Thousands of years ago, humans were sustained by hunting and gathering activities. However, as the population grew and people gravitated toward life in settlements and eventually cities, humans began to employ agriculture or "*the science, art, or occupation concerned with cultivating land, raising crops, and feeding, breeding, and raising livestock; farming.*"[1] Over the past century, agriculture has been transformed from the use of the horse and plow to modern machinery. Such technology advances can be seen as progress, a natural progression in human evolution and preservation of the species. As the decade of the 1960's approached, the world population was reaching 3 billion, and with it the concerns for food production gave rise to an organized attempt to eliminate famine by improving crop performance. This was known as Green Revolution. In more recent times, the advent and spread of biotechnology (the use of recombinant DNA technology to transfer genetic material from one organism to another) has resulted in Genetically Modified (GM) and Genetically Engineered (GE) crops.[2] Wendell Berry once said that "*How we eat determines to a considerable extent how the world is used*." As we consider his words in the context of life in 2013, we are left to consider not only the moral and philosophical aspects but also the legal and regulatory controls that constrain agricultural activities in our modern society.

In the United States, agricultural products are regulated by 3 key Federal Agencies (FDA, EPA, USDA), which derive their regulations primarily from 11 laws or Acts of Congress. This is shown in Figure 1 below:

[1] Online Dictionary, available at http://dictionary.reference.com/browse/agriculture
[2] Pew Initiative on Food and Biotechnology, Guide to U.S. Regulation of Genetically Modified Food and Agricultural Biotechnology Products, 2001, at 1

