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The Food Fight between the United States and Europe: Why GMOs Divide the West

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INTRODUCTION

Opposition to Genetically Modified (GM) foods has been growing in Europe[1] ever since GM food entered commercial markets in 1994 with the Flavr-Savr tomato. Since that time, disagreements have arisen between the United States and Europe over aspects of GM foods, from production to consumption. These differences finally motivated the United States to file a complaint against the European Union with the World Trade Organization (WTO) in May 2003. Today the differences remain strong, and both sides are still awaiting the WTO's official ruling. In the interim, however, the European Union has already sought efforts that will regulate GMOs in a satisfactory way so that GMOs may safely enter Europe's borders.

This issue is important because for the most part, the Western world shares many values based on shared history and traditions. The United States derives many of its roots from the European continent, and thus values were carried over with immigration to the New World. But over time the United States has developed its own history, traditions, and values. And though there are still many things that Europe shares with the United States, overall support for Genetically Modified (GM) Foods is not one of them. While European consumers resist GM food, American consumers are largely unaware of its presence and offer little opposition. This project investigates the reasons why such opposite feelings exist between two continents with similar economic, political, and social backgrounds. It argues that there are several factors, including agricultural

[1] For purposes of simplification, my research will use the term "Europe" for the European Union and its member states.

history, food crises, and political party systems, which have caused the trans-Atlantic divide on GMOs,

Agricultural history and food crises have been extremely influential in shaping opinion on GMOs. A European tradition of small, family-owned farms has created a closer relationship with the land, while the United States' relatively short 230-year agricultural history has led to big farming, big business, and more trust in progress and scientific development. The European public, according to studies conducted by the European Union such as the "Eurobarometer,"[2] is also much more skeptical about the role of technology and the quality of food products. This is a result of famines and widespread epidemics experienced by Europeans, such as the outbreak of mad cow disease and the more recent threat of bird flu. Europe suffered far greater consequences than the United States due to mad cow disease, and now faces a more serious threat from bird flu due to its relative geographical proximity to countries that have had human casualties of bird flu.

The importance of political parties in this project is their role in the different party systems in the United States and Europe. While various "Green" parties represent the ecological movement in many European nations and are opposed to GMOs, the dominance of the two-party system in the United States has hindered the efforts of third parties focusing on ecological issues. The Green Party in the United States receives support from interest groups such as the Sierra

[2] Eurobarometer 55.2 Europeans, Science, and Technology. European Commission. Brussels, 2001. < http://europa.eu.int/comm/ research/press/ 2001/pr0612en-report.pdf>. Jan 2006.

Club and Greenpeace, but it lacks enough support among voters to bring its issues, including campaigns against GMOs, to the national agenda.

These differences help explain why Europe has taken a different approach to GMOs than the United States. It is important to understand this issue because we can learn how two of the world's biggest powers and allies behave in a situation of conflict. The methodology used to analyze this issue first includes a brief background on GM food, including how GMOs are made and who the main producers are. I discuss the differences of increased farm production of GM crops in the United States as opposed to Europe. The second section discusses the pros and cons of GM food. Both sides make compelling ethical and practical arguments on the issue and elaborate on the benefits and dangers of the technology. Section 3 describes in detail agricultural history, food crises, and political party systems, and how they have shaped both European and American public opinion on GM food. Section 4 analyzes the different GM regulations that exist today in the United States and Europe. The role of the WTO in providing a solution to the debate is discussed in Section 5. I conclude with how this issue can be interpreted in international relations according to realist, liberal, and Marxist theories and speculate on what will happen in the future with GM food.

SECTION 1: BACKGROUND ON GMOs

Genetically Modified Organisms, or GMOs, involve the use of gene manipulation to alter the genetic material of animals, microorganisms, and in this case, plants, by inserting genes of one organism into another, usually of a different species. For example, the genes from a daffodil were engineered into the DNA of rice to produce a new strain of rice that is rich in Vitamin A.[3] Manipulating agriculture is not a new idea. Crops have been crossbred to achieve desired traits. But this process is restricted to using crops that are of the same species, and can take many generations to obtain desired results. Genetic engineering offers a much faster and more efficient way of producing organisms with specific traits. Genetic engineers can alter the genes of plants in many ways to produce crops with these specific desired traits. The two most common are the use of *Agrobacterium,* and the "shotgun" method.

Agrobacterium tumefaciens is a common bacterium that resides in soils and is unique in that it infects plant cells with its DNA.[4] In nature, this actually harms plants because the bacterium implants its own DNA into the plant's genes, which gives the plant a disease called crown gall disease. Here in Image 1.1 is a photograph of a raspberry plant with crown gall disease. The round sphere on one of the branches in the center of the picture is the effect caused by disease.

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[3] "What are GMOs?" USDA Agricultural Research Service. Texas, 23 Feb 2005. <http://www.ars.usda.gov/Research/docs.htm?docid=7205>. 14 April 2006.

Image 1.1 "Crown gall of raspberry caused by *Agrobacterium tumefaciens*." 2004. Colorado State University. 26 Jan 2006. <http://www.colostate.edu/programs/lifesciences/TransgenicCrops/how.html>.

Genetic engineers have captured this unique ability of the bacteria to insert DNA into cells and have applied it in new ways to create a GMO. Scientists can isolate a gene they wish to have included in the final product by inserting it into the plasmid (a circular ring of DNA) of the bacterium. By using enzymes to replace the gene that causes crown gall disease with the new gene, as shown in the illustration below, a new plasmid ring is created. Bacterium with the new plasmid are mixed with cells of the plant that scientists wish to alter. Some cells will then integrate the new gene into their own DNA. When the cells are grown in tissue cultures, they can be tested to see if they carry the new gene.[5] Figure 1.1 on the following page is an illustration of how this process is performed.

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[4] "How do you make a transgenic plant?" Transgenic Crops: An Introduction and Resource Guide. Colorado State University. http://www.colostate.edu/programs/lifesciences/TransgenicCrops/how.html. 26 Jan 2006.

[5]Brown, Lynn J. "Making genetic engineered plants." The Pennsylvania State University. 2002. <http://pubs.cas.psu.edu/freepubs/pdfs/uk102.pdf>. 30 Jan 2006.

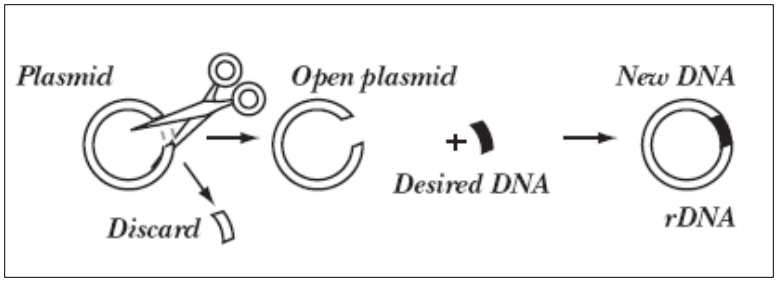

Figure 1.1 Brown, Lynn J. "Making genetic engineered plants." The Pennsylvania State University. 2002. <http://pubs.cas.psu.edu/freepubs/pdfs/uk102.pdf>. 30 Jan 2006.

