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UK GE Plants and Animals Report

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Report Highlights:
The UK has a long history of progressive genetic research in plant and animal science. Ensuring continued investment in research, and improving the competitiveness of UK agriculture and food in global markets, is driving UK politicians to be bolder in calling for greater access to commercial applications of genetic engineering. The back-drop of the debates on food security, climate change, and population growth has led to an increased awareness of the role that genetic enhancement can play. The UK is a strong proponent of more efficient and effective regulation of genetic engineering within Europe. Most of the major grocery stores now permit their private label animal products to be fed GE products, and, in time, the food industry may have greater confidence to incorporate more products of genetic engineering in the supply chain.

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Notes:

1. The United Kingdom (UK) is a member of the European Union (EU) and this report should be read in conjunction with the EU GE Plants and Animals (Biotechnology) Report, coordinated by the Foreign Agricultural Service in Paris, France. The EU Report, is available here: FAS/USDA GAIN Report Database

2. The term "agricultural biotechnology" refers to an evolving continuum of technologies. It is a broadly applied term that may or may not refer to crops developed through recombinant DNA technologies, i.e., "plant biotechnology," "GMO", "transgenic," "biotech crops," or genetically engineered (GE) crops.

3. USDA uses the terms biotechnology or genetically engineered (GE) in addressing this topic. However, the European Union legislation and Member State implementing regulations refer to Genetically Modified (GM) food and feed and Genetically Modified Organisms (GMO). These terms are used in this report when discussing EU legislation and UK implementation.

SECTION I. Executive Summary

There are strong historic and cultural ties between the UK and the United States, which are obvious in consumer trends in retail and foodservice markets.

In recent years, the UK has increasingly imported more horticultural products and consumer-ready food and drink products as opposed to bulk and intermediate agricultural products from the USA. The *de facto* closure of large swathes of the UK market after implementation of the EU's biotechnology regulations in 2004 (Regulation 1829/2003) affected bulk/lightly processed commodities, such as animal feed components: soybean meal, and corn products such as Distillers Dried Grains (DDGS) and corn gluten feed (CGF), in particular. Confidence to purchase is wholly dependent on the status of EU approval (for food and feed) for new GE crops. The main supplier countries are located outside of the EU - Argentina, Brazil and USA. Low Level Presence (LLP) of unapproved GE events in bulk shipments remains a concern that dominates trade decisions, since the threshold for feed is very low at 0.1 percent and only for traits already in the EU approval pipeline. There continues to be zero tolerance for the food supply chain. Trade statistics highlight what can be achieved in exports from the U.S. when the approvals landscape is positive: UK imports of soybeans from USA increased from $30 million in calendar year 2010 to $130 million in 2011; soybean meal followed reaching $100 million in import value in 2012, up from $27 million in 2011.

On genetic engineering in animals, the UK has imported embryo progeny of clones or embryos of clone progeny as well as bovine semen which may have come from clones or their progeny. The UK has not imported GE animals or livestock clones.

Despite being a supporter of the science, the UK has never planted a commercial biotech crop, and has no crops under development. The limited portfolio of plant biotech events that are approved for cultivation in the EU are not well-suited to UK growing conditions. The UK has some of the largest and most efficient farms in Europe, but recent extreme weather events and a reduction in available fungicides and pesticides (as a result of an EU review) has left horticultural production vulnerable. The UK is keen to attract inward investment in plant science applications and capitalize on any growth opportunities presented by agricultural biotechnology. As a policy response, the UK is developing a long-term agri-tech strategy focused on knowledge transfer and the application of technology to the agricultural sector. An initial indication of its scope is expected by mid 2013.

UK political leadership on this issue may give greater confidence to the food industry to incorporate more products of plant genetic engineering in the food chain. Availability and cost of non-biotech ingredients is becoming an issue to the extent that several major supermarket chains and foodservice suppliers are reviewing their policies. This is creating a more favorable market for biotech animal feed. Incorporation of ingredients derived from biotech crops is happening on a case-by-case basis so that the cost-benefit analysis to consumers is clear.

As with plant biotechnologies, the UK Government takes a pro-science and generally positive, pragmatic and permissive approach to animal biotechnologies, albeit implementing and following all EU legislation on animal biotechnologies.