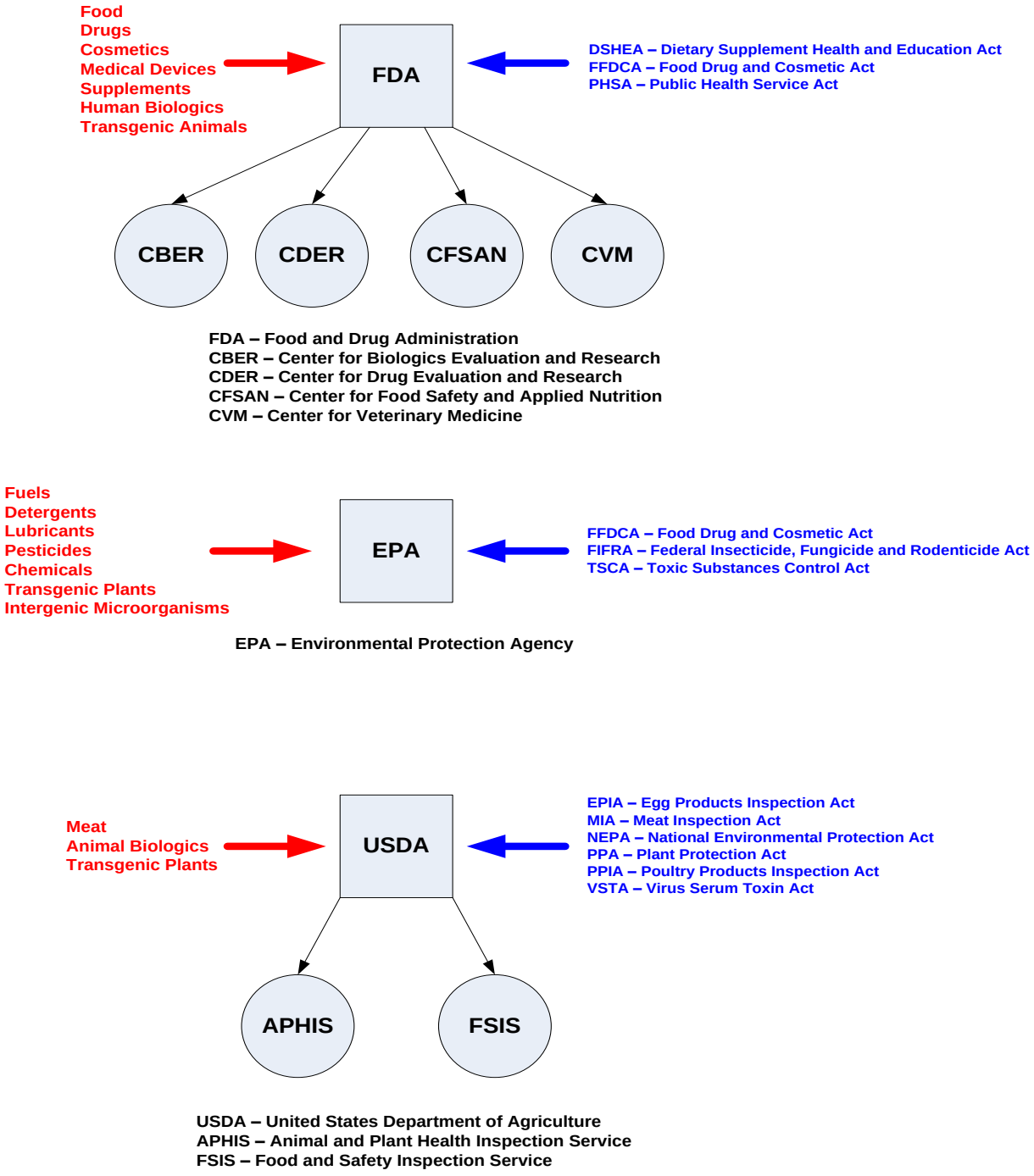

Figure 1: Derived from [3]

[3] Pew Initiative on Food and Biotechnology, Guide to U.S. Regulation of Genetically Modified Food and Agricultural Biotechnology Products, 2001, at 3,4,26

In the United States, as shown in Figure 1, the following laws form the legal basis and regulation of all food products including GM Foods:

1. DSHEA – This law defines supplements as food and not drugs. As such, this law does very little to enforce the regulation of GM Foods.

2. EPIA – This law is found in 21 USC Chapter 15 and addresses the inspection of egg products. Amendments to the Act were proposed in 2012 but not enacted.

3. FFDCA – This is the major Food and Drug Law of the United States. It was enacted in 1938 and is found in 21 USC Chapter 9.

4. FIFRA – This law is codified in 7 USC Section 136 and controls the use of pesticides including their sale and distribution.

5. MIA – This law was created in 1906 and regulates meat production to prevent the sale and distribution of adulterated and misbranded meat.

6. NEPA – This law is codified in 42 USC sections 4321-4347 and was enacted in 1970 to protect the environment or the natural world.

7. PHSA – This law was enacted in 1944 to address broad concerns in public health. It is found in USC Title 42 section 201.

8. PPA – This law is codified in 7 USC Chapter 104 and regulates plant pests and weeds.

9. PPIA – This law was created in 1957 and controls the inspection of domesticated birds that are used in food consumption.

10. TSCA – This law was created to regulate the sale and distribution of newly created commercial chemicals.

11. VSTA – This law was enacted in 1913 and is codified in 21 USC Sections 151-159 to regulate vaccines.

A valid criticism of the United States regulatory framework is that it appears fragmented. As shown previously in Figure 1, responsibility lies in three different regulatory bodies, which might eventually result in some products “falling through the cracks.”

As mentioned previously, recombinant DNA or rDNA technology has resulted in GM agricultural products, which are regulated by the same agencies that produce such products in the conventional way. The rationale lies with the belief that the final product must be evaluated regardless of how it was produced. This regulatory scheme is based on a 1987 report from the National Research Council which concluded the following:

- *"There is no evidence that unique hazards exist either in the use of rDNA techniques or in the movement of genes between unrelated organisms."*
- *"The risks associated with the introduction of rDNA-engineered organisms are the same in kind as those associated with the introduction of unmodified organisms and organisms modified by other methods."*
- *"Assessment of the risks of introducing rDNA engineered organisms into the environment should be based on the nature of the organism and the environment into which it is introduced, not on the method by which it was produced."*[4]

Why has there been a recent push toward GM foods? Since the beginnings of the Green Revolution, the world population has more than doubled. GM foods and crops hold much promise as a means to address the demand for food worldwide. According to [5] the Economic Research Service published data in 1997 that revealed *'a statistically significant relationship between increased crop yields and increased adoption of herbicide- and pesticide-tolerant crop seeds.'* A further study of 377 fields conducted by Iowa State University *'estimated that crops grown from GM seeds yielded 160.4 bushels of Bt corn per field, while crops grown from non-GM seeds yielded 147.7 per field.*' A consideration of the economics involved quickly enables one to deduce that lowering the use of pesticides translates into increased profits (a decrease in the purchase of chemicals yet an increase in crop production). Thus, on the surface, the movement

[4] National Research Council, Genetically Modified Pest-Protected Plants: Science and Regulation, citing Introduction of Recombinant DNA-Engineered Organisms into the Environment: Key Issues, National Academy of Sciences, Washington, D.C. 2000, at 5.
[5] David Kruft, Impacts of Genetically-Modