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## **Korea - Republic of**

### **Agricultural Biotechnology Annual**

#### **Biotech Annual**

**Approved By:**

M. Kathryn Ting

**Prepared By:**

Seung Ah Chung / Stephen L. Wixom

**Report Highlights:**

The LMO Act was revised in December 2012 with a few modifications including a revised definition of stacked events. However, the LMO Act still fails to make the fundamental distinction between seed and food, feed and processing (FFP); does not revise the redundant risk assessment process; nor does it provide a workable adventitious presence definition. The revised Act shall go into effect on December 12, 2013. Korea's proposal to expand biotech labeling is still pending. Additionally, three draft bills to expand labeling were submitted in 2013 by law makers to the National Assembly, but have so far not made any progress. The expansion of labeling to products like oil and syrups where the modified protein is undetectable will create enormous trade implications and food price inflation.

**Section I. Executive Summary:**

Korea is heavily dependent on imported food (except rice) and feed grains, most of which were sourced

from the United States until the severe drought in the United States in 2012. A limited amount of food products are made from biotech ingredients due to consumer concerns about biotechnology, whereas the bulk of livestock feed is made from biotech corn and soybean meal. Brazil is the top grain supplier to Korea in 2013.

Imports of biotech grains as well as genetically engineered animals are regulated under the Living Modified Organism (LMO) Act. The Ministry of Trade, Industry and Energy (MOTIE) announced its first revision of the LMO Act on December 2012 with a few modifications including a definition of stacked events. Overall, however, it still fails to make the fundamental distinction between seed and food, feed and processing (FFP), to revise redundant risk assessment process nor does it have a workable adventitious presence definition. The revised Act shall go into effect on December 12, 2013. MOTIE plans to complete the revision of lower regulations to reflect changes made in the revised Act before the end of 2013.

On April 30, 2013, MOTIE revised the import approval application for LMOS for FFP to address concerns on the “does contain” principle. The revised form clearly stipulates “may contain” principles for LMO FFP and, therefore, eliminated vulnerabilities in the written regulations due to gaps between industry practice and principle.

MFDS’s earlier proposal to expand its biotech labeling is still pending deliberation at the Prime Minister’s Office (PMO). In 2013, an additional three draft bills to expand biotech labeling were submitted to the National Assembly by lawmakers. All three draft bills call for expanded labeling to cover products like oil and syrups where the modified protein is undetectable, and will create enormous trade implications and food price inflation if passed by the National Assembly. The domestic industry has kept registering its concern with expanded labeling as it would end up misleading consumers, limit the available selection of products on the market, and increase production costs. Industry is asking MFDS to hold up the implementation of expanded labeling until MFDS has a scientifically verifiable means to monitor false claims in products.

While sensitivities remain with biotech food, consumers are much more comfortable with non-agriculture uses, such as pharmaceuticals. Generating local farmers’ support to adopt and actively use this technology is considered as the lynchpin for increasing consumer confidence in biotech food and livestock products.

The Ministry of Science, ICT and Future Planning (MSIP) announced its third phase plan (between 2013 and 2017) for the Science Technology Basic Plan in July 2013. The Korean government will invest 9.2 trillion won (approximately \$8 billion) in R&D of science technology for five years. MSIP has designated 30 focused technologies and genetic resource technology to develop and commercialize value added life science resources. The Ministry of Agriculture, Food, and Rural Affairs (MAFRA) also announced the long and mid-term plan to promote agriculture technology. In the plan, the technology to develop bio materials and transformed animals to produce pharmaceutical products has

been designated as one of the sub-projects to be carried out under the four major research areas that MAFRA will focus on.

## **Section II. Plant Biotechnology Trade and Production:**

### **Part A. Production and Trade**

#### **A) Product Development**

The development of biotech crops is being led by various government agencies, universities and private entities. Research is mainly focused on 2nd and 3rd generation traits, such as drought and disease resistance, nutrient enrichment, transformation techniques, and gene expression. A total of 251 cases of research in 14 different crops were approved for field trials by RDA's designated evaluation entities and private entities in 2012.

Academic and government experts are busy publishing papers on genetically engineered crops. For example, according to a 2009 survey of local scientific journals, 380 papers on this subject were published between 1990 and 2007. Of those papers, there were 99 on tobacco, 45 on rice, and 29 on potatoes.

RDA currently has 133 events in 17 different varieties of crops under development. These crops include some of the following: resveratrol enriched rice, vitamin A enriched rice, insect resistant rice, environmental stress tolerant rice, virus resistant pepper, vitamin E enriched beans, insect resistant beans, herbicide tolerant vent grass, virus resistant potatoes and Chinese cabbage, watermelon, sweet potato, and apples. Safety assessment data for six events in three crops; four rice, one pepper, and one cabbage are currently being generated. Rice enriched with resveratrol, known to be an antioxidant polyphenol preventing heart disease and virus resistant pepper are several steps ahead and RDA's target is to generate the dossier for the environmental risk assessment before the end of 2013 and to submit the dossier in 2014.

The private sector is also doing research on biotech crops. According to industry estimates, approximately 60 varieties are currently under development, although most of them are still at the laboratory stage. The one noteworthy exception is the virus resistant pepper, which is several steps ahead but is apparently struggling with generating the dossier for environmental risk assessment.

Although significant research has been done, the soonest one of these crops, most likely the virus resistant pepper or resveratrol enriched rice, could finish the regulatory review process in five years. Commercialization, though, is expected to take much longer and will be entirely dependent on the task of getting Korean farmers to first recognize the benefits and adopt this technology. Generating farmers' support to actively use this technology is considered as the lynchpin for increasing consumer confidence in biotech food.

#### **B) Commercial Production**

Despite substantial investment, Korea has yet to commercially produce any biotech crops.

### **C) Exports**

Korea does not export any biotech crops as Korea does not commercially produce any biotech crops.

### **D) Imports**

Korea imports biotech crops and products for food, feed and processing, but not for propagation. The United States was the largest supplier of biotech grains and oilseeds to the Korean market until the severe drought in the United States in 2012. Import statistics provided below shows that the United States became the second largest suppliers of biotech grains in 2013 following Brazil.

In 2012, Korea imported 8.2 million metric tons of corn 2012, which was made-up of 6.0 million metric tons for feed and 2.2 million metric tons for processing. The United States was the top supplier with imports reaching 2.8 million metric tons, or 34.5 percent of the total. Imports of U.S. corn were comprised of 2.78 million metric tons for animal feed, which was nearly all biotech corn. The remaining 0.1 million metric tons of U.S. corn was used for processing of which nearly two-thirds was biotech.

Imported biotech processing corn is generally used to make products, like high fructose corn syrup (HFCS) or corn oil, which are exempt from biotech labeling requirements since the biotech protein is undetectable. Despite mounting pressure from local NGOs and consumer groups, some processors continue using biotech corn since it is more affordable and easier to secure on the world market compared to conventional corn. Meanwhile, the processors producing flour, grits and flakes are importing identity preserved (IP) conventional corn from a variety of international suppliers.

In 2012, Korea imported 1.1 million metric tons of soybeans, three-quarters of which are used for crushing. The United States was the top soybean supplier, with imports totaling 494,465 metric tons, which represented about 43 percent of all imports. Of that amount, 305,036 metric tons were used for crushing, 189,429 metric tons for food processing/sprouting, and 438 metric tons for direct feed.

In addition to domestically produced meal, Korea imported 1.5 million metric tons of soybean meal in 2012. The United States was the fifth largest supplier behind Brazil, Argentina, India, and China with 13,718 metric tons, accounting for 0.9 percent of total imports.

Soybean oil is exempt from biotech labeling requirements since the modified protein is undetectable. Soybeans for food processing are used in products, such as tofu, bean paste, bean sprouts, and are IP-handled, non-biotech beans.

Table 1 contains import statistics for LMO soybeans and corn. This data differs slightly from the numbers reported in the preceding paragraphs since it's based on import approvals instead of customs clearance. Nonetheless, the information contained in the table reinforces the point that Korea imports a

significant volume of LMOs for both food and feed purposes. Table 2 highlights the price difference between biotech and conventional grains.

**Table 1: Imports Statistics for LMO Soybeans and Corn<sup>1</sup>**

(Calendar year basis / Unit: 1,000 MT)

Classification			2009	2010	2011	2012	2013 Jan-May
			Volume	Volume	Volume	Volume	Volume
Soybean	Food (Crushing)	US	442	475	294	392	191
		Non-US	459	447	556	490	125
		Total	901	922	850	882	316
Corn	Food	US	471	865	920	42	0
		Non-US	0	128	105	992	417
		Total	471	993	1,025	1,034	417
	Feed	US	5,008	5,897	5,076	2,375	42
		Non-US	802	554	771	3,404	3,249
		Total	5,810	6,451	5,847	5,779	3,291
Oilseeds	Feed	US	75	77	52	33	16
		Non-US	23	42	78	113	65
		Total	98	119	130	146	81

Source: Korea Biosafety Clearing House

<sup>1</sup> Statistics are on an import approval basis; and only cover biotech grains and oilseeds.

**Table 2: Average Price Difference of U.S. Origin Non-LMO and LMO for Food Use in 2008**

(Unit: Price for One Metric Ton / US dollars)

Crops	LMO	Non-LMO	Difference
Corn	329	386	57 (17.3%)
Soybean	564	768	204 (36.2%)

Source: Korea Biosafety Clearing House (KBCH) Note: This is the latest data available from KBCH.

### E) Food Aid Recipient Country

South Korea is not a food aid recipient. South Korea provides intermittent food aid to North Korea depending on the prevailing political conditions and is also considering making donations to third countries.

### **Section III. Plant Biotechnology Policy:**

#### **Part B. Policy**

##### **A) Regulatory Framework**

Korea ratified the Cartagena Protocol on Biosafety (CPB) on October 2, 2007. Shortly thereafter, on January 1, 2008, Korea implemented the LMO Act, which is the implementing legislation for the CPB and the overarching law governing the country's biotechnology related rules and regulations.

The LMO Act has a fairly lengthy history prior to implementation. The Ministry of Trade, Industry and Energy (MOTIE: formerly the Ministry of Knowledge Economy (MKE), which is the competent national authority, spearheaded the drafting of the Act and its underlying regulations back in early 2001. After several years and numerous iterations, MOTIE published drafts for public comment in September 2005. While the text of the Act and the lower level regulations were finalized just six months later, in March 2006, the regulations were not implemented, as noted above, until January 1, 2008. After several attempts, the LMO Act was finally revised on December 2012 with a few modifications including a revised definition of stacked events. Overall, however, it failed to address U.S. concerns regarding redundant consultation reviews and distinction between LMOs-FFP and LMOs for propagation. The revised Act shall go into effect on December 12, 2013.

##### **Roles & Responsibilities of Government Ministries**

Ministry of Trade, Industry and Energy (MOTIE): National competent authority for the CPB, responsible for the LMO Act and issues related to the development, production, import, export, sales, transportation, and storage of LMOs for industrial use.

Ministry of Foreign Affairs (MOFA): National focal point for the CPB.

Ministry of Agriculture, Food, and Rural Affairs (MAFRA): matters related to the import/export of agricultural/forestry/livestock LMOs.

Rural Development Administration (RDA) (overseen by MAFRA): ERAs for biotech crops, environmental risk consultation for LMOs and leading developer of biotechnology crops in Korea.

Animal, Plant and Fisheries Quarantine & Inspection Agency (QIA) (overseen by MAFRA): import inspection of LMOs for agricultural use at the port of entry.

National Agriculture Product Quality Service (NAQS) (overseen by MAFRA): import approval of LMOs for feed use.

Ministry of Oceans and Fisheries (MOF): matters related to the trade of maritime LMOs including risk assessments for such LMOs.

National Fisheries Research & Development Institute (NFRDI), (overseen by MOF): import approval

of fisheries and consultations for LMOs for marine environment.

Ministry of Health and Welfare (MHW): matters related to the import/export of LMOs used for health and pharmaceutical purposes including human risk assessments of such LMOs.

Korea Center for Disease Control and Prevention (KCDC) (overseen by MHW): human risk consultation for LMOs.

Ministry of Food & Drug Safety (MFDS) (under the Prime Minister's Office): matters related to the import/export of LMOs for food, pharmaceutical, and medical devices; food safety approvals of biotechnology crops; and the enforcement of labeling requirements for non-processed and processed food products containing biotech ingredients.

Ministry of Environment (MOE): issues related to the trade of LMOs that are used for the purpose of environmental remediation or release into the natural environment including risk assessments for such LMOs, not including agricultural LMOs for planting.

National Institute of Environmental Research (NIER) (overseen by MOE): import approval of LMOs under jurisdiction of MOE and environmental risk consultation for LMOs.

Ministry of Science, ICT & Future Planning (MSIP): issues related to the trade of LMOs that are used for testing and research including risk assessments for such LMOs.

### **Role and Membership of the Biosafety Committee and Its Political Implications**

In accordance with Article 31 of the LMO Act, a Biosafety Committee was formed in 2008 under the Office of the Prime Minister and will be moved under the MOTIE starting in December 2013 in accordance with the LMO Act revision issued on December 11, 2012. The change of the Committee chair to the MOTIE Minister from the Prime Minister is not meant to downgrade the status of the committee but is to achieve more effective and efficient operation of the Committee. The Committee reviews the following factors relevant to the import and export of LMOs:

- Factors relevant to the implementation of the protocol
- Establishment and implementation of the safety management plan for LMOs
- Re-examination in accordance with the provisions of Article 18 and Article 22 of appeals by an applicant who fails to get import approval, etc.
- Factors relevant to legislation and notification pertinent to the safety management, import, and export, etc. of LMOs
- Factors relevant to the prevention of damage caused by LMOs and measures taken to mitigate damage caused by LMOs
- Factors requested for review by the Chair of the Committee or the head of the competent national authority.

The MOTIE Minister is the chair of the 15-20 member Committee. Members include Vice Ministers from the seven relevant ministries noted above plus the Ministry of Planning and Finance (MOPF). Private sector specialists can also be members of the Committee. The Committee may have subcommittees and technical committees.

The most important role of the Committee is to reconcile different positions among the relevant ministries. As each relevant ministry holds authority and responsibility in its respective areas, it may not be easy to reach consensus on some issues. In such cases, the MOTIE Minister as the Chair of the Committee can be called upon to resolve matters lacking consensus. While the frequency of meetings is not exactly known, it appears as though the committee meets very infrequently.

### **Political Influence**

Regulatory decisions related to agricultural biotechnology are influenced by political pressure, mostly from vocal anti-biotech NGOs. Some of these outspoken organizations are appointed as members of the government's food safety and biotechnology risk review committees and use this position as a means to pressure the government to introduce more stringent biotech regulations. Three draft revisions to the Food Sanitation Act to expand biotech labeling requirements are good examples of political influence that is in response to the insistence of the vocal anti-biotech NGOs.

### **B) Approvals**

Biotechnology crops are required to undergo a food safety assessment and environmental risk assessment (ERA). Of note, the ERA is sometimes referred to as a feed approval, though the review is largely focused on the impact to the environment, not animal health.

Several different agencies are involved in the overall assessment process. RDA conducts the ERA's to approve new events in feed grains. As part of the environmental assessment, RDA consults with three different agencies, including the National Institute for Environmental Research (NIER), the National Fisheries Research & Development Institute (NFRDI), and the Korea Centers for Disease Control & Prevention (KCDC). Meanwhile, MFDS conducts a safety assessment for food grains containing biotech events. The MFDS review process includes consultations with RDA, NIER and NFRDI.

The overlaps between the reviewing agencies, particularly between MFDS and KCDC and redundant data requirements have led to confusion and unnecessary delays in the approval process. MOTIE may address some of this duplication when it revises the Consolidated Notice. MOTIE plans to revise the Consolidated Notice before the end of 2013.

MFDS has three categories of approval: full approval and two types of conditional approval. Full approval is given to biotech crops that are commercially produced and imported for human consumption. Conditional approval applies to those crops that have been discontinued or are not grown commercially for human consumption.



As of July 2013, KFDA has granted food safety approval to 92 events out of a total of 121 submissions. Meanwhile, RDA has approved 88 events for use in feed out of a total of 116 submissions. See Appendix for a complete list of approved events.

Although no product has been approved for commercial production in Korea, a local developer approached RDA in 2008 requesting the approval to plant biotech grass used for landscaping purposes. However, the submission, initially turned down due to insufficient data, was re-submitted with the requested data in October 2010. The developer again withdrew the submission in 2012 and plans to submit the new package with some modification in the near future.

### **C) Field Testing**

RDA authorized contained field trials for 251 events in 14 crops in 2012. From January to March 2013, a total of 161 field trials were approved. Many of the approved field trials are for traits with resistance to environmental stress. RDA renews the field trial permits every year. The lion's share of field trials are for rice with many different traits, such as environmental stress resistance, enhanced nutritional qualities, and insect resistance. Field trials for peppers, beans, cabbages and grass are also underway.

According to the Consolidated Notice, which is the implementing regulations of the LMO Act, in-country field tests are required for imported LMOs used as seed. For LMOs used as food, feed, and processing (FFPs), RDA will review the data from field trials conducted in the exporting country. However, if necessary, RDA may require in-country field tests for LMO FFPs.

The biotech crops being developed by RDA are subject to field trials and must follow the "Guidelines for Research and Handling of Recombinant Organisms Related to Agricultural Research." Biotech crops developed by private entities, including universities, should adhere to voluntary guidelines published by the Ministry of Health & Welfare, entitled "Guidelines for Research of Recombinant Organisms." The Consolidated Notice also includes guidelines for local biotech developers and laboratories to comply with during their research and development.

### **D) Stacked Events Approval**

KFDA does not require a full safety assessment for stacked events if they meet the following criteria:

- Traits that are being combined were already approved individually
- There is no difference in the given traits, intake amount, edible parts and processing method in the stacked event and the conventional non-biotech counterpart
- There is no crossbreeding among subspecies

The Consolidated Notice announced on December 2007 includes a provision for ERAs for stacked events. The following documents need to be submitted to RDA:

1. Information to verify whether there is interaction of traits in nucleic acid inserted in the parental

line

2. Available information pertinent to characteristics of the stacked event
3. Evaluation of 1 and 2 above
4. Confirmation from the developer who received approval for the parental event used in the stacked event and agreement for review of already submitted information for the parental event

RDA reviews the submitted documents. If there is interaction between traits in the inserted nucleic acid of the parental line or other differences are noticed, RDA will then require an ERA. Otherwise, no additional review is required.

Korea reviews multi-trait stacked events with crop-based information rather than information for individual intermediate events. This means that intermediate events are not subject to the review unless they become commercialized.

The approval process for stacked events is becoming reason for concern. Both RDA and MFDS allow the submission of a dossier for stacked events after all parental single events are approved in Korea. Considering the approval time needed for stacked events after submission, which is minimum 4 to 6 months to one year, developers have to hold up the commercialization of the stacked events until after USDA approval, waiting for approval of stacked events from Korea.

#### **E) Additional Requirements**

For biotechnology crops for food or feed or for processing, no additional registration is required other than approval. For LMOs for propagation, however, the crop should complete the process to be approved as a seed.

#### **F) Coexistence**

As noted earlier, biotech crops are not yet grown in Korea. As a result, regulators have not developed co-existence policies, which will undoubtedly be controversial with organic production continuing to increase each year.

#### **G) Labeling**

With the restructure of the Korean government in 2013 under the new administration, the authority over labeling of unprocessed biotech agricultural products was moved to MFDS from MAFRA. Now, MFDS is responsible for establishing biotech labeling guidelines for both unprocessed and processed products and enforcing guidelines in the market place.

Both unprocessed biotech crops for human consumption and certain processed food products containing biotech ingredients must carry GM food labels. The stated purpose behind biotech labeling is to respond to the consumers' right to know. But, since public sentiment generally tends to be anti-biotech, there are very, very few products on the market with a GM label.

With respect to processed products, including consumer-ready products, MFDS (formerly KFDA) requires biotech labeling for 27 categories of foods if ingredients derived from biotech are among the top five ingredients in the finished product and if a foreign protein or DNA is present in the finished product. Foods containing refined ingredients derived from these crops, such as soybean oil, high fructose corn syrup and raw sugar are currently exempt from labeling since the biotech protein is undetectable. However, vocal NGOs and consumer groups continue to push MFDS to expand its labeling requirements to include these products.

In 2008, during the candlelight protests against U.S. beef, consumer groups learned that some of the country's corn processors would be bringing in biotech corn for processing for the first time because of the short supply of conventional corn and rising international grain prices. These groups threatened to boycott products from food manufacturers using biotech corn ingredients. In response, 21 large-sized companies jointly declared that they would not use ingredients derived from biotech corn in their products.

MFDS was also under mounting pressure from outside groups to expand its labeling requirements. In October 2008, MFDS responded to these pressures with a draft proposal to expand its labeling requirements to include undetectable products like soybean oil and high fructose corn syrup made from GM crops. MFDS had originally planned to finalize this proposal by April 2009, but the PMO intervened over trading partners' concerns as well local food manufacturers' concerns about upward spiraling inflation. In April 2012, MFDS re-attempted to move on an earlier proposal to expand its biotech labeling for the benefit of consumers' right to know. However, due to significant push back from the local food industry the PMO instructed MFDS to gather industry comments on the proposal. The proposal is currently pending PMO's deliberation although there does not appear to be any timetable for the deliberation.

In 2013, a total of three draft bills related to the Food Sanitation Act that would require expanded biotech labeling were submitted by lawmakers to the National Assembly. One of the four social evils identified by the new administration is food safety; the law makers submitted the draft bill to respond to local NGOs supporting the expanded biotech labeling. In addition, the detection of the GE wheat in Oregon State in May added momentum to the movement of local anti biotech groups to strongly demand the expanded labeling to the Korean government. A civic group called the "Citizen's Coalition for Economic Justice (CCCE)" formed the "Consumer Justice Center" in 2013. CCCE is one of the very vocal non-government organizations that have criticized the structural problem of the Korean economy and have demanded economic reforms. The Center is headed by a former Agricultural Minister and one of their goals is to achieve expanded biotech labeling for the consumer's right to know. The Center has been organizing multiple meetings to debate expanded labeling and keeps pressing MFDS to expand labeling requirements. The Center also requested that MFDS provide the names of food manufacturers that use biotech grains and the volume of biotech grains used by each company. MFDS refused the request as it is confidential information. The Center claimed that they would take MFDS to court as consumers have a right to know that sort of information.

The local food industry is concerned that the proposal to expand GMO labeling would end-up misleading consumers, limit the available selection of products on the market, and increase production costs. For example, if implemented, food manufacturers would be unwilling to develop any food using these ingredients and supermarkets would shy away from carrying any GM-labeled product for fear of losing sales. The industry is also concerned that in the absence of scientifically verifiable measures there could be false labeling or documentation forgery for imported oil and syrups claiming to be non-GM but actually made of biotech enhanced crops. The domestic industry is demanding that MFDS delay implementation of the expanded labeling requirements until there are scientific methods available to detect biotech content or a system put in place that can prevent such falsely labeled products from entering Korea.

In April 2007, MIFAFF revised its Feed Manual requiring retail packaged animal feed products to carry a GMO label when the product contains biotech ingredients. This labeling requirement was enforced beginning on October 11, 2007. There have been no reported problems due to the fact that nearly all animal feed products contain biotech ingredients and are therefore subject to this labeling requirement.

#### **GM Labeling Requirements for Bulk Grains**

- Shipments consisting of 100 percent unprocessed biotech crops for human consumption are required to carry labels stating “GM ‘commodity’” (e.g. “GM soybeans”)
- Shipments that contain some biotech-enhanced crops are required to carry labels stating that the product “contains GM ‘commodity’” (e.g. “contains GM soybeans”)
- Shipments that may contain biotech-enhanced crops are required to carry labels stating that the product “may contain GM ‘commodity’” (e.g. “may contain GM soybeans”).

#### **Labeling Requirements for Processed Products**

- Products that contain biotech corn or soybeans, which comprise less than 100 percent of the product ingredients, are required to be labeled as “GM food” or “food containing GM corn or soybeans.”
- Products that may contain biotech corn or soybeans are required to be labeled “May contain GM corn or soybeans.”
- Corn or soybean products that are 100 percent biotech products are required to be labeled “GM” or “GM corn or soybeans.”

#### **Unintentional Presence**

Korea allows for up to a three-percent unintentional presence of approved biotech components in unprocessed non-biotech products (e.g.. conventional food grade soybeans) which carry an IP or government certificate. This three-percent tolerance of biotech components in raw materials is the

default threshold for processed food products that are subject to biotech labeling requirements. Intentional mixture of biotech ingredients triggers the labeling requirement even if the final level of biotech presence is within the three percent threshold. Grains and processed food products within the three percent threshold are required to submit full IP documentation or a certificate recognized by the exporting government to be exempted from biotech labeling requirement.

**Table 3: Unintentional GM Presence and GM Labeling**

	<b>Threshold</b>	<b>Label</b>
<b>Conventional Bulk Grain Shipments Containing Unintentional GM Presence</b>		
with IP or government certificate	3%	GMO label is exempted.
without IP or government certificate	0%	GMO label shall be affixed.
<b>Processed Products Containing Unintentional GM Presence</b>		
with IP or government certificate	3%	GMO label is exempted.
without IP or government certificate	0%	GMO label shall be affixed.
<b>Processed Products Containing Intentional GM Presence (in top five ingredients)</b>		
- with IP or government certificate	3%	GMO label is exempted
- without IP or government certificate	0%	GMO label shall be affixed.
<b>Processed Products Containing Intentional or Unintentional GM Presence (beyond top five ingredients)</b>		
GMO label is exempted without any further documentation requirements.		
<b>Processed Product Containing No Foreign DNA, such as syrups, oils, alcohols and processing aids</b>		
GMO label is exempted without any further documentation requirements.		

### **Use of Labels Such as Biotech-Free, Non-Biotech, GMO-Free, or Non-GMO**

Concerning unprocessed grains for human consumption, MAFRA allows a voluntary non-GMO label if the product is 100-percent non-biotech. With regard to processed food products, however, MFDS does not encourage non-GMO or GMO-free labeling to prevent the misuse of such labels.

Importers must keep the relevant documents that support their non-GMO claim. Such documents can include a testing certificate issued by MFDA accredited GMO testing laboratories stating that there is no presence of GMO components. See Attaché Reports [KS1004](#) and [KS1046](#) for more details on GM labeling.

### **H) Trade Barriers**

*LLRice:* The Korean government has required shipments of U.S. rice to be tested multiple times to confirm the absence of LLRice since the discovery of trace amounts of LLRice601 in the U.S. rice supply in August 2006. The Korean state trading entity, aT requires two separate tests prior to loading, while the MFDS requires a third test upon arrival. Once rice is released into the market, the National

Agricultural Product Quality Service under MAFRA conducts the fourth test to verify the absence of LLRice in the marketed rice. For MFDS's arrival testing, it can be exempt if rice is accompanied by a test certificate issued by MFDS's accredited testing lab for GMO testing following MFDS recognized testing methods. To date, two foreign laboratories, OMIC USA and Genetic ID, have been accredited by MFDS for GMO testing. Starting April 15, 2013, MFDS has been temporarily monitoring testing of all US origin rice for LLRice to determine whether to continue to mandate LLRice arrival testing. MFDS may make its decision sometime in August or later. Please see [KS7068](#) for more details on LLRice test requirements.

*Finding of MON71800 Wheat Event:* In response to USDA's announcement of the finding of the unapproved GE wheat, MON71800, in Oregon in May 2013, MFDS has mandated 100% arrival testing of U.S. origin wheat for food use upon arrival. For wheat for feed use, MAFRA tested imported wheat for years prior to the finding of the GE wheat in Oregon. After the finding, MAFRA expanded U.S. origin wheat sample sizes to test for the presence of the GE wheat. Testing conducted by the Korean government to date has all turned out negative.

*Approvals:* There have been growing concerns over the risk assessment process for LMO FFP. Specifically, some facets of the risk assessment process are considered to be redundant, unprecedented and occasionally lack scientific justification. This cumbersome consultation process is sometimes slow, contributing to delays in the final approval of new events.

*Organics:* MFDS maintains a zero-tolerance policy for the inadvertent presence of biotech content in processed organic products. However, this policy might change with MAFRA becoming the competent authority over processed products and implementation of the new certification program for processed organic products beginning January 1, 2014. In particular, MAFRA is looking at introducing a processed-based certification program instead of requiring final product verification, which would be a considerable step towards redefining the current zero tolerance policy to something that is more workable.

*Expanded Labeling:* As noted earlier, the stalled proposal and several draft revisions submitted by lawmakers to expand biotech labeling to non-detectable products would be very problematic and as such remains on the watch list.

#### **I) Intellectual Property Rights**

As noted in section above, biotechnology crops are not commercially planted in Korea. However, intellectual property rights are protected under the existing domestic regulations.