As regards consumer acceptance for biotechnology, there is a vocal minority opposed. However, most surveys show apathy and lack of knowledge by the general population, who rely heavily on supermarket chains to provide them with safe, quality food. There is a dominance of private label products in the UK market and an inherent trust (cultivated by the retailers) that they will "do the right thing" for their customers.

Generally, there are signs that the ground is shifting in the UK. Trade and even the mainstream media is increasingly making a case for the technology and calling on industry and the public to be more open-minded about potential benefits. There is a growing awareness that European consumers are buying meat from animals fed on biotech feed, and a growing acceptance that biotech crop derivatives in the food supply chain are inevitable, and to be managed, if not embraced.

Section II: Author Defined

CHAPTER 1: PLANT BIOTECHNOLOGY

PART A: Production and Trade

a) PRODUCT DEVELOPMENT

The private sector's interest in developing varieties of biotech plants suitable for UK and wider EU cultivation has waned. Almost all of the nearly 60 crop trials conducted in the UK since 2000 have been subject to vandalism, and this, together with the uncertainty and delays characteristic of the EU approval process, amounts to an unattractive investment.

While UK publicly funded laboratory and field work into plant biotechnology continues, it is unlikely that any of the current research, for example: anti-oxidant rich purple tomatoes, aphid-resistant wheat, nematode- or blight-resistant potatoes will be brought forward for commercialization in the UK within the next five years.

b) COMMERCIAL PRODUCTION

Despite being a supporter of the science, the UK has never planted a commercial biotech crop and has no crops under development. The limited portfolio of plant biotech events that are approved for cultivation in the EU are not well-suited to UK growing conditions.

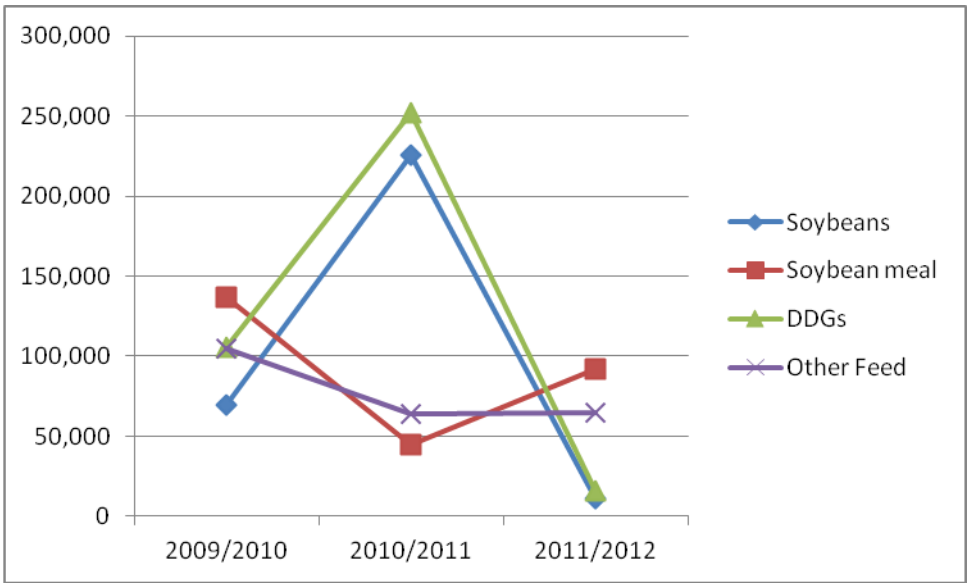
c) EXPORTS

The UK does not export genetically enhanced crops or products to the United States or any other country.

d) IMPORTS

Despite the fact that the UK livestock industries are protein-deficient, import trade in animal feed products continues to be erratic. Confidence to purchase is wholly dependent on EU approval (for food and feed) for new biotech crops. The main supplier countries are located outside of the EU and include Argentina, Brazil and the United States. Low Level Presence (LLP) of unapproved biotech events in bulk shipments remains a concern that dominates trade decisions, since the threshold for feed is very low at 0.1 percent (and only for traits already in the EU approval pipeline) and continues to be zero tolerance for the food supply chain. The chart below demonstrates the nature of trade between the U.S. and the UK in the main commodities affected by asynchronous approval timelines when a genetically engineered trait is commercially grown in the U.S. ahead of EU approval. Of course, trade is also dependent on many other things such as availability of supply, demand, exchange rates, etc. However, the extent and speed that trade is switched between the U.S. and its competitors is largely linked to the GE issue.

UK imports from U.S. of Soybeans, Soybean Meal, Distillers Dried Grains and Other Animal Feed (metric tons)



Many UK imports arrive via other EU destinations. As can be seen in the tables below, a significant proportion of soybean and soybean product imports is shown as product of the Netherlands. This cannot be the case as the Netherlands does not grow soybeans. Ireland and Belgium are also frequent trans-shipment countries for product ultimately destined for the UK. This routing through other EU Member States makes it difficult to say definitively what proportion of UK imports can be attributed to the original country, such as the U.S., Brazil, Argentina, etc.

Tables: UK imports of Soybeans, Soybean Meal, Distillers Dried Grains and Other Animal Feed

United Kingdom HMRC Import Statistics Commodity: 1201, Soybeans, Whether Or Not Broken						
Year Ending: September						
Partner Country	**Unit**	**Quantity**			**% Share**	**% Change**
		2010	**2011**	**2012**	**2012**	**2012/2011**
World	T	879,283	815,364	767,240	100.00	- 5.90
Brazil	T	625,428	400,537	638,944	83.28	59.52
Netherlands	T	63,028	73,733	46,908	6.11	- 36.38
Canada	T	62,774	84,013	30,854	4.02	- 63.27
Ireland	T	19,603	12,366	17,106	2.23	38.34
Belgium	T	7,096	6,853	16,829	2.19	145.56
United States	T	69,601	225,826	10,887	1.42	- 95.18

Source of Data: Her Majesty's Customs & Excise/GTIS

United Kingdom HMRC Import Statistics Commodity: Soybean Meal (2304)						
Year Ending: September						
Partner Country	**Unit**	**Quantity**			**% Share**	**% Change**
		2010	**2011**	**2012**	**2012**	**2012/2011**
World	T	2,082,273	2,087,093	1,878,104	100.00	- 10.01
Argentina	T	1,022,459	1,317,270	1,202,651	64.04	- 8.70
Netherlands	T	388,844	304,554	289,273	15.40	- 5.02
Brazil	T	390,409	353,639	172,178	9.17	- 51.31
United States	T	136,572	44,624	92,048	4.90	106.27
Ireland	T	11,783	10,773	41,677	2.22	286.88

Source of Data: Her Majesty's Customs & Excise/GTIS

United Kingdom HMRC Import Statistics Commodity: 230330, Brewing Or Distilling Dregs And Waste (DDGs)						
Year Ending: September						
Partner Country	**Unit**	**Quantity**			**% Share**	**% Change**
		2010	**2011**	**2012**	**2012**	**2012/2011**
World	T	287,113	410,554	297,580	100.00	- 27.52
France	T	58,693	59,925	76,663	25.76	27.93
Netherlands	T	14,662	40,915	69,669	23.41	70.28
Ireland	T	20,829	24,360	63,910	21.48	162.36
Belgium	T	42,585	11,885	34,604	11.63	191.17
Sweden	T	39,646	7,819	23,848	8.01	205.01
United States	T	105,677	252,390	15,564	5.23	- 93.83

Source of Data: Her Majesty's Customs & Excise/GTIS

United Kingdom HMRC Import Statistics Commodity: 2308, Vegetable Residues And By-Products, Used In Animal Feeding						
Year Ending: September						
Partner Country	**Unit**	**Quantity**			**% Share**	**% Change**
		2010	**2011**	**2012**	**2012**	**2012/2011**
World	T	562,616	522,502	617,699	100.00	18.22
Argentina	T	254,968	353,538	470,518	76.17	33.09
United States	T	104,776	64,141	64,866	10.50	1.13
Netherlands	T	56,118	29,043	38,582	6.25	32.84
Ireland	T	12,953	13,441	34,491	5.58	156.61

Source of Data: Her Majesty's Customs & Excise/GTIS

For over a decade, U.S. exports of processed foods and beverages have also been constrained by market conditions and EU legislation pertaining to GE in food products. As a result of the pervasive negative image of biotechnology, UK supermarkets and food manufacturers formulate their regular grocery products to exclude biotech ingredients. Usually the biotech element of processed foods is a small component of the overall product, for example, soy lecithin (used as an emulsifier). This means that the additional cost of sourcing non-biotech ingredients adds only a small contribution to the finished price of the goods. However, for many U.S. companies, the additional burden to source non-biotech ingredients to supply the EU is often too large a hurdle to overcome. This is also increasingly the case for other countries wishing to supply the EU. Since 28 countries now produce biotech crops it is becoming ever-harder to source non-biotech ingredients.

e) FOOD AID RECIPIENT COUNTRIES

The UK is not a recipient of Food Aid.

PART B: Policy

a) REGULATORY FRAMEWORK

As a Member State, the UK must implement all European Union Directives and Regulations since novel foods and processes is an aspect of food law that is harmonized throughout the EU.

Responsible UK authorities

1. The Health and Safety Executive (HSE) regulate genetically modified organisms (GMOs) in contained use (e.g., in a laboratory) HSE

2. The Department for Environment, Food & Rural Affairs (Defra) is responsible for the control of the deliberate release of GMOs, and for national, EU and international policy on the environmental safety

of GMOs. Defra

Defra is the competent authority that implements and enforces Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms. EU Directive 2001/18/EC

Defra provides the secretariat for the Advisory Committee on Releases to the Environment (ACRE). ACRE is the independent body which reviews applications for field trials of organisms. Defra/ACRE

3. The Food Standards Agency (FSA) controls the assessment of GM food for human consumption (food and feed), and consumer labeling of GM foods. FSA

The FSA is advised on both GM and novel foods by an independent body of experts called the Advisory Committee on Novel Foods and Processes (ACNFP) and on GM animal feed by the Advisory Committee on Animal Feedingstuffs (ACAF). The ACNFP is responsible for assessing the safety of novel and GM food, and ACAF is responsible for assessing the safety of GM feed.

The United Kingdom is comprised of England, Wales, Scotland and Northern Ireland. The devolved governments of Northern Ireland, Scotland and Wales have jurisdiction over agriculture, fisheries, and food policy in their regions. Scotland and Wales are countries with a high proportion of "Less Favored Areas" for agriculture under EU Common Agricultural Policy definitions and they trade heavily on their 'pristine environment' image. The political leadership of Scotland and Wales continues to seek the most restrictive policies possible on agricultural biotechnology, including the set up of "GM-free zones". Similarly, Northern Ireland joined forces with the Republic of Ireland to call for Ireland to become a "GM-free zone" in September 2008. These more rural communities generally feel that growing biotech crops risks damaging the reputation of produce from Scotland, Wales and Ireland that outweighs any benefits that agricultural biotechnology might bring.

In formulating overall UK biotechnology policy, central government (based in London) solicits views from a wide range of stakeholders, including the devolved Parliaments.

b) APPROVALS

The EU approval process distinguishes between the regulatory treatment of the approval for food, feed, processing and environmental release. For information on EU policy, approval process and pending approvals, please see EU-27 GE Plant and Animals Report coordinated by FAS/USDA Paris at: FAS/USDA GAIN Report Database

c) FIELD TESTING

Almost 60 crop trials have been conducted in the UK since 2000, mainly on corn, sugar beet, wheat and potatoes.

In 2012, Rothamsted Research embarked on a field trial of Cadenza wheat, modified to produce a non-

toxic odor - (E) beta-farnesene (EBF) (a naturally occurring chemical found in peppermint plants) that the wheat releases to act as an alarm signal to keep aphids away and attract their native predators, parasitic wasps (Braconidae). This is unlikely to be brought on for commercialization singly, but has the potential to be stacked with other genetic traits. Project details are available here: Rothamsted Research

In addition, the UK has recently completed publicly funded field trials of potato lines genetically modified for resistance to late blight and for nematode resistance. In 2007, a large private biotechnology company undertook a field trial with late blight resistant potatoes. It was destroyed in 2007, but completed successfully in 2008. Despite this, that company decided to halt field trials in the UK, citing delays in the EU approval process and a review of returns on its investment within Europe for its portfolio as a whole.

d) STACKED EVENT APPROVALS

In the EU the approval process for stacked events is the same as for single events. For more information, please see EU-27 GE Plant and Animals Report coordinated by FAS/USDA Paris at: FAS/USDA GAIN Report Database

e) ADDITIONAL REQUIREMENTS

The UK has no additional requirements on approvals.

