free products (corn starch, corn syrup) to overseas markets as well as to comply with the GM free certification requirements by many countries in the Southern African Development Community (SADC);
(b) the establishment of a detailed, comprehensive, sophisticated traceability system to ensure food safety and quality, promulgated on the 13 May 2005, in terms of the *Standards regarding Food Hygiene and Food Safety of Regulated Agricultural Food Products and Plant Origin intended for Export,* in terms of the Agricultural Product Standards (APS) Act 119 of 1990;
(c) the extensive use of "Silo bags" in South Africa, imported from Argentina, enabling farmers to store grain on-farm and segregate **individual events/varieties of GM grains** from other GM varieties, thereby preserving the identify of individual GM varieties.

SEGREGATING GM FROM NON- GM MAIZE

South African company, African Products (Pty) Ltd is able to export non-GM maize products from South Africa, notwithstanding that approximately 15% of South African farmers grow several different GM maize varieties. They are able to do so, because grain handlers in South Africa have been able to develop a verifiable and trustworthy system of traceability and segregation from farm to point of export.[3]

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[2] Mayet. M *Critical Analysis Of South Africa's Labelling Regulations For Genetically Modified Food, Feed And Products Derived From Gm-Fed Animals***,** October 2004 www.biosafetyafrica.net

[3] Personal Communication, Nico Kruger, Managing Director, African Products 3 March 3006.

Several African countries such as Zambia, Zimbabwe, Malawi and Mozambique have also requested that exports of maize from South Africa must be accompanied by GM-free certification.[4]

Private law contracts are entered into with farmers for the growing and purchasing of non-GM maize. Approximately 2000 farmers in South Africa grow GM free maize in GM free zones such as Ventersdorp, Ottersdaal, Hartebeesfontein, Viljoenskroon etc, straddling several provinces.[5]

Post-harvest, the maize is delivered to a silo for storage and testing and where the grains are placed in "clean" or GM free bins. The storage of grain at silos is controlled by grain- handlers such as OKT and SENWES, formerly part of the old Agricultural Co-operatives before the demise of apartheid. For non-GM maize, handlers have 2 separate documentation paper trails or identity preservation systems (IPS). The first is linked to the conducting of strip tests on farm ("at intake") and at the silos. The other, is based on PCR testing.[67] Strip tests are only qualitative in that they are able to give a positive or negative decision as to whether the maize in question is GM or not. The likelihood of a wrong result is higher than with PCR. Strip tests are thus a good means for a quick check in cases were quantitative results are required in the "in the field". However, strip tests are of no use for the testing of bulk shipments with the aim of determining specific GMO events or thresholds, strip tests are of no use.

The threshold for detection and GM free certification currently used in South Africa is below 1%, although some importing countries such as Zimbabwe is prepared to accept a 2% threshold.[8]

Independent agents such as Swiss company, SGS, do the sampling, testing and certification.[9]

Each silo has approximately 15 bins, with each bin having the capacity to hold an average of 50 000 tons of grain. The cost of testing is R2 450 for 8 hours, during which time at least 5 bins can be tested.[10] (The ratio of South African Rand to US dollar is approximately 6.3:1).

Once the grain is loaded onto trucks, destined for transport to the point of export, the handlers sign off to the grain trader such as Cargill, by handing over the certificate. Liability for any contamination that may occur after this point, is borne by the grain trader in terms of a private contract entered into between the grain handler and the grain trader.

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[4] Personal Communication, Richardo Govender, SGS, 29 February 2006.
[5] Personal Communication, Jos Cohn, SANWES (Grain handler), 27 February 2006.
[6] PCR tests can detect all the transgenic DNA present, whereas, the strip test is designed to detect for the cry1ab and cry1ac genes.
[7] Personal Communication, Jos Cohn, SANWES (Grain handler), 27 February 2006.
[8] Personal Communication, Richardo Govender, SGS, 29 February 2006.
[9] www.sgs.com
[10] Personal Communication, Richardo Govender, SGS, 29 February 2006.

Grain handlers have thus put in place an identity preservation system, which allows them to preserve non- GM grain from GM grain, from farm to silo.[11] The private law responsibility of ensuring the GM free status of the consignment from silo to the harbour is thus borne by the grain trader.

African Products feel strongly that no new varieties of GM maize should be approved unless the biotechnology companies are able to produce a verifiable, trustworthy and economically viable test for the particular GM variety in question. In other worlds, it must be a pre-condition for approvals that such means of testing and verification exist. Failing such test, it will be impossible to keep GM maize separate from non-GM maize. As more and more GM events come onto the market, it will become increasingly prohibitively expensive for exporters of GM free products to test for the presence of each and every GM maize variety approved. African Products are of the view that the Biotechnology industry must thus devise only *one* test/mechanism that is able to test for all the commercially approved events ("one stop shop test").[12]

SOUTH AFRICA'S SOPHISTICATED TRACEABILITY SYSTEM

The Perishable Products Export Control Board (PPECB), established in 1926, is a statutory body, operating on behalf of the National Department of Agriculture as an independent service provider of quality certification and cold chain management services for producers and exporters of perishable food products. Customers and stakeholders include producers, producer-organisations, pack-houses, manufacturers, exporters, export agents, cold store operators, transport operators, shipping lines, port authorities, port terminal operators, retailers and governments.