#### **J) Cartagena Protocol Ratification**

Korea ratified the Cartagena Protocol on Biosafety (CPB) on October 2, 2007 and implemented the LMO Act, the legislation implementing the CPB on January 1, 2008. The first revision of the LMO Act was issued in December 2012 and the revised LMO Act will go into effect on December 12, 2013.

MOTIE is in the process of revising lower implementing regulations to harmonize with the revised Act. MOTIE is targeting completion of the revision prior to the implementation of the revised LMO Act. At the same time, MOTIE is also working on revision of the Consolidated Notice, which has been pending for years. MOTIE plans to finish the revision of the Consolidated Notice before the end of 2013. If the Consolidated Notice is revised with some of the changes proposed by MOTIE a few years ago, it may reduce the redundancy of consultation reviews as the U.S. government has recommended

To address concerns from domestic industry and foreign trading partners on the “does contain” principle in the existing regulation, MOTIE revised the import approval application for LMOS for FFP, which is part of the Enforcement Regulations of the LMO Act, on April 30, 2013. The revised form clearly stipulates “may contain” principles for LMO FFP and therefore it eliminated vulnerabilities that exporters and domestic importers worried about due to gaps between industry practice and principle in the written regulations. Korea allowed and continues to allow exporters to simply provide a list of all biotech events approved for use in Korea on the commercial invoice and importers to simply copy and paste the same list in the import application form.

#### **K) International Treaties/Fora**

Korea is actively participating in meetings such as CODEX, IPPC, OIE, APEC and others. Korea tends to loosely follow CODEX regulations in their safety assessment guidelines.

#### **L) Related Issues**

No further issues.

#### **M) Monitoring and Testing**

The National Institute of Environmental Research (NIER) under the Ministry of Environment (MOE) has been carrying out monitoring on contamination of imported LMOs in Korea. In 2012, NIEF collected and tested total 626 samples of corn, soybean, canola and cotton countrywide. Of them, 42 samples of corn, canola and cotton turned out to be LMOs. NIER assumed that such LMO plants were grown from LMOs imported for FFPs by leaking during transportation process in Korea. NIER will continue to monitor fallout of imported LMOs in to the Korean environment.

#### **N) Low Level Presence Policy**

Korea does not set a policy on low level presence (LLP). Instead, Korea uses a term “adventitious presence” in enforcing mandatory labeling and allowing 0.5% of unapproved LMOs used as feed in the non-LMO shipment.

### **Section IV. Plant Biotechnology Marketing Issues:**

#### **Part C. Marketing**

## **A) Market Acceptance**

There are contradictory views about biotechnology in the Korean marketplace. The public holds positive views about the use of biotechnology in human and animal research, bio-medicine, and in the treatment of disease while they tend to be negative towards the use of the technology to produce food.

## **B) Public/Private Opinions**

Consumers are much more sensitive and generally negative towards the use of the technology to produce food and are therefore more willing to pay more for non-GM food. Outspoken NGOs and some in the broadcast media industry tend to reinforce this negative image, vilifying foods made from biotech crops as 'franken food'.

The detection of the GE wheat in Oregon State in May alarmed Korean consumers and media and was perceived as inadequate management of GE production in the United States. The detection gave a momentum to a civic group called the "Citizen's Coalition for Economic Justice (CCCE)" to demand expanded biotech labeling for consumer's right to know. The Center has been organizing multiple meetings to debate expanded labeling and keeps pressing MFDS to expand labeling requirements. To address concerns raised by consumers and end-users, the Korean Flour Millers Association temporarily suspended the purchase of U.S. origin wheat for about a month until MFDS released its second testing results for GE wheat in wheat and wheat flour imported from the United States. In light of these sensitivities, many local food manufacturers are very reluctant to use biotech ingredients. In fact, on the heels of the 2008 beef protests, twenty-one large food conglomerates, including several multinational companies, declared themselves GMO-free as a marketing ploy. Local retailers are likewise reluctant to carry GM-labeled foods since they don't want to put product on their shelves that will not sell and would inevitably draw public scrutiny.

Nonetheless, Korea imports substantial amounts of biotech food ingredients for further processing into vegetable oil, corn syrup, and other products that are currently exempt from the GM food labeling requirements. The general public, though, seems unaware of this fact.

## **C) Marketing Studies**

### Consumer Group Survey

In July 2008, the Korea Consumer Union conducted a survey of National Assemblymen to gauge lawmakers' awareness about biotechnology. The survey showed that the ruling conservative Grand National Party (GNP) was more favorable towards the technology compared to the opposition Democratic Party (DP). Overall, though, both the GNP and DP have a rather negative perception of biotechnology.

Over 50 percent of the lawmakers felt uneasy about eating biotech food and more than 75 percent said that biotech labeling should be required for cooking oil. These findings, though, seemed somewhat out of place since over 60 percent of the lawmakers were aware that Korean regulators conduct safety evaluations of each biotech crop used in food and feed before allowing it to come into the country.



While there is apparent reluctance over eating biotech crops, the survey revealed that the Assemblymen were less concerned about the locally developed biotech crops. About 7 percent of the GNP and 24 percent of the DP Assemblymen thought Korea should stop the development of biotech crops. This is a noteworthy finding since it shows that one of the keys to improving consumer confidence in biotech foods lies in the development and commercialization of a Korean biotech crop. As noted earlier, while research is currently underway to develop the country's first biotech crop, commercialization is still several years away under the most favorable circumstances.

#### *Korea Biosafety Clearing House Surveys*

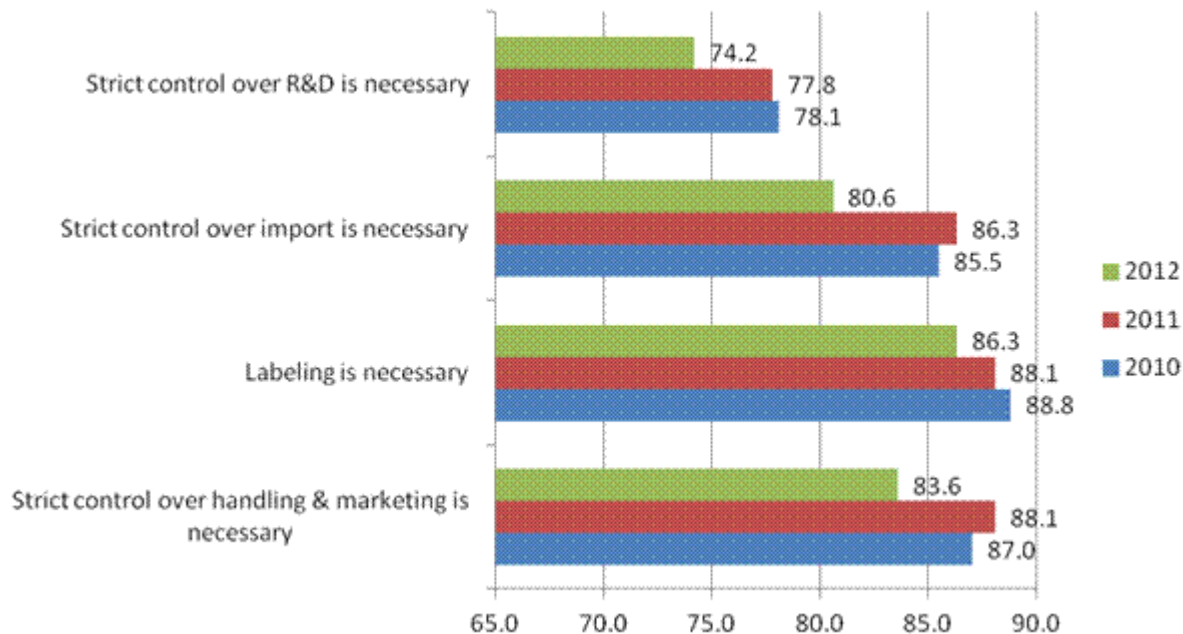
In November 2012, the Korea Biosafety Clearing House (KBCH) conducted its fifth annual survey of 1,000 consumers nationwide to gauge public perceptions on biotechnology.