f) COEXISTENCE

The UK government's policy statement on coexistence of GE crops with conventional or organic crops says: "*If and when GM crops are grown in England commercially, we will implement pragmatic and proportionate measures to segregate these from conventional and organic crops, so that choice can be exercised and economic interests appropriately protected.*"

The basis for any UK coexistence policy is likely to be the extensive work carried out by SCIMAC (Supply Chain Initiative on Modified Agricultural Crops). Information on their proposals for coexistence and liability can be found here: SCIMAC

g) LABELING

The EU's labeling requirements are intended to address consumer concerns, and are not related to safety. Labeling regulations for products containing or consisting of Genetically Modified Organisms (GMOs) are presented in Regulation (EC) No 1830/2003, article 4B. In general, these labeling regulations apply to bulk agricultural commodities, such as whole grains and oilseeds. The scope of biotech products covered is defined in Directive 2001/18, see: Eur-Lex Europa.

Labeling regulations for food and feed products that are produced from GMOs are presented in Regulation (EC) No 1829/2003, articles 12-13 for food, and articles 24-25 for feed. These are for products that have undergone varying degrees of processing. In general, all food and feed products containing/consisting of GMOs and/or produced from GMOs, including products that no longer contain

detectable traces of GMOs, must be labeled. The allowable adventitious presence level for EU-approved varieties of GMOs for use in food and feed is set at 0.9 percent. Above this level, all products must be labeled.

As the EU's authorization procedures for new biotech varieties tend to be slower than those of other countries, a time-lag known as 'asynchronous authorization' occurs. To deal with the possible presence of unauthorized varieties in imports of commodity crops, the EU has adopted a measure, Regulation 619/2011, which sets a tolerance level of 0.1 percent for certain varieties for which a valid application for an EU authorization has been made and which fulfill the requirements set out in Article 2 of the Regulation.

Above this threshold, the product is not allowed on the EU market. Operators must demonstrate that the presence of GM material was adventitious or technically unavoidable.

The EU's Joint Research Centre has published guidance on the application of Regulation (EU) No 619/2011.

EU regulations do not require labeling of products that are not food ingredients, such as processing aids. In addition, meat, milk or eggs obtained from animals fed with GM feed or treated with GM medicinal products do not require GM labeling.

Example of to How to Label for Food Produced from GMOs

Article 13 of Regulation 1829/2003 specifies the wording to be used on the label as follows:

(a) Where the food consists of more than one ingredient, the following wording must follow immediately after the ingredient concerned, in brackets: "genetically modified" or "produced from genetically modified [name of ingredient]. A compound ingredient with a constituent X which is produced from a GMO Y must be labeled "contains X produced from genetically modified Y. Example: a biscuit containing soy flour derived from GM-soy must be labeled "contains soy flour from genetically modified soy".

(b) Where the ingredient is designated by the name of a category, the following wording must be used in the list of ingredients: "contains genetically modified [name of organism]" or "contains [name of ingredient] produced from genetically modified [name of organism]". Example: for vegetable oils containing rape oil produced from genetically modified rape, the reference "contains rape oil from genetically modified rape" must appear in the list of ingredients.

(c) Where there is no list of ingredients, the words "genetically modified" or "produced from genetically modified [name of organism]" must appear clearly in the labeling. Example 1: "a spirit containing caramel produced from genetically modified corn". Example 2: "genetically modified sweet corn"

(d) If the product consists of or contains a GMO, e.g., sweet corn in a Mexican salad, the label must state "genetically modified sweet corn"

The designations in (a) and (b) may appear in a footnote to the ingredients list, provided they are printed in a font at least the same size as that of the list of ingredients or, where there is no list of ingredients, clearly on the labeling.

Labeling for Genetically Modified Microorganisms (GMMs) and "Processing Aids

Food and feed (including food and feed ingredients, such as additives, flavorings and vitamins) produced by fermentation using a GMM which is kept under contained conditions and is not present in the final product are not included in the scope of Regulation (EC) No. 1829/2003. These food and feed products are considered as having been produced with the GMM, rather than from the GMM.

Therefore, these products do not have to be labeled like products produced from agricultural biotechnology. Likewise in the case of GMMs such as yeast used in alcoholic beverages, the EU does not require labeling if the GMM is not present in the final food. This is also true of cheese that has been produced "with" the use of chymosin, an enzyme that is genetically modified. Such processing aids do not fall within the scope of the labeling regulations.

In the UK, traceability and labeling regulations are the responsibility of the Food Standards Agency. UK information on GM food and feed labeling can be found at: FSA Labelling.

Seed Labeling Legislation

In the absence of any EU seed labeling regulation for the adventitious presence of biotech seed, the European Commission has advised that any seed lot containing GM seed authorized for the cultivation has to be labeled as containing GMOs. Seed lots containing GM seeds that are not authorized for cultivation cannot be marketed in the EU.

In the UK, this is enforced by the GM Inspectorate of the Food and Environment Research Agency (Fera). In the coming year the GM Inspectorate will focus on minimizing the risk of adventitious GM presence in conventional seeds of *Brassica napus*, *Brassica rapa*, *Glycine max* and *Zea mays*. For more information see: GM Inspectorate.

h) TRADE BARRIERS

Please see text under "IMPORTS" heading above

i) INTELLECTUAL PROPERTY RIGHTS

The UK has a comprehensive system to address Intellectual Property Rights, including an Intellectual Property Office that covers plant breeders' rights. In addition, the Plant Variety Rights Office, part of the UK government's Food and Environment Research Agency, administers Plant Breeders' Rights in

the UK. More information: https://www.gov.uk/plant-breeders-rights

j) CARTAGENA PROTOCOL RATIFICATION

The UK has ratified the Cartagena Protocol on Biosafety. Defra is the contact point, see: Defra/Cartegena Protocol

The enforcement of this regulation has been implemented in England by way of the Genetically Modified Organisms (Transboundary Movements) (England) Regulations 2004 . Similar regulations have been implemented in Scotland, Northern Ireland and Wales).

Biological Diversity is an increasing area of work for the UK government, as agricultural innovation seeks to increase production while at the same time reducing environmental and biodiversity impacts. Biodiversity 2020 – A strategy for England's wildlife and ecosystem was launched in 2011. Increasingly, countries with experience of growing biotechnology crops will be asked how they measure the impact of monoculture/short rotation on wildlife, and for hard statistical results.

k) INTERNATIONAL TREATIES/FORA

A member of the Food and Environment Research Agency's Plant Health Policy Team, was elected Chair (from 2012-2014) of the Commission on Phytosanitary Measures (CPM), the governing body for the International Plant Protection Convention (IPPC). Additional information available here: Fera Chair for IPPC

l) RELATED ISSUES

The food price spikes of 2008 and ensuing debate and focus on how to deliver global food security, while addressing climate change and feeding a burgeoning population resulted in more positive media coverage for biotechnology. This, together with the economic downturn and a need for the UK government to support areas that will create economic growth and skilled labor, has created a more favorable policy environment for biotechnology. This may create more confidence in the food retail and manufacturing base to incorporate biotech derivatives in mainstream grocery products. The majority of consumers look to grocery store chains to determine the quality/price ratio and to rigorously check the safety of the food they purchase.

m) MONITORING AND TESTING

All UK imports are subject to random or more frequent testing (depending on product) upon border entry. Since it is not a food safety concern, testing for genetically enhanced material is normally randomised testing unless the EU Rapid Alert System has flagged a particular product and origin for additional measures. The food supply chain conducts its own testing to satisfy import specifications, labelling obligations and customer assurance.

n) LOW LEVEL PRESENCE POLICY

As a member of the EU, the UK must adhere to its Low Level Presence policy and tolerance level for unapproved GE traits being found in shipments. The EU has a 0.1 percent threshold for animal feed

products, but (as yet) has set no tolerance for the possibility of finding unapproved GE traits in food. For more information, please see EU-27 GE Plant and Animals Report coordinated by FAS/USDA Paris at: FAS/USDA GAIN Report Database

PART C: Marketing

a) MARKET ACCEPTANCE

Since the late 1990s/early 2000s, U.S. agriculture and food exports have been constrained by market conditions and EU legislation on genetic engineering. A focus on the economy and trade (particularly in light of forthcoming negotiations on a Transatlantic Trade and Investment Partnership between the United States and the EU) has made a stronger political case for UK access to the products of genetic engineering. Recent statements by the Environment, Food and Rural Affairs Minister are clearly designed to indicate to technology companies that the UK is 'open for business.' In addition, the UK government is keen to make the European Union regulatory system governing genetically engineered (GE) crops "*more efficient and more effective*".