The second common method of gene manipulation is the "shotgun method." It is used mainly in wheat, rice, and corn because the *Agrobacterium* is not very effective with these crops. Despite the crude name, this is a very sophisticated technique in which geneticists mix a targeted gene with microscopic pellets of gold or tungsten. The DNA coats the bullet-like pellets, which are then propelled toward plant cells by a blast of helium gas. Some of the pellets hit and enter the cells where the new DNA mixes with the plant's original DNA. The cells are then tested to see which have the new gene.[6]

The technology behind these ideas proved to be quite successful in multiple arenas. In 1973, scientists genetically engineered human insulin and the hepatitis B vaccine.[7] In 1983, a strain of tobacco plant that was resistant to antibiotics was created. Commercial production soon followed. The Flavr Savr tomato, produced by Calgene, Inc and released into markets in 1994, was created

[6] Ibid.
[7] Nottingham, Stephen. Eat Your Genes: How Genetically Modified Food is Entering Your Diet. London: Zed Books, 1998.

with the intent of slow ripening to make the tomatoes last longer.[8] Monsanto followed the Flavr-Savr tomato with its Roundup Ready soy and corn[9].

GM crops have grown enormously today, especially in the United States. There are many techniques that can be used and many different agricultural crops have been altered in this manner. With the success of the Flavr-Savr tomato and Roundup Ready crops, farmers chose to plant genetically modified seeds in their fields because of the benefits that GM food promised. These crops promised reduced inputs necessary to grow. Starting mostly with soy and corn crops, GMO technology quickly spread to a variety of crops to include canola, cotton, potatoes, tobacco, papaya, and squash. The United States, Argentina, and Canada have emerged as the top three producers of GM crops.[10]

The four most popular GM crops are: soybeans, cotton, canola, and corn. The graph below, taken from the International Service for the Acquisition of Agri-biotech Applications, shows how these four GM crops have substantially increased in acreage worldwide from 1996 to 2002.[11]

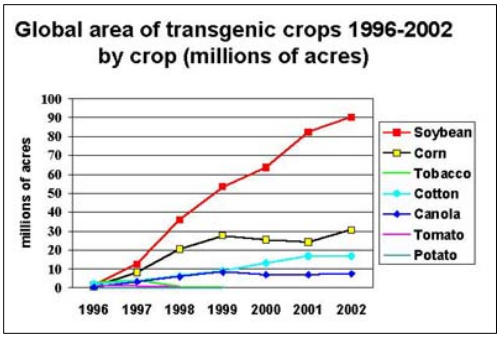

Table 1.1 James, C. 2002. Global status of commercialized transgenic crops: 2002. ISAAA Briefs No. 27. ASAAA: Ithaca, NY. <http://www.isaaa.org/home.htm>. 9 Jan 2006.

[8] Martineau, Belinda. First Fruit: The Creation of the Flavr Savr™ Tomato and the Birth of Genetically Engineered Food. New York: McGraw Hill, 2001

[9] Seetharaman, Koushik. "Genetically Modified Crops." Department of Food Sciences, Penn State University. <http://biotech.cas/psu.edu/articles/gmo_crops.htm>. 10 Jan. 2006.

[10] Paarlberg, Robert. "The Global Food Fight." Foreign Affairs. 79.3 (2000): 24-39.

[11] James, C. 2002. Global status of commercialized transgenic crops: 2002. ISAAA Briefs No. 27. ASAAA: Ithaca, NY.< http://www.isaaa.org/home.htm>. 9 Jan 2006.

Of the 672 million acres of land used for agriculture worldwide in 2003, 167.2 million acres are used to grow GM crops. In only eight years, from 1996 to 2003, GM crops started from almost no production to taking up 25% of cultivated land in 18 countries.[12] .

About two-thirds of GM food is produced in the United States. Not only does it have the most land-percentage, but the United States also adopted GM crops much faster than any other state. According to the Pew Initiative on Food and Biotechnology, from 1996 to 2003, there was about a 28% increase in the use of GM crops from a meager 3.7 million acres in 1996 to an astounding 105.7 million in 2003.[13] The following chart in Figure 1.2 shows the percentage of land area used by the top GM-producing states:

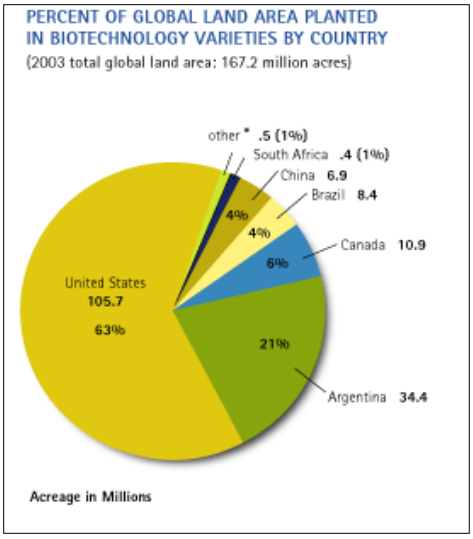

Figure 1.2 "Genetically Modified Crops in the United States." Pew Initiative on Food and Biotechnology. The University of Richmond. August 2004. <http://pewagbiotech.org/resources/factsheets/display.php3?FactsheetID=2>. 3 Mar 2006.

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[12] "Genetically Modified Crops in the United States." Pew Initiative on Food and Biotechnology. The University of Richmond. August 2004. <http://pewagbiotech.org/resources/factsheets/display.php3?FactsheetID=2>. 3 Mar 2006.

[13] Ibid.

Some of the largest GM food producers today are Syngenta, Monsanto, Dow AgroSciences (a subsidiary of the Dow Chemical Company), and Pioneer Hi-Bred International (a subsidiary of DuPont). The largest of these, Syngenta, which was recently created by the selling and combining of the agricultural divisions of Novartis and AstraZeneca, reported that its 2004 global sales of GM seeds and its own pesticides and insecticides reached approximately $7.3 billion.[14]

"Agribusiness" is a huge market today, and these companies' success proves that there is a high demand for GM crops from farmers, especially in the United States. In 2003, more than half of all U.S. crops were GM crops. The statistics for GM crops have continued to grow since the introduction of GMOs, and it appears that this trend will continue in coming years. Farmers have been persuaded by the increased production offered to them by using GM products. The following section will discuss these benefits in more detail.

[14] Syngenta. 10 Jan 2006. <http://www.syngenta.com/en/index.aspx>. 10 Jan 2006.

SECTION 2: PROS AND CONS OF GMOs

Supporters of GM foods argue that the benefits for large-scale farmers justify the technology. Farmers can use fewer herbicides and pesticides, and yield more crops that are of a better quality. According to *PBS*, in 1996 the United States did not commercially produce any GM crops. By 2002, the percentages of corn, cotton, and soy had increased to 34%, 71%, and 75%, respectively. This is a huge leap for only eight years and shows how quickly GM crops became popular in the United States. *PBS* also cited that the amount of pesticides required for GM cotton is only 17 % of the amount needed for non-GM cotton, and, overall, planting GM cotton lowered costs by 25%,[15] justifying the higher price of purchasing GM seeds. Basic economics alone shows how these benefits enabled GM food to enter the market so easily.