The survey results showed that consumer awareness has continued to remain high while consumers still retained concerns over safety of biotechnology. Over 61 percent answered that biotechnology would be beneficial to humans as it might help cure diseases such as cancer. Over 38 percent of the respondents questioned the safety of biotechnology to humans and over 37 percent of the respondents thought that biotechnology used in making food was against nature.

The KBCH survey confirmed again that consumers were more favorable towards the use of the technology outside the agricultural sector. Over 81 percent and 77 percent of the respondents supported its use in the medical and bio-energy sectors respectively, while over 54 percent supported its use in livestock and 40 percent in food and agricultural products.

Concerning consumer acceptance, over 70 percent of the respondents answered that they would not buy GM salmon while over 64 percent would accept GM insulin or vaccines. Over 42 percent responded that they would buy GM rice that helps digestion and fat hydrolysis. Over 35 percent of the respondents answered that they would buy vitamin A or iron enriched rice. About 86 percent were in favor of labeling and strict import controls on biotech products.

About 19 percent of the respondents were interested in LMOs. However, 59.6 percent of respondents were interested because of their concern over the safety of LMOs. The respondents obtained information on LMOs mostly from TV, followed by internet news.



In November 2008, the KCBH conducted a nationwide survey of 1,082 researchers from various backgrounds to gauge the academic community's perception of biotechnology. The survey results showed that around 44 percent of the respondents understood LMOs well. Over 69 percent thought that GMO is the most familiar term referring to LMO. Eighty-five percent of the respondents thought that LMOs would contribute to the development of human life. The survey also revealed that researchers were more positive about LMOs used for pharmaceutical purposes than food use.

## **Section V. Plant Biotechnology Capacity Building and Outreach: PART D: Capacity Building and Outreach:**

### **A) Activities**

A number of activities have been organized and funded to provide biotechnology outreach in Korea:

1. Biotech briefings for participants in the State Department's International Visitors Program since 1999
2. Biotech press mission to the United States consisting of six reporters in 2000 sponsored by the USDA
3. Cochran Fellowship Program for three Korean biotechnology regulators in 2002
4. Video conference sponsored by the USDA for professors and media in 2002
5. Speakers from the USDA, the State Department, and other agencies/organizations for various local symposiums organized by Korean government agencies including KFDA, RDA, the Korea Research Institute for Bioscience and Biotechnology, etc.
6. U.S. Grains Council's (USGC) annual biotech program for media, NGOs, scientists, and high

school science teachers, etc.

7. International Food Information Council speech and press outreach in June 2006
8. Presentation by an expert from North American Export Grain Association to Korean industry pertinent to the Cartagena Protocol on Biodiversity in December 2007
9. Presentation by U.S. Grain Council's invited speakers for science high school students, graduate students and professors at the university, the Korea Society of Food Science and Korean NGOs in May 2009
10. Presentations to universities by FAS/Seoul staff in 2007-2009
11. US Soybean Board-sponsored speaker visit to Korea in June 2011
12. USGC-sponsored educator mission to the United States in August 2011
13. USGC-sponsored trip for KFDA and RDA committee members in August 2011
14. Regulator to regulator meeting sponsored by the State Department and organized by FAS/USDA
15. USGC-sponsored trip for KFDA and RDA committee members in August 2012
16. USGC-sponsored trip for MFDS, RDA and their review committee members in July 2013

## **Strategies and Needs**

In 2012, FAS Seoul initiated a U.S. tour for a delegation of future farmers and farm leaders to learn about the use and application of biotechnology and other emerging technologies in the U.S. agricultural sector. This visit was notably different from past outreach efforts as it exclusively focused on the Korean farmer rather than consumer and media interest groups, which generally tend to be negative towards the technology. Generating local farmers' support to adopt and actively use locally developed biotech crops is considered by many of the companies engaged in developing biotechnology as the lynchpin for increasing consumer confidence in biotech food as well as making the country's regulatory system more functional. The technology, if adopted, would also help bolster the nation's food security situation and help it to address critical structural problems such as rising cost of labor. Post will have a similar tour program for young farm leaders during the summer of 2013.

## **Section VI. Animal Biotechnology:**

### **Part E. Production and Trade**

#### **A) Biotechnology Product Development**

Korea is actively using genetic engineering for the development of animals. The research being led by various government agencies and private entities is mainly related to the development of biomedicines and bio-organs.

In 2010, MIFAFF announced its overall plan for future growth engines for the life science industry in Korea. Biomedicine is one of the areas where considerable resources are being invested. RDA's Next Generation Bio-Green 21 Project launched on May 19, 2011 is also focusing on development of biomedicines and bio-organs as one of the three top sectors.

The National Institute of Animal Science (NIAS) of RDA is focusing on the development of new bio materials using biotechnology such bio organs, securing diversity of animal genetic resources, developing high value added livestock products, developing renewable energy using livestock resources, etc. with the goal of becoming a "world G7 livestock technology country" by 2015. NIAS is conducting research to develop 16 different traits in two animals; 11 traits in swine and 5 traits in chicken. These traits are designed to produce high value protein and anti-virus materials, swine

producing material that can treat anemia, hemophilia, thrombus and chickens producing eggs with lactoferrin and antioxidant substances. NIAS has produced three transformed mini pigs that can be used to produce bio organs. RDA is also conducting research to develop 23 different traits using silk worm. Traits under development will enable production of silk in various natural colors and medicine for humans. In 2012, RDA succeeded in trans-planting a heart and a kidney from a transformed mini pig to monkeys. However, all this research is still in the development stage and has not reached even the risk assessment stage although great efforts have been made. Currently, RDA does not have any plan to develop genetically-engineered animals for food use.

The Ministry of Science, ICT & Future Planning (MSIP) announced in July 2013 that they would invest 9.2 trillion won (approximately \$8 billion) in the R&D of science technology for five years until 2017. MSIP designated 30 focused technologies that they will support during the five years and genetic resource technology to develop and commercialize value added life science resources is one of the 30 projects. No details about investment or specific sectors that will receive investment have been released yet. In line with the MSIP investment plan, the Ministry of Agriculture, Food, and Rural Affairs (MAFRA) also announced the long and mid-term plan to promote agriculture technology in July 2013. In the plan, the technology to develop bio materials and transformed animals to produce pharmaceutical products has been set as one of the sub-projects under the four major research areas that MAFRA will focus on. Post will report any details on MAFRA's plan when it becomes available.

In 2013, a team of professors from multiple Korean and U.S. universities announced that they succeeded in the production of a cloned mini pig named "GI Blue" whose gene to cause acute immune rejection response was removed. This is one step forward to the development of bio organs and organ plantation in different species.

Private entities are also developing genetically-engineered animals that produce high value protein pharmaceuticals. In 2012, one pharmaceutical company announced that they produced 14 transformed pigs inserted with a human growth hormone gene (hGH) and those pigs produced milk in which hGH was expressed. This is one step forward to the development of a pharmaceutical product with hGH. Others are developing transgenic cattle that can produce lactoferrin and insulin, a fluorescent dog for human disease research, chickens that purportedly produce substances to cure leukemia and mini-pigs for production of bio organs.

## **B) Commercial Production**

Despite active research by Korean scientists, Korea has yet to commercially produce any genetically-engineered animals. It is too early to estimate how close Korea is to commercial production. As for food use, Korean scientists are unwilling to engage in research as they are concerned with consumer's acceptance of meat from genetically-engineered animals.

## **C) Biotechnology Export**

Korea does not export any biotech animal as Korea does not commercially produce any biotech animals.

## **D) Biotechnology Imports**

Korea imports genetically engineered mice for research and zebra fish.

## **Part F: Policy**

### **A) Regulation**

The LMO Act and its implementing regulations apply to the development and import of genetically engineered animals. Pharmaceuticals produced from genetically-engineered animals are governed by the Pharmaceuticals Affairs Act. No specific regulation has been established for the management of genetically engineered animals.

### **B) Labeling and Traceability**

MAFRA is responsible for the labeling and approval of genetically-engineered animals, but has not yet established any regulations. MFDS is responsible for the safety evaluation of genetically-engineered animals and fishery products for human consumption under its GMO safety evaluation guidelines.

### **C) Trade Barriers**

No trade barriers have been identified.

### **D) Intellectual Property Rights (IPR)**

As noted in the section above, biotechnology animals are not commercially grown in Korea. However, intellectual property rights are protected under the existing domestic regulations.

### **E) International Treaties/Fora**

Not specifically related to genetically-engineered animals, but Korea is actively participating in meetings such as CODEX, IPPC, OIE, APEC and others. Korea is trying to loosely follow CODEX regulations in their safety assessment guidelines.

## **Part G: Marketing**

### **A) Market Acceptance**

There are contradictory views about biotechnology in the Korean marketplace. The public holds positive views about the use of biotechnology in human and animal research, bio-medicine, and in the treatment of disease while they tend to negative towards the use of the technology to produce food.

### **B) Public/Private Opinions**

Many Koreans believe that biotechnology is an important frontier for the economic development of Korea in the 21<sup>st</sup> century. Proponents have had some success in making the case that biotechnology could be an engine for growth and could solve public health and environmental problems. Korea continues to expand investment on biotechnology research and development for biomaterial, biomedicine and organs, gene therapy, etc.

Despite the Korean government's support for biotechnology research, the Korean public has a negative perception of crops and foods produced through biotechnology. For meat or food from genetically-

engineered animals, it is expected that the public will have even more serious concerns. Consequently, the majority of government funding for biotechnology research is directed toward non-agricultural projects such as biomedicine, stem cell research, cloning, and gene therapy. Koreans in general maintain a positive view towards non-agricultural biotechnology and believe biotechnology will play an important role in the country's economic development.

**C) Market Studies**

Not available.

**Part H: Capacity Building and Outreach**

**A) Activities**

No U.S. government-funded outreach activity related to genetic engineering of agriculturally-relevant animals has been carried out in Korea.

**B) Strategies and Needs**

No specific strategies or needs have been identified.

**Section VII. Author Defined:**

**APPENDIX**

**TABLE OF APPROVED BIOTECHNOLOGY PRODUCTS AS OF JULY 2013**

Note: Biotechnology crops are required to undergo a food safety assessment and environmental risk assessment (ERA). Of note, the ERA is sometimes referred to as a feed approval, though the review is largely focused on the impact to the environment, not animal health.

Crop	Event	Applicant	Trait	Approval	Approval Date
Soybean	GTS40-3-2	Monsanto	Herbicide Tolerance (HT)	Food & Feed	2010* & 2004
Soybean	MON89788	Monsanto	HT	Food & Feed	2009
Soybean	A2704-12	Bayer	HT	Food & Feed	2009
Soybean	DP-356043-5	Dupont	HT	Food & Feed	2010 & 2009
Soybean	DP-305423-1	Dupont	High oleic	Food & Feed	2010
Soybean	A5547-127	Bayer	HT	Food & Feed	2011
Soybean	CV127	BASF	HT	Feed & Food	2011 & 2013

Soybean	MON87701	Monsanto	IR	Food & Feed	2011
Soybean	MON87769	Monsanto	SDA	Feed & Food	2012 & 2013
Soybean	MON87705	Monsanto	High oleic	Feed	2012
Soybean	MON87708	Monsanto	HT	Feed	2012
Soybean	DP-305423-1 X GTS40-3-2	Dupont	High oleic, HT	Food & Feed	2011
Soybean	MON87701 X MON89788	Monsanto	HT, IR	Feed & Food	2012
Corn	MON810	Monsanto	Insect Resistance (IR)	Food & Feed	2012* & 2004
Corn	TC1507	Dupont	HT, IR	Food & Feed	2012* & 2004
Corn	GA21	Monsanto	HT	Food & Feed	2010 & 2007
Corn	NK603	Monsanto	HT	Food & Feed	2012* & 2004
Corn	Bt 11	Syngenta	HT, IR	Food & Feed	2013* & 2006
Corn	T25	Aventis / Bayer	HT	Food & Feed	2003 & 2004
Corn	MON863	Monsanto	IR	Food & Feed	2003 & 2004
Corn	Bt176	Syngenta	HT, IR	Food & Feed	2003 & 2006
Corn <sup>1)</sup>	DLL25	Monsanto	HT	Food	2004
Corn <sup>1)</sup>	DBT418	Monsanto	HT, IR	Food	2004
Corn	MON863 X NK603	Monsanto	HT, IR	Food & Feed	2004 & 2008
Corn	MON863 X MON810	Monsanto	IR	Food & Feed	2004 & 2008
Corn	MON810 X GA21	Monsanto	HT, IR	Food	2004
Corn	MON810 X NK603	Monsanto	HT, IR	Food & Feed	2004 & 2008
Corn	MON810 X MON863 X NK603	Monsanto	HT, IR	Food & Feed	2004 & 2008
Corn	TC1507 X NK603	Dupont	HT, IR	Food & Feed	2004 & 2008
Corn	Das-59122-7	Dupont	HT, IR	Food & Feed	2005
Corn	Mon88017	Monsanto	HT, IR	Food & Feed	2006

Corn	Das-59122-7 X TC1507 X NK603	Dupont	HT, IR	Food & Feed	2006 & 2008
Corn	TC1507 X Das-59122-7	Dupont	HT, IR	Food & Feed	2006 & 2008
Corn	Das-59122-7 X NK603	Dupont	HT, IR	Food & Feed	2006 & 2008
Corn	Bt11 X GA21	Syngenta	HT, IR	Food & Feed	2006 & 2008
Corn	MON88017 X MON810	Monsanto	HT, IR	Food & Feed	2006 & 2008
Corn <sup>2)</sup>	Bt10	Syngenta	HT, IR	Food	2007
Corn	MIR604	Syngenta	IR	Food & Feed	2007 & 2008
Corn	MIR604 X GA21	Syngenta	HT, IR	Food & Feed	2008
Corn	Bt11 X MIR604	Syngenta	HT, IR	Food & Feed	2007 & 2008
Corn	Bt11 X MIR604 X GA21	Syngenta	HT, IR	Food & Feed	2008
Corn	Mon89034	Monsanto	IR	Food & Feed	2009
Corn	Mon89034 X Mon88017	Monsanto	HT, IR	Food & Feed	2009
Corn	Smart stack	Monsanto/ Dow	HT, IR	Food & Feed	2009
Corn	Mon89034 X NK603	Monsanto	HT, IR	Food & Feed	2010 & 2009
Corn	NK603 X T25	Monsanto	HT	Food & Feed	2010 & 2011
Corn	Mon89034 X TC1507 X Nk603	Monsanto/ Dow	HT, IR	Food & Feed	2010 & 2011
Corn	MIR162	Syngenta	IR	Food & Feed	2010 & 2008
Corn	DP-098141-6	Dupont	HT	Food & Feed	2010
Corn	TC1507 X Mon810 X NK603	Dupont	HT, IR	Food & Feed	2010
Corn	TC1507 X DAS-591227 X Mon810 X NK603	Dupont	HT, IR	Food & Feed	2010
Corn	Bt11 X MIR162 X MIR604 X GA21	Syngenta	HT, IR	Food & Feed	2010 & 2011
Corn	Event3272	Syngenta	Functional trait	Food & Feed	2011
Corn	Bt11 X MIR162 X GA21	Syngenta	HT, IR	Feed & Food	2011 & 2012



Corn	TC1507 X MIR604 X NK603	Dupont	HT, IR	Food & Feed	2011
Corn	MON87460	Monsanto	Drought Resistance (DR)	Feed & Food	2011 & 2012
Corn	Bt11 X DAS-591227 X MIR604 X TC1507 X GA21	Syngenta	HT, IR	Feed & Food	2011 & 2013
Corn	TC1507 X DAS-591227 X MON810 X MIR604 X NK603	Dupont	HT, IR	Food & Feed	2012
Corn	Bt11 X MIR162 X TC1507 X GA21	Syngenta	HT, IR	Feed & Food	2012
Corn	3272 X Bt11 X MIR604 X GA21	Syngenta	HT, IR	Feed & Food	2012 & 2013
Corn	MON87460 X MON89034 X NK603	Monsanto	DR, HT, IR	Feed & Food	2012 & 2013
Corn	MON87460 X MON89034 X MON88017	Monsanto	DR, HT, IR	Feed & Food	2012 & 2013
Corn	MON87460 X NK603	Monsanto	DR, HT	Feed & Food	2012 & 2013
Corn	TC1507 X MON810 X MIR162X NK603	Dupont	HT, IR	Feed & Food	2013
Corn	5307	Syngenta	IR	Feed	2013
Cotton	Mon531	Monsanto	IR	Food & Feed	2013* & 2004
Cotton	757	Monsanto	IR	Food & Feed	2003 & 2004
Cotton	Mon1445	Monsanto	HT	Food & Feed	2013* & 2004
Cotton	15985	Monsanto	IR	Food & Feed	2013* & 2004
Cotton	15985 X 1445	Monsanto	HT, IR	Food & Feed	2004 & 2008
Cotton	531 X 1445	Monsanto	HT, IR	Food & Feed	2004 & 2008
Cotton	281/3006	Dow Agro Science	HT, IR	Food & Feed	2005 & 2008
Cotton	Mon88913	Monsanto	HT	Food & Feed	2006
Cotton	LLCotton 25	Bayer	HT	Food & Feed	2005
Cotton	Mon88913 X Mon15985	Monsanto	HT, IR	Food & Feed	2006 & 2008

Cotton	Mon15985 X LLCotton 25	Bayer	HT, IR	Food & Feed	2006 & 2008
Cotton	281/3006 X Mon88913	Dow Agro Science	HT, IR	Food & Feed	2006 & 2008
Cotton	281/3006 X Mon1445	Dow Agro Science	HT, IR	Food	2006
Cotton	GHB614	Bayer	HT	Food & Feed	2010
Cotton	GHB614 X LLCotton 25	Bayer	HT	Food & Feed	2012 & 2011
Cotton	GHB614 X LLCotton 25 X 15985	Bayer	HT, IR	Feed & Food	2011 & 2013
Cotton	T304-40 X GHB119	Bayer	HT, IR	Feed & Food	2012 & 2013
Cotton	GHB119	Bayer	HT	Feed	2012
Cotton	COT67B	Syngenta	IR	Feed	2013
Cotton	GHB614 X T304-40 X GHB119	Bayer	HT, IR	Food	2013
Canola	RT73 (GT73)	Monsanto	HT	Food & Feed	2013* & 2005
Canola	MS8/RF3	Bayer	HT	Food & Feed	2005
Canola	T45	Bayer	HT	Food & Feed	2005
Canola <sup>1)</sup>	MS1/RF1	Bayer	HT	Food & Feed	2005 & 2008
Canola <sup>1)</sup>	MS1/RF2	Bayer	HT	Food & Feed	2005 & 2008
Canola <sup>1)</sup>	Topas19/2	Bayer	HT	Food & Feed	2005 & 2008
Canola	MS8	Bayer	HT	Feed	2012
Canola	RF3	Bayer	HT	Feed	2012
Potato <sup>1)</sup>	SPBT02-05	Monsanto	IR	Food	2004
Potato <sup>1)</sup>	RBBT06	Monsanto	IR	Food	2004
Potato <sup>1)</sup>	Newleaf Y (RBMT15-101, SEMT 15-02, SEMT 15-15)	Monsanto	IR, Virus Resistance (VR)	Food	2004
Potato <sup>1)</sup>	Newleaf Plus (RBMT21-129, RBMT21-350, RBMT22-82)	Monsanto	IR, VR	Food	2004
Sugar beet	H7-1	Monsanto	HT	Food	2006
Alfalfa	J101	Monsanto	HT	Food & Feed	2007 & 2008

Alfalfa	J163	Monsanto	HT	Food & Feed	2007 & 2008
Alfalfa	J101, J163, J101 X J163 <sup>3)</sup>	Monsanto	HT	Food & Feed	2007 & 2008

**Total Food Approval: 92**

**Total Feed Approval: 88**

**\* Food approval has been renewed 10 years after the first approval**

- 1) Conditional approval for discontinued items
- 2) Conditional approval for items that are not intended for commercialization
- 3) Conditional approval as other category and adventitious presence is accepted

### **Useful Acronyms**

GMO: Genetically Modified Organism

LMO: Living Modified Organisms

LMO FFP: LMOs for Food, Feed and Processing

PMO: Prime Minister's Office

MFDS: Ministry of Food & Drug Safety

MHW: Ministry of Health & Welfare

KCDC: Korea Center for Disease Control and Prevention

ME: Ministry of Environment

NIER: National Institute of Environmental Research

MAFRA: Ministry of Agriculture, Food, and Rural Affairs

RDA: Rural Development Administration

QIA: Animal, Plant and Fisheries Quarantine & Inspection Agency

NAQS: National Agriculture Product Quality

NIAS: National Institute of Animal Science

MOTIE: Ministry of Knowledge Economy

MOFA: Ministry of Foreign Affairs

MOF: Ministry of Oceans and Fisheries

NFRDI: National Fisheries Research & Development Institute

MSIP: Ministry of Science, ICT & Future Planning

KBCH: Korea Biosafety Clearing House

HT: Herbicide Tolerance

IR: Insect Resistance

VR: Virus Resistance

DR: Drought Resistance