Imports of products containing soy and corn-based products have been particularly negatively affected. In addition, products containing glucose or other sugar components of biotech sugar beet or oilseed rape (Canola) must also label, and by doing so the GE presence is highlighted and the product may not be listed or carried in UK inventories as a result.

There are increasing examples of products overcoming the hurdles, labeling appropriately and achieving sales success. These products are usually those where consumers have a desire for the product or there is a price incentive that counters the presence of biotech ingredients, for example, candy bars and oils.

b) PUBLIC/PRIVATE OPINIONS

There are signs that the ground is shifting towards a more positive realm in the UK. The trade and even mainstream journalism are increasingly making a case for the technology and calling on industry and the public to be more open-minded about potential benefits. There is a growing awareness that European consumers are buying meat from animals fed on biotech feed, and a growing acceptance that biotech crop derivatives in the food supply chain are inevitable, and to be managed, if not embraced.

Numerous opinion polls and consumer surveys have been carried out in relation to British consumer acceptance, or otherwise, of biotech food. There is a vocal minority against, but most surveys report apathy and a lack of knowledge by the general population, who rely heavily on supermarket chains to provide them with safe, quality food. There is a dominance of private label products in the UK market and an inherent trust (cultivated by the retailers) that they will "do the right thing" for their customers. Since all of the retail chains publicly declared their private label to be "GM free" in the early 2000s very few biotech derived ingredients/products have made it onto British shelves.

As the number and adoption of biotech products worldwide continues to increase exponentially, availability and the cost of sourcing and segregating biotech products has become a real issue for the UK supply chain. No single retailer wants to be the first to undo their previous general stance on biotechnology. However, movement has been necessary on the animal feed side as the availability of non-biotech has rapidly decreased and the cost increased. Asda (Walmart) and Wm Morrisons Supermarkets were the first to move to acceptance of biotech feed for their private label meat and poultry products around two years ago. In April 2013, Tesco, Cooperative Group, Marks & Spencer, and Sainsbury Supermarkets also communicated to their customers that from May 2013 the poultry and livestock supply chains could no longer source sufficient quantities of non-biotech animal feed at a reasonable cost. Organic options are available for those who wish to avoid biotech-fed livestock, and the up-scale Waitrose chain (capitalizing on the opportunity to differentiate from its competitors) now requires non-biotech feed for both its poultry and pig meat products.

There have been recent calls by lobby groups to label biotech-fed meat and poultry products (currently exempt from EU labeling law). Some commentators believe that voluntary labeling will help acceptance of biotech feed and food, since the labeling will be become familiar. Others cite concerns that biotech-fed meat and poultry products will be seen as the option for the poorest in society, while the richest will have alternatives. However, it is more likely, if given the information and a choice, a large majority of UK consumers will vote with price uppermost in mind.

c) MARKETING STUDIES

A selection of available research:

Food Standards Agency Consumer Research on GM and Novel Foods

British Science Association Reports

Institute of Grocery Distribution Factsheet

European Crop Protection Association

PART D: Capacity Building and Outreach

a) ACTIVITIES

U.S. oilseed and grain trade associations are very active in the UK market. Seminars and trade missions take place frequently. USDA London continues to host seminars and set up meetings for visiting U.S.

government personnel or trade allied to this issue. Funding utilized is a derived from a mix of industry funds, Market Access Program funds, FAS Country Strategy Statement Funds as well as State Department funding.

The International Visitors Leadership Program (IVLP) has also provided a valuable opportunity to send British contacts to the U.S. on tailored biotechnology or broader agriculture programs.

b) STRATEGIES AND NEEDS
Since the UK government is supportive of the technology, on a case-by-case basis, our strategy involves supporting the UK within the wider EU context. Additional outreach on GE crops is needed to retail, food manufacturers and consumers – to the extent that is possible.

CHAPTER 2: ANIMAL BIOTECHNOLOGY

PART E: Production and Trade

a) BIOTECHNOLOGY PRODUCT DEVELOPMENT
Research is the main focus for animal biotechnology in the UK. GE animals are under development but none are expected to be on the market within the next five years.

b) COMMERCIAL PRODUCTION
The only GE animals produced in the UK are mice, for research purposes. With regards products from animal biotechnologies, embryo progeny of clones or embryos of clone progeny have been imported for use in the dairy sector. Bovine semen is also imported, including from the U.S. Holstein herd, so it is possible that this has been sourced from clones or their progeny.

c) BIOTECHNOLOGY EXPORTS
The UK has not and does not export GE animals, livestock clones, or products from these animals. Given the aforementioned reference to the beef and dairy sector, it is possible that the UK exports products produced from, and genetics from, the progeny or subsequent generations of clones.

d) BIOTECHNOLOGY IMPORTS
As mentioned above, the UK has imported embryo progeny of clones or embryos of clone progeny as well as bovine semen which may have come from clones or their progeny. No import data is available as these products are not differentiated from other embryos or semen. The UK has not imported GE animals or livestock clones.

PART F: Policy

As with plant biotechnologies, the UK Government takes a pro-science and generally positive, pragmatic and permissive approach to animal biotechnologies, albeit implementing and following all EU legislation on animal biotechnologies. The UK does not have any country specific legislation or registration requirements on animal biotechnologies.

With regards EU legislation, the EU Novel Foods Regulation from 1997 is the only EU legislation covering animal cloning. Under the Novel Foods Regulation, food "produced from non-traditional breeding techniques" (implicitly including cloning) – but not from their offspring – requires a pre-market authorization in order to be imported or sold in the EU. The European Commission will present two new proposals - one on novel foods and one on food from cloned animals – but the timeline remains uncertain. More information is available here.

The Department for Environment, Food and Rural Affairs (Defra) plays an overarching role in the implementation of animal biotechnology regulation in the UK. The Health and Safety Executive helps to control the contained use of genetically engineered organisms in the UK to ensure no products or animals are released or exposed to humans without safety inspections and approvals. Further information on Defra's role in the regulation of GE animals and/or livestock clones, is available here

PART G: Marketing

a) MARKET ACCEPTANCE

No independent market research has been undertaken into the market acceptance of animal biotechnologies in the UK.

b) PUBLIC/PRIVATE OPINIONS

The UK has a number of organizations, such as the Roslin Institute and the Biotechnology and Biological Sciences Research Council (BBSRC), active in public, positive engagement on animal biotechnologies. There are also a number of organizations actively campaigning against the technologies, including but not limited to Genewatch, Friends of the Earth, the Soil Association and Compassion in World Farming (CIWF).

The UK populous is generally apathetic to the technologies although, if asked, is likely to be biased towards more traditional technologies. It is also more sensitive to perceived animal welfare issues associated with the technologies over and above any other aspect. Opinions vary with the intended use of the technology, with medical applications (improved medicines) being the most accepted. If the awareness level on positive animal welfare traits (such as breeding cattle without horns so that they do not have to be de-horned) were higher then it should be expected that this would increase the acceptance of the technologies.

Publicly funded research is more trusted than that undertaken by the private sector, there being an inherent bias towards the acceptance of technology provided free to all as a public good over that perceived to be created for financial reward by private companies. Indeed, UK-based breeding companies have distanced themselves from the technologies, preferring to maintain the trust of the public in their other research.

c) MARKET STUDIES

The Farm Animal Welfare Committee (FAWC) is an expert committee of Defra. It provides advice to Defra on the welfare of farmed animals, including farmed animals on agricultural land, at market, in transit and at the place of killing. On November 16, 2012, the Committee published its "Opinion on the welfare implications of breeding and breeding techniques in commercial livestock agriculture". The detailed report is available here. Among its many conclusions, it is notable that it encourages publicly funded animal biotechnology researchers to "engage closely with the livestock-breeding industries to (the) target research effort better towards traits that are likely to have the greatest impact on animal welfare".

PART H: Capacity Building and Outreach

a) ACTIVITIES

A number of U.S. Government speakers have visited the UK and undertaken outreach on new technologies, including but not limited to that in the animal arena. A U.S. Government-funded Voluntary Visitor Program also saw opinion leaders from Europe visit the U.S. in January 2012 to learn more about how animal biotechnology is regulated in the U.S. and see examples of ongoing research. The group included both a UK Government official and a UK-based media representative**.**

b) STRATEGIES AND NEEDS

The U.S. should continue to be open and transparent in the sharing of information on developments in the agricultural biotechnology arena.