The PPECB is thus the responsible agent that conducts the practical (at the Durban harbour), on the ground tests on exports of perishable products, including bulk shipments of GM and non GM grains, before any phytosanitary certificate can be issued by the national Department of Health. It is common cause that Phytosanitary certificates are required before any export can take place

The PPECB is thus, a lead agent in ensuring that South Africa's new traceability legislation (mentioned above) is complied with. The APS Act has introduced a system to facilitate traceability for food safety and food quality in order to comply with new standards set by the European Union with regard to maximum residue levels (MRL) with regard to pesticides, and other food quality requirements. Strangely, this system has not been adapted to apply also to GM content in bulk shipments of grain. Why not?

The central mechanisms of this new traceability system are driven by requirements that:

[11] Personal Communication, Sean Walsh, GWK, 1 March 2006.
[12] Personal Communication, Nico Kruger, Managing Director, African Products 3 March 2006.

- all **Food business operators (FBOs)** including producers, on/off farm packhouses, transporters, stores, processing plants and cold stores, in other words, **everyone in the supply chain must** register as a FBO with the Department of Agriculture (DoA);
- FBOs are then entered into a database kept and maintained by the DoA;
- all product containers destined for sale on the local as well as export market must be marked with a Food Business Operator code (FBO code) in addition to the name and address of the producer, exporter or owner of the carton.

With this system, a product can be traced back along the production chain for instance for aflotoxins or pesticide residues, from farm, on farm-pack house, off farm pack house, processing, cold storage, road transport, container depot, holding store, shipping, supermarket to the consumer. [13]

According to PPCEB,[14] this system can easily be adapted to trace for GM presence throughout the production chain and that it is entirely practically possible to allocate GM free silos at the harbour for the purposes of storing GM free grains to enable testing and certification, prior to the grain being loaded onto the vessel.

SEGREGATING INDIVIDUAL GM EVENTS FROM EACH OTHER

From the preceding discussions, it has become apparent that it is indeed possible to segregate non-GM maize from GM maize (for export purposes but also for domestic consumption). However, using either the IPS put in place by the silo operators/grain handlers or adapting the new traceability system to GMOs, it will not be possible to preserve the identify of individual GM varieties once the GM grain is handed over to the silos because for instance, grains from 10 farmers growing different GM varieties are mixed together at the silos. It is at this point that the individual GM varieties lose their individual identity.

In order to overcome this problem, silo bags can be used as an option to store individual GM varieties on-farm. These bags are about 60 meters long and 2.7 meters wide and are capable of holding between 180 and 200 tons of grain.

According to the website of Silo Bags Africa,[15] the importer of silo bags from Argentina, it is normal practice in both Argentina and the USA to store grain in these giant bags. In this current season an estimated 14 million tons of grain is being stored in silo bags in Argentina. Grain stored in the Silo bags costs the owner between R25 and R35 per ton in the first year, depending on whether the owner buys the machines to load and unload the grain. In the second year, without the costs of the machines, the storage is R25 per ton.

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[13] Lindy Groenewald, Programme Manager: Food Safety PPECB *The Legislative Environment…the new Official Food Safety Law* Power Point Presentation, Addo Research Station Open Day 22 June 2005 http://www.ppecb.com/NR/rdonlyres/2280EFC3-93C1-4B8D-B630-447C41E9579C/267/20050622LindyGroenewaldFoodsafetyCitrusOpenDay.ppt

[14] Personal Communication John Roberts, PPCEB, 2 March 2006.

[15] www.silobagsafrica.com

According to Silo Bags Africa, compared to the costs of storing grain in conventional silos, including transport costs and handling fees, silo bags present a favourable alternative.

However more importantly, GM grain cultivars can now be kept separate from conventional cultivars as well as other/different GM cultivars, and can be guaranteed as such. It is possible also for the individual bags to be labelled.

The severe limitation of these silo bags, however, is that they are made from plastic and are used only once, and then disposed.[16] Furthermore the use of silo bags will mean that grain handlers may be driven out of business.

However, South Africa cannot allow the international grain traders such as Cargill, Grindron (trading as Atlas Shipping Pty Ltd), Louis Dreyfuss and others currently operating in South Africa, and belonging to the same international grain trade consortium, to flood the global grains market, without putting in place proper systems to ensure that separate GM events are kept apart from each other.

It is incumbent upon South Africa, as a Party to the Biosafety Protocol, as well as all GM producing/exporting countries, to respect the sovereign rights of importing countries to subject, the individual GM varieties being imported into their country, to a full and proper risk assessment, on a case-by-case basis. Failure to do so will be tantamount to allowing unapproved GMOs to be exported around the world, which will be in clear violation of the Biosafety Protocol.

[16] Personal Communication, Robert Burt, Silo Bags Africa, 3 March 2006.