Agricultural biotechnology began with the purpose of making agriculture more efficient. The potential of the technology was encouraging. Some of the foreseen benefits were higher crop outputs; resistance to diseases, insects, and weeds; prolonged shelf life so crops stay fresh longer; crops that could withstand high levels of salt; crops with higher nutritional content, such as important vitamins; crops that were more tolerant of natural phenomena, such as drought;[16] and crops that could develop vaccines or certain desired proteins.[17]

There are also many ethical arguments that support GMOs due to the

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[15] "Seeds of Conflict-The Debate." Now with Bill Moyers. Science and Health. 4 Oct 2002. <http://www.pbs.org/now/science/genedebate.html>.
[16] Seetharaman, Koushik. "Genetically Modified Crops." Department of Food Sciences, Penn State University. <http://biotech.cas/psu.edu/articles/gmo_crops.htm>. 10 Jan. 2006.
[17] "Seeds of Conflict-The Debate." Now with Bill Moyers. Science and Health. 4 Oct 2002. <http://www.pbs.org/now/science/genedebate.html>.

benefits they offer, not just for GM producers, but also for all of humankind. If the technology offers utilitarian benefits, then it will help anyone, not just Americans or GMO supporters. Examples of these are GMOs that could produce life-saving medicines. Insulin has already been modified to help those suffering from diabetes, so what other diseases could possibly be cured by GMOs? Ethicists also believe that GMOs will reduce levels of fertilizers, insecticides, and pesticides, which would better for the environment. The potential of GMOs and the technology behind it offer many universal benefits that could be extremely valuable in the future.

Another important aspect of GM food to producers is the potential to help third-world hunger. The United States sees the future of GMOs in helping to establish sustainable development in underdeveloped countries. In other words, the United States would like to cure world hunger with GMOs by making crops more cost efficient for producers. According to the Organization for Economic Cooperation and Development, in 2005 the United States donated $27.5 billion in foreign aid. This is the highest dollar amount of any single state.[18] American supporters of using GM food in the third world believe that it can relieve some of that money by helping establish efficient GM crops. The United Nations also supports sending GMOs to developing states since GM crops require fewer inputs, and are easier and cheaper to grow.

Inputs such as herbicides and pesticides are very costly to producers.

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[18] "Aid flows top USD 100 billion in 2005." Organisation for Economic Cooperation and Development. 4 Apr 2006. <http://www.oecd.org/document/40/0,2340,en_2649_33721_36418344_1_1_1_1,00.html>. 18 Apr 2006.

Spending a little extra on investing in GM crops that do not require these inputs, or require significantly fewer inputs, is more economical to the producer, which has been proven with many statistics provided in Section 1. But Europe has proven that is has a different value system concerning GMOs. Based on European reactions to GMOs, I would conclude that reduced costs are less important to them than ensuring that crops are safe both for the environment and for consumers.

Instead of embracing GM food after seeing the positive effect it had for American producers, many European producers and consumers have both rejected growing it and put heavy regulations on it, putting U.S. producers who export to these areas in a tough situation. While American companies continue to push the benefits of GM crops, many European producers are worried about the possible negative effect of using GMOs. They are much more conservative about opening their markets to food that has not had long- term testing. No one is sure what the future of GM food will bring. So while most Americans are content to continue eating GM food daily, Europe is doing its best to stay away from products it considers unsafe.

Opponents of GM food fear the unknown long-term consequences. According to *PBS,* some of these include possible allergic reactions or other health responses in both humans and livestock animals; unwanted flow of genes through wind and cross-pollination to other species and non-GM crops; the creation of new and more vigorous pests and pathogens, which can lead to the evolution of weeds to become resistant to herbicides; irreparable changes in

species diversity and genetic diversity within a species; and unwanted effects to surrounding ecology, such as harming soil organisms, helpful insects, or birds. [19]

Religious and ethical concerns include arguments that the altering the DNA of a living organism is "playing God" and thus is wrong. This kind of ethical view argues that, unlike God, we are not omniscient and should not overestimate our ability to predict or control the future consequences of genetic engineering. Emmanuel Kant believed that one should not do evil so that good may come. In this Kantian view, even if there are numerous universal outcomes that humanity can benefit from by using GMOs, it is wrong to use them because they were created in an unnatural, and in this case, "evil" way.

Further ethical concerns include the issue of intellectual property rights, and solving third-world hunger. Big corporations are, in a way, putting a patent on nature by altering plants and animals and claiming rights to the genetically altered product. To control the use of their products, their crops produce sterile seeds, forcing farmers to purchase new seeds every season. This creates dependence on the GMO-producing corporations. It also makes it harder for developing countries to afford GM crops, even though the GMO corporations argue that GM crops will help alleviate hunger. Hunger is not a result of under-production of food. In fact, the world produces a surplus of food. The problem instead lies with the logistics of getting food to places that need it. If GMO-producing corporations would like to alleviate hunger in the third world, they could help ensure that food reaches these countries instead of trying to convince them to buy GM crops, which makes them dependant on the corporation season after season.

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[19] Ibid.

Dependence on corporations is not the only reason for resistance to GMOs from developing countries. Zambian President Levy Mwanawasa refused US food aid to his country, even though his people were starving, because the food contained GMOs. His decision most likely results from a similar view on GMOs to that of Europeans. He made his opinion about GMOs well known to the US when he called them "poison." But Zambia (like Zimbabwe and Mozambique) is also be scared of hurting its exports to European and also to Japanese markets should it begin producing GM crops.[20] After all, in 2005 the European Union member states together donated a total of more than $50 billion in financial assistance to developing states, which greatly overshadows the $2.7 billion donated by the United States.[21] It is understandable that developing countries would not want to risk losing both European aid and European markets, especially if they don't even support GMOs to begin with.

In reaction to the various concerns of GM food, a new trend has developed in Europe supporting organic foods. Organic farming favors methods that respect the environment to avoid synthetic chemicals, growth hormones, and especially genetic manipulation. It offers an alternative from GMOs to consumers that, according to the EU, also tries to reduce pollution, helps to sustain the ecosystem, and regulates animal welfare of livestock.[22] Although the EU reported that only

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[20] Ibid.
[21] "Aid flows top USD 100 billion in 2005." Organisation for Economic Cooperation and Development. 4 Apr 2006. <http://www.oecd.org/document/40/0,2340,en_2649_33721_36418344_1_1_1_1,00.html>. 18 Apr 2006.
[22] "Organic Farming." European Commission. <http://europa.eu.int/comm/agriculture/qual/organic/def/index_en.htm>. 17 Feb 2006.

3% of its utilized agricultural area participates in organic farming,[23] the countries with the 10 highest percentage of land area of organic farms in the world are all European states (8 of which are EU members).[24] The EU also reported that numbers of organic farms are growing due to high consumer demand. The United Kingdom, for example, has to import about three quarters of its organic foods because it cannot produce enough to meet the demand.[25] The United States, on the other hand, does not have such a high demand for organic products. They are available, and about 1.4 million hectares of North American (including Canada and Mexico) farms are organic. However, Europe's organic farms cover a growing 6.5 million hectares.[26]

The growing demand for non-GM Organic food shows again that Europeans see the use of GM crops as a huge risk, one that they are not willing to take. They are afraid of destroying their farms and the surrounding ecosystem. There are already numerous reports that confirm the fear that GM crops can unintentionally spread to nearby areas through wind and cross-pollination. In fact, Monsanto, a GMO producing company, filed a suit against a farmer in Canada for royalties because of cross-pollination of a nearby farm of GM crops to his organic canola crops[27]. If this fear has been confirmed, then what other long-

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[23] Ibid.
[24] "The 10 Countries with the Highest Percentage of Land Area under Organic Management." FIBL Survery 2005/2006. < http://www.soel.de/images_inhalte/oekolandbau/statistiken/topten_%25_2006_300dpi.gif>. 17 Feb 2006.
[25] J. Pretty. "Existing Forms of Sustainable Agriculture in Europe." Center for Environment and Society. University of Essex. <http://www2.essex.ac.uk/ces/ResearchProgrammes/SusAg/susageu.htm>. 17 Feb 2006.
[26] "The World of Organic Agriculture." Source: FIBL Survey 2005/2006. <http://www.soel.de/oekolandbau/weltweit.html>. 17 Feb 2006.
[27] "Tougher European GMO legislation." Greenpeace International. <http://www.greenpeace.org>. 2 July 2003.

term effects will appear in the future? Europeans fear long-term health risks above all. And since GM food is still relatively new, there are no scientific tests that can show that GM food is safe in the long run. Therefore, Europeans prefer to approach the GM issue with precaution. They fear the possible negative effect of GM food, so they prefer to strictly regulate GMOs both when entering Europe's borders and being approved for cultivation.

The technology to make a product with the potential for both such positive and negative consequences is guaranteed to face controversy. But the goal of this research project is to find out why defenders of GM food and opponents have divided themselves along geographical lines. Why is it that mainly *European* producers focus on the negative consequences and mainly *American* producers are focused on the beneficial consequences? The next section explains European skepticism and American trust in scientific development.

SECTION 3: HOW DIFFERENCES AROSE

There are many similarities in American and European farming despite GMOs. For example, both are located in a northern temperate zone, and so many of their agricultural products are the same, such as grains, dairy, livestock, fruit, and vegetables. They are the top two world producers of agricultural products, implying that both have efficiently mastered the art of farming. They both export between 20 to 25% of their products and so they both depend on foreign markets[28]. So what has motivated these two groups to approach the issue of GMOs so differently?

I have found three principal factors that contribute to the continental divide on GMOs: differing agricultural histories; the effect of various food crises, some of which are still a problem today; and the role of political party systems. When combined, these reasons provide a broad understanding of the world's top two agricultural producers' different approaches to GMOs. The section concludes with an analysis of how these factors have shaped both European and American public opinions held today.

European agricultural history dates back much farther than that of the United States. The European tradition of small farms today can be traced back to the feudal system, where peasant farmers would work a plot of land owned by a nobleman in exchange for protection from invaders. Today, most of Europe's farms remain relatively small in scale. Producers own and live on their own farms, and have a stronger personal investment in the crops that they produce.

United States' agriculture has developed very differently. Unlike the family-run operations we still see in Europe, American farming developed during the 20th century into corporations often owned by stockholders and concentrated in the midwestern parts of the country. With the aid of cheap labor through slavery, large-scale agriculture on plantations had developed in the South before the Declaration of Independence had even been signed. During the 19th century, the United States began to industrialize, and with the aid of factory-produced farming machinery, many farmers in the rest of the country were encouraged to commercialize their small farms. By implementing new technology for machinery and irrigation systems, as well as developing better seeds and fertilizers, American farmers today have reached a higher yield of crops per acre. Small farms have been consolidated into large corporate-owned farms to cut down on expenses for a more efficient operation.[29]

The American approach to large-scale commercial farming and smaller European farms has caused a wide gap in farm sizes between the two regions. The USDA has reported that the average European farm is one-tenth the size of a typical American farm. So even though the United States has over three times the arable farming land, Europe has more than three times the number of farms. Table 3.1 on the following page shows the actual number of farms and average farm sizes in the United States and the European Union in 2001.

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[28] Normile, Mary Ann and Price, Jason. "The United States and the European Union-Statistical Overview." USDA. <http://www.ers.usda.gov/publications/WRS0404/WRS0404b.pdf>. Jan 2004.

[29] "American Agriculture: Its changing significance." Chapter 8. Department of State Publication. International Information Programs. < http://usinfo.state.gov/products/pubs/oecon/chap8.htm>. 17 Feb 2006.

	Units	U.S.	EU
Agricultural land	1,000 acres	941,210	316,913
Number of farms	1,000	2,158	6,766
Average farm size	Acres	436	46.2

Table 3.1 Normile, Mary Ann and Price, Jason. "The United States and the European Union-Statistical Overview." USDA. http://www.ers.usda.gov/publications/WRS0404/WRS0404b.pdf .

The USDA has also reported that more than half of the farms in Europe are less than 12 acres. This size farm may seem more like a backyard garden in comparison to the fact that almost half (47%) of U.S. farms are more than 140 acres. Farm size is an important factor to consider because smaller farms do not require a large outside labor force, thus allowing a more personal investment in the farm itself. There is a difference between owning a farm and simply being employed as a farm worker. For example, a farmer who owns a small farm needs the crops he or she produces to be successful more than a hired farmer who receives wages for his or her work does.

Smaller farms also may not require as many inputs such as insecticides and herbicides because crops can receive more attention. Weeding by hand might be possible with a small farm, but farmers on large-acreage farms would find the task of weeding 436 acres quite exhausting.

As history has documented, Europeans have also experienced disease and famine beyond anything experience in the United States. The Black Plague, which arrived in Europe in the 1350's, killed nearly a third of Europe's population. The Great Potato Famine from 1845 to 1947 sent many desperate Irish immigrants to the United States. More recent crises include mad cow

disease in the United Kingdom, which caused major concern in Europe over how beef was produced in the 1980s, dioxins found in domesticated animals in Belgium in 1999, and an outbreak of hoof-in-mouth disease also in the UK in 2001.[30] Europe's history of food insecurities has furthered its concern for the environment and better use of resources. Europe has a history of experience with what happens when these things are not respected, so many Europeans are taking preventative measures to ensure that biotechnology does not threaten their agriculture.

Unlike Europe, the only major agricultural catastrophe in United States history occurred from 1932 to 1936 when drought and "dust-bowl" conditions developed in the Mid-west.[31] Crops cannot survive in such dry, harsh conditions. This kind of disaster would only further motivate American agriculture to look for crops that can survive harsher environments.

Mad cow disease in the United Kingdom, which began in the 1980s, has piqued European distrust of food safety. Mad cow disease was thought to have spread by using portions of slaughtered cattle to add protein to a grain-based diet that is fed back to living cattle. Ingestion of these contaminated parts caused the disease to spread quickly.

Complications and public interest grew when questions of the risk of contracting the human virus, Creutzfeldt-Jacob Disease (CJD) arose. CJD is thought to be a result of exposure to animal products contaminated with the

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[30] Paarlberg, Robert A. "The Politics of Precaution: Genetically Modified Crops in Developing Countries." Baltimore: John Hopkins Press, 2001.
[31] "A Condensed History of American Agriculture 1776-1999." U.S. Department of Agriculture. <http://www.usda.gov/news/pubs/99arp/timeline.pdf>. 14 Jan 2005

protein that causes mad cow disease in cattle. CJD is not a disease to be taken lightly. Its symptoms include progressive dementia, confusion, muscle jerks, and eventual death.[32] According to the World Health Organization, most of the first cases of CJD were found in the UK. By November of 2002, 129 cases were found of CJD just in the UK. This problem concerns the rest of Europe as well because since 1986, there have been 181,376 cases of mad cow disease in the UK, but in addition, 3,473 cases were found in cattle in France, Germany, Ireland, Portugal, Spain, and Switzerland; and 206 total cases were found in Austria, Belgium, Czech Republic, Denmark, Finland, Greece, Israel, Italy, Japan, Liechtenstein, Luxembourg, Netherlands, Poland, and Slovakia.[33]

Since the outbreak of mad cow disease, European governments have introduced programs to monitor and prevent it. But this has not ended European skepticism on food safety. The recent outbreak of avian influenza, or "bird flu," has Europe concerned yet again, this time about domesticated poultry. The recent spread is thought be a result of migrating birds spreading the virus to poultry along their flight paths. The World Health Organization reported that 186 cases of human infection by avian influenza have been confirmed since 2003, and 105 deaths have resulted from the infection due to the recent outbreak of bird flu. [34] Luckily for Europe, these human cases were only found in Asia, and the closest to Europe was found in Turkey. But bird flu is highly contagious, and can be spread

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[32] "Frequently Asked Questions about "Mad Cow Disease" and Human Health." The Massachusetts Department of Public Health. <http://mass.gov/dph/cdc/factsheets/madcow.htm>. Jan 2004.

[33] "Variant Creutzfeldt-Jakob disease." World Health Organization. <http://www.who.int/mediacentre/factsheets/fs180/en/>. 2 Apr 2006.

through human clothing and shoes that come into contact with infected poultry. In fact, avian influenza was first identified in Italy about 100 years ago. Due to the recent spread of the infection, many places in Europe have reported infected poultry. Illustrated below in Image 3.1 is a map as of March 22, 2006, from the World Health Organization showing which countries have found infected birds.

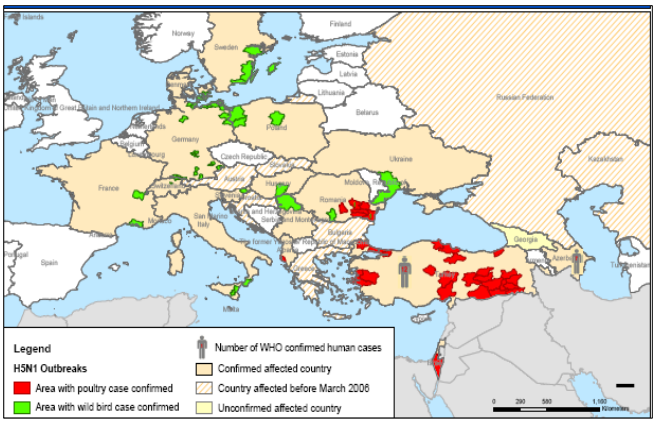

Image 3.1 "WHO EURO-Avian Influenza Infections." Map. World Health Organization Working Document Data. 22 March 2006. <http://www.euro.who.int/document/INF/01_22March2006EURO.pdf>

Thanks to an agricultural background nearly free of outbreaks or disasters, Americans do not have many reasons to distrust their government over the monitoring of the safety of the food they consume. It appears that Americans trust the Food and Drug Administration (FDA), the official government body appointed to monitor food safety, to do their job correctly. But in order to avoid a reoccurrence of disease, sickness, and other harmful effects, Europeans feel that being prudent and precautionary with agriculture is the best way to ensure food security.

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[34] "Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO." World Health Organization. <http://www.who.int/csr/disease/avian_influenza/country/cases_table_2006_03_24/en/index.html>. 24 Mar 2006.

The European Union has created the European Food Safety Authority (EFSA), which is a body with responsibilities similar to that of the United States' Food and Drug Administration (FDA). But the EFSA does not enjoy the same kind of support that the FDA does because of Europe's background. This is because of a belief that governments were not able to stop past disasters, so they should not be trusted in the future. For example, the British government was unable to stop the outbreak of mad cow disease, so the new EFSA should not be fully trusted to prevent future agricultural disasters either. Both government bodies aim to provide food safety to consumers, and want to protect their citizens' well being. But differing opinions on food safety and agriculture have led the United States and the European Union to different approaches on how to treat GM food.

The only serious food security crisis that the United States has experienced is the lack of food due to environmental conditions 70 years ago. To prevent repeating history, it is preferable for American producers to push scientific innovation to develop crops which can withstand harsh environmental conditions. But since Europeans have experienced many serous food security crises, they believe that it is in their best interest to contain GMOs so that they do not cause another crisis in the future.

The third and final aspect that must be discussed in the GMO debate is the role of political party systems in the United States and Europe. This is an important factor because political structure affects how issues are treated on a national level in the United States and at the European Union level in Europe.

GMOs are given more consideration in the European Parliament than the U.S. Congress due to differing roles of political parties. I will give a brief background of each political system, stressing the important role of political parties because, although both the United States and Europe are democracies, there are some interesting differences regarding party systems that affect how GMOs are treated in the two regions.

The United States has developed into a two-party system comprised of Democrats and Republicans. Although this is not what the nation's founders had planned for, the two-party system has dominated U.S. elections since the 1860s.[35] Today about 60% of registered American voters identify as either a Democrat or a Republican. This is due to the unique structure of American politics. For example, when a candidate receives a majority of the vote in one district, he or she wins the entire district. Unlike more representative or proportional systems, this allows for only one party's candidate to win the district. Another aspect of the American electoral system that hinders third parties is the Electoral College. Voters actually cast their votes in presidential elections for electors, not for the candidates themselves. Each state is allocated a number of electors based on the state's population. The electors assigned to the candidate who receives the popular vote in each state are then allowed to vote; and, of course, their vote is always for the candidate to whom they were assigned. So even if the victorious candidate only won a margin of the popular vote, he or she still receives the votes for the entire state. This electoral process has shown such bi-partisanship that

third parties find it very difficult to gain support. It is often an expensive and difficult task just to get one's name on a ballot. To illustrate this, one can look at the representation within the U.S. Congress. There are 55 Republicans, 44 Democrats, and only 1 Independent in the Senate; and in the House of Representatives there are similarly 232 Republicans, 202 Democrats, and only 1 Independent Congressman.[36] The Green Party does have a small base of voters across the country and support from interest groups. But due to the electoral process, the Green Party has no representation in the U.S. Congress because its votes are lost to the two main parties in each voting district. So unless GM food appears on either the Democratic or Republican agenda, the issue will not receive much attention in the U.S. political scene.

European democracies, however, have shown favor toward a more proportional electoral process. It is not out of the ordinary to find several parties seriously competing in a single election. For example, the recent 2005 election in Germany for a new chancellor was a competition between five major parties and a small percentage of minor parties.[37] And on a larger scale, in the European Union, Members of the European Parliament (MEPs) represent seven official political parties.[38] In this system, many parties, and thus many issues, are heard and supported. Even though the two largest parties carry a vast percentage of members, the EU has implemented a system so that smaller parties have a say in

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[35] Bibby, John F. "Elections 2004: Political Parties in the United States." U.S.Department of State. International Information Programs. <http://usinfo.state.gov/products/pubs/election04/parties.htm>. 5 Jan 2006.

[36] Damerow, Dr. Harold. "Congress." Union County College. <http://faculty.ucc.edu/egh-damerow/congress.htm.> 5 Jan 2006

[37] "List of political parties in Germany." Wikipedia, the free encyclopedia. <http://en.wikipedia.org/wiki/List_of_political_parties_in_Germany>. 5 Jan. 2006

politics, even though they do not win the majority of votes. With the issue of GM food, the European Green Party, named the "Group of the Greens/European Free Alliance," enjoys the fourth-highest percentage of representation with 42 of 731 votes. Its issues can be brought forth much easier than in the U.S. Congress, and therefore its concern over GM food is made public more easily thanks to this proportional system. Shown below in Image 3.2 is a card from the Green Party in Europe that is part of their campaign, advising consumers to get the facts before purchasing GM food.

Image 3.2 Don't be bullied on GM Food. 2005. The Greens-EFA. <http://www.eat-better.org/eat-better.php>. June 2005.

Of course, the Green Party is not the sole force spreading information about GM food around Europe, but it certainly is a powerful one. With the help of the Green Party, grassroots organizations and interest groups such as Greenpeace and Friends of the Earth International have joined the campaign to spread awareness and fight GM food by fueling existing mistrust of food security. Names such as "FrankenFood" have been coined to drive the public against them. These groups create a domino effect, which is apparent today because many Europeans are aware of the issues involved in GM food. Americans, on the other

[38] European Parliament. <http://www.europarl.eu.int/groups/default_en.htm>. 5 Jan 2006

hand, are restricted to bi-partisan political issues such as abortion, social security, and the War in Iraq; "outside" issues rarely receive mainstream coverage, making it harder for the public to be aware that other issues, such as GMOs, exist. Information regarding GMOs is abundant, and many U.S. interest groups exist to spread awareness, but American awareness remains low.

The combination of agricultural history, food crises, and differing political systems has helped to create the dichotomy of public opinions held by consumers about GMOs today. There are two other very important aspects necessary to understand as well in order to fully comprehend American versus European opinions. The first is how aware the consumers actually are of the debate. The second is the different views held by Europeans, since the EU is really comprised of 25 sovereign states, some of which have their own national legislation on GMOs.

While both American and European producers and *European* consumers are well aware of the GMO issue, *American* consumers are far less informed on the subject. A study at Rutgers University Food Policy Institute published in October 2003 showed its most important finding to be that, "While most Americans are likely to consume GM food every day, they know very little about it." The proof was astounding. The study found that 43% of Americans knew little or nothing about GM food even though they are probably consuming it on a daily basis due to the prevalence of GM products in an estimated 60-70% of all processed foods in the United States.[39] It was even more shocking to learn that

[39] Hallman, W.K., et al. 2003. "Public Perceptions of Genetically Modified Foods: A National Study of American Knowledge and Opinion." New Brunswick, New Jersey: Food Policy

25% of Americans who participated in the study did not believe that GM food was even sold in grocery stores. It is very interesting to see proof of how the U.S. population, which continues to consume GM food on a daily basis, is the one that is less informed.

This fact is also very important because it shows that many American consumers do not participate in the GMO debate due to their lack of awareness. After explaining the GMO issue to them, the Rutgers study asked the same 25% of people who were unaware of GMOs if they would prefer that GM food have labels. Surprisingly, 94% said yes to this question.[40] Perhaps if more American consumers were aware of the GMO issue, they would be more vocal in calling for labeling as well.

The second major issue that must be addressed is that, while this paper treats the European Union as one entity, the truth is that it is comprised of 25 sovereign states that each has its own national laws and opinions on GM food, and all of these opinions are factored together to show a larger "EU Opinion." The responsiveness of both individual European national governments and the European Union is also another measure that reflects a negative public opinion on GMOs. According to a Eurobarometer poll in 2001, 70.9% of EU citizens as a whole agreed that they do not want GM foods, and an astonishing 94.6% would like to have the right to choose if they want to eat GM food or not.[41] But on an individual state-basis, what do the people think? According to Friends of the

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Institute, Rutgers-The State University of New Jersey. < http://www.foodpolicyinstitute.org/docs/reports/NationalStudy2003.pdf> 2 Apr 2006..

[40] Ibid.

Earth Europe, there is varied opinion from or for complete bans to requests for labeling or for more information. For example, the organization reported that a 2001 poll showed that 67% of Italians did not support GMO production. In a 2000 poll in Poland, 89% of Poles wanted GM foods to be labeled. And in 1999, 91% of the French population did not think that there was adequate information available about GM food to be fully aware of its consequences,[42] which supports the principle of precaution discussed earlier.

This section, I have examined the importance of agricultural history, food crises, and political party systems as the major reasons that affect public opinion on GM food. These reasons remind us that here is still an ocean between the two regions, despite the many similarities between them. For example, many Americans have roots that trace back to Europe, both have similar stances on many international political issues such as human rights, both use English for universal communication, and both have Judeo-Christian religious majorities. But because of that geographical difference, cultures and attitudes were able to develop separately from one another. The issue of GMOs has given both regions an opportunity to express their differences. The next section considers how these different views have been implemented into legislation regarding GMOs.

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[41] Eurobarometer 55.2 Europeans, Science, and Technology. European Commission. Brussels, 2001. < http://europa.eu.int/comm/ research/press/ 2001/pr0612en-report.pdf>. Jan 2006.
[42] "What Europeans thing about GMOs." FoEE Biotechnology Programme and European GMO Campaign. < http://www.foeeurope.org/GMOs/explore/what_europeans.htm >. 16 Feb 2006.

SECTION 4: REGULATING GMOs

In the case of government regulations, again there is a sharp contrast in how Europe and the United States approach GMOs. In past years the European Union member states have each established sets of rules on national and regional levels regarding how GM food is to be treated in their respective country. For example, France, Austria, and Luxembourg have placed bans prohibiting the planting of certain GM crops; Greece and the local Tuscan government in Italy have banned field testing of certain GM crops; the Basque region of Spain has declared a five-year moratorium on GM crops in 1999; and the Czech Republic's Senate passed legislation in 2000 requiring the labeling of GM food.[43]

The European Union as a whole has since created legislation targeted directly at how to manage the presence of GM food in its markets. The moratorium banning approvals of new GMOs ended on April 18, 2004 with the implementation of European Parliament and Council Regulations 1829/2003 and 1830/2003. These laws introduced a way of tracing GMOs, introduced labeling requirements for GMOs located in animal feed, and reinforce existing labeling rules that had previously been implemented in 1998.[44] These regulations enabled the European Parliament to tighten any loopholes and declared that any food or animal feed products containing GMOs must be clearly labeled. The legislation does exclude dairy and meat products that derive from animals who have been fed GMOs, and while it gives member states the right to enforce national legislation

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[43] "Bans and Labeling." Greenpeace International. <http://www.greenpeace.org. > 2 July 2003.
[44] "Biotechnology." Foreign Agricultural Service U.S. Mission to the European Union. 10 Apr 2006.

which ensures that organic farms are not contaminated with GMOs, the EU does not require it. [45]

The United States has taken a different approach to regulating GMOs. There are three important United States government agencies responsible for monitoring GMOs: The Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), and the Environmental Protection Agency (EPA). Essentially, in the realm of GMOs, the FDA monitors the safety of food products released into the market, the USDA is supposed to support American farmers and monitor organic crops, and the EPA monitors how GMOs affect the ecology of the area.

The FDA is also responsible for the labels we find on food products, such as Nutrition Facts and ingredients. Although there are strict law in place regarding these labels, the FDA is much more lenient than EU legislation regarding labeling GMOs. For example, the FDA presently does not require the labeling of any food product that contains GMOs. Instead, the FDA has outlined guidelines that companies should follow should they voluntarily wish to start labeling their GM products. Commercialized GM foods in the United States are held to the same standards of labeling requirements by the FDA that apply to any non-GM food.

The reasons behind the FDA's decision include the argument that most GMOs are not significantly different from their organic counterparts. Under FDA

<http://useu.usmission.gov/agri/GMOs.html#New%20EU%20Regulations%20on%20Labeling%20and%20Traceability>. 10 Apr 2006.

[45] "Tougher European GMO legislation." Greenpeace International. <http://www.greenpeace.org>. 2 July 2003.

regulations, food labels must bear a common name (or an appropriate descriptor), and all material facts about the food. For example, if a GMO has different nutritional information, or contains an allergen that is not included in the food's name, it must be included in the label. In this case, even if the product contains GMOs, the FDA does not require the producer to indicate this information on the label.[46]

Another reason for not requiring the labeling of GMOs is that the FDA believes it would be misleading to the consumer to label products with terms that include the word "modified." They argue that most crops have actually been modified in some way, such as through crossbreeding or mutations, and such a label would be inaccurate since it is impossible to guarantee that a crop, either GM or non-GM has not been "modified" in some way. The FDA also states that using the term "biotechnology" in labeling may also be misleading if it implies that food that was not produced using biotechnology is superior to food that was produced using biotechnology.[47]

By analyzing both U.S. and EU regulations, we can see a difference in where each places its importance. While Europe imposes regulations on GMO products so that consumers are aware of which products contain them, the United States government believes that labels claiming to contain GMOs are misleader and may suggest that foods that do not contain GMOs are superior. If companies wish to voluntarily include this information, the FDA has offered guidelines on

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[46] "Guidance for Industry Voluntary Labeling Indicating Whether Foods Have or Have Not Been Developed Using Bioengineering." Draft Guidance. U.S. Department of Health and Human Services. Food and Drug Administration Center for Food Safety and Applied Nutrition. Jan 2001 < http://www.cfsan.fda.gov/~dms/biolabgu.html>. Apr 2005.

how the company may do that. But the United States does not support requirements to label GMOs. It is an interesting comparison though, that the USDA *does* heavily enforce the labeling of organic foods. The "Organic" label can be seen on food products in grocery stores across the country, proclaiming that the product meets all organic standards, and most importantly, does not include GMOs.

The effects of GMO legislation go farther than consumers; it has caused major complications for producers as well. The group most at a disadvantage appears to be U.S. producers of GM food who are subject to Europe's strict regulations on their products in order to sell their goods in European markets. For example, non-GM corn made up only 1% of U.S. corn production in 1999,[48] so how are U.S. corn producers supposed to market the remaining 99% to a Europe that doesn't want their corn? While EU legislation does not prohibit the importation of GM products, its requirements on labeling are sure to turn off many consumers, hurting the U.S. market in Europe.

The fact that many American GM producers are now ending their use of GM crops could be seen as a victory for Europeans. One of the largest U.S. grain producers, A.E. Staley and Archer Daniels Midland (ADM), decided in 1999 to stop using any non-EU approved GM corn in production so as not to lose exports to Europe. The Gerber and Heinz companies also announced in 1999 that their

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[47]Ibid.
[48] "Biotechnology: U.S. Grain Handlers look ahead." Special Article. Economic Research Service/USDA. Agricultural Outlook. Apr 2000.

baby food facilities would cease to include GMOs, and in 2000 Frito-Lay, Inc. announced it would stop using GM corn in its snack food production.[49]

But to American GMO producers, Europe's regulations stand in the way of free trade. In 2003, the United States government filed a complaint against the European Union with the World Trade Organization saying that their labeling requirements and moratoriums on GMOs were illegal barriers to free trade. U.S. producers see GM products as equivalent to non-GM products and thus should not be treated as differently, but as we have seen, the EU sees them as distinctly different and believes consumers should be aware of the differences. The following section will discuss the details and affects of this case.

[49]Ibid.

SECTION 5: THE ROLE OF THE WTO

On May 13, 2003, the United States, Canada, and Argentina, the top three producers of GM food, filed complaints against the European Union and individual national governments over the moratorium placed on GM food since October 1998. The three countries argued that there is not any scientific justification that GM food is dangerous, and the moratorium is an unfair trade barrier against WTO standards. The moratorium meant that no "biotech" products were approved during that period. US farmers have claimed that the moratorium has cost them $300 million per year in lost sales to European non-GM crops. [50] Several states (many of which produce GMOs) have taken interest to the case signed on as consultant third parties, including Australia, Brazil, Canada, Chile, China, Chinese Taipei, Columbia, El Salvador, Honduras, Mexico, New Zealand, Norway, Paraguay, Peru, Thailand, and Uruguay.[51]

In case WT/DS293, the United States argued that the EC had violated its obligations to the WTO with the moratorium. Most specifically, Article 2 of the Agreement on Technical Barriers to Trade which states:

> "Members shall ensure that in respect of technical regulations, products imported from the territory of any Member shall be accorded treatment no less favourable than that accorded to like products of national origin and to like products originating in any other country."[52]

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[50] "Q&A: Trade battle over GM food." BBC News. 8 Feb 2006.
[51] "European Communities-Measures Affecting the Approval and Marketing of Biotech Products." Dispute DS293. The World Trade Organization. 10 Mar 2006.
[52] "Agreement on Technical Barriers to Trade." WTO. 12 Apr. 1994.

The United States is arguing here that the EU has put an unfair technical barrier on GM products imported from the United States. In other words, American-produced GM maize is not given equal treatment to European non-GM maize. The United States, Canada, and Argentina argue that even though the moratorium has been lifted for over a year, the EU is still not properly approving GM products due to import bans on GM products. They want to be sure that the EU is approving GM products based on scientific facts and not political motivations.[53]

The EU has stated that since 2004 and the end of the moratorium, it has introduced two new rules based on GM-approvals. First, GM products are labeled, and second, the EU ensures that any processed products that may contain GMOs are traceable. These rules were put in place to give consumers awareness about the food they eat. Each GM-approval is done on a case-by-case basis as well to insure consumer safety as well as the safety of the environment. Since 2004, the EU has made some effort to allow GM-products, having made 10 GMO approvals. [54]

On February 7, 2006, the WTO issued a preliminary ruling that the EU moratorium was indeed a ban that broke international trade rules. A final ruling will be produced later this year. It will be very interesting to see what the WTO has to say about the entire situation, and how the EU will be held accountable. However, since the European Union has already taken the initiative to lift the moratorium and begun the process of approving and labeling GMOs, I personally doubt that the WTO will require many changes.

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[53] "Europe 'stopped GM food imports.'" BBC News. <http://www.bbc.co.uk>. 7 Feb 2006.
[54] "Q&A: Trade battle over GM food." BBC News. <http://www.bbc.co.uk>. 8 Feb 2006.

SECTION 6: THEORIES AND CONCLUSIONS

Given all of the data in the previous chapters, it is necessary to interpret these facts in terms of their role in international relations today. This can be accomplished by using different theories to develop conclusions about the GMO debate. I will focus on three major theories: Realist, Liberal, and Marxist; and show how each can explain the US-EU debate and what should be done by the important actors involved.

Realism is a popular approach to international relations, especially for national governments because it identifies states as the principle actors. Even though a state is comprised of diverse groups of individuals, the state as a whole is one solitary actor in an international community that exists in a perpetual state of anarchy. This simply means that there is no overarching structure that has authority over national governments to control relations among states. Due to this condition of anarchy, the only main issues that concern realists are national interests such as state sovereignty, national security, and war.

A realist approach to the GMO debate focuses on how GMOs affect the security of the state. Even though Europe is comprised of 25 sovereign states, in this case it acts as one, and that is how it will be treated in this interpretation. According to realist theory, both American and European governments have a national interest to provide food security. This includes both providing enough food for their citizens and guaranteeing the safety of GM food for consumption. Since Europeans did not feel their government was capable of properly monitoring the safety of GMOs, the EU issued a complete moratorium. It was in

the European interest to ban GMOs even though it has hurt trade relations with the United States due to its history of food crises.

It is in the United States' national interest, however, to promote GMOs. Most of its agricultural producers are growing GM crops because they find them more efficient. There is also very little resistance by American consumers to GM food, due mostly because of the lack of awareness of the presence of GM foods in the markets. American consumers appreciate the reduced costs passed to them by the use of GMOs as well. GMOs have enabled American producers to be more competitive and efficient, which benefits both the producers and consumers.

Realism is a useful tool in describing conflictual relations among states. But it cannot explain cooperation among states other than that it may be in a state's national interest to do so in order to accomplish a certain goal. Instead, Liberal theory is a much more useful lens to explain the role of international organizations such as the United Nations and the World Trade Organization in promoting peaceful compromise between the United States and Europe over GMOs.

Liberalism in international relations acknowledges that many interactions between states are not just war and conflict, but though trade. This theory, like Realism, recognizes states as individual actors, but it also recognizes the important role of non-state international organizations, economics, and free and open markets in international relations. Modern liberals argue that conflict is regulated by the stronger interest of states to trade with one another. Establishing

peaceful trade relations benefits all parties involved, and this is important in regulating state behavior because it promotes interdependence.

Since liberalism supports a free-market economy, liberals argue that the EU moratorium is really a form of protectionism that hinders free trade. It also makes it harder for European farmers to stay competitive to American farmers because of the low cost of inputs necessary for GM crops. A liberal lens would suggest that the United States brought the issue to the WTO because the moratorium threatens the exchange of goods in a free market. It also offers the explanation that the future of the political and economic partnership that exists between the US and the EU is not worth jeopardizing because of a disagreement over GMOs, so the US prefers to let the WTO resolve the issue peacefully. In response, the EU has demonstrated its desire for cooperation by ending the moratorium before the WTO's decision has even been announced and has started approving some GMOs in Europe.

Realism explains the tendency of states to act in their own interests, and Liberalism sees states as interdependent with one other though trade, which promotes cooperation through international organizations. The final theory, Marxist theory, is also needed because it addresses the issues of big business and intellectual property rights in the GMO debate. The main assumptions taken by Marxism in international relations are that capitalism dominates international trade, which therefore creates exploitation in order to generate profit.

In the case of GMOs, Marxism critiques companies such as Syngenta, Monsanto, Dow AgroSciences, and DuPont as multi-national corporations

(MNCs). To Marxists, these companies value profit over scientific research that truly tests the safety of GMOs. And since the United States promotes big businesses such as these, the US government agencies (FDA, USDA, EPA) should not be trusted either to provide efficient monitoring of these GMO products. Instead, the United States is concerned with global capitalism. Therefore, these agencies operate on the idea that a product is safe until proven otherwise.[55]

Furthermore, MNCs introduce the issue of intellectual property rights. They are essentially trying to put a patent on nature. This is hypocritical because one of the main arguments of GMO supporters is the potential to help the third world alleviate its hunger problems. But GMO-producing companies have engineered their products to create sterile seeds that cannon be used for another growing season. Farmers are instead forced to buy new seeds each planting season. This establishes a dependence on the company, and what Kelly-Kate Pease has labeled "biocolonialism."[56] Therefore, Marxists call for decreased power of MNCs in influencing the treatment and regulation of GMOs on those with less power.

By considering these perspectives, different aspects of the US-EU debate on GMOs can be analyzed. This is an extremely complex issue that still has yet to be resolved. But the end is near. With its preliminary ruling already announced, the WTO will soon finalize its decision that the European Union did,

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[55] Pease, Kelly-Kate. International Organizations: Perspectives on Governance in the Twenty-First Century. Prentice Hall. New Jersey: 2003. p174.
[56] Ibid.

in fact, violate trade regulations with its moratorium on GMOs, which supports the liberal theory that international trade will promote peaceful cooperation.

While the decision will set an important precedent, it will not change much. Europe has already demonstrated its willingness to cooperate with the United States and has begun approving some types of GMOs. The United States and Europe value the partnership that exists between them.

While I agree with the realist view that every state should act in its own best interest, I support the liberal theory that those interests are best realized today through cooperation rather than confrontation, and that international organizations such as the WTO play an important role in conflict resolution.

In a time of rapid globalization, states can benefit from international cooperation in order to achieve their own goals. For example, the United States enjoyed European support in Afghanistan in 2001. By appealing to the WTO, the United States is sending a message to Europe and to the rest of the world that it favors a fair and peaceful solution to the GMO debate. It is in each region's interest to continue its relationship of peace and cooperation, because they both because they both benefit from it. This may prove to be one of the best recent examples of U.S. diplomacy we have seen. I applaud both the United State's decision to take the case to the WTO, and initiative taken by the European Union to create legislation that allows GMOs safely into its borders and still gives its consumers the choice of purchasing them. In this way, a peaceful solution has been reached and Europe and the United States may continue its friendly partnership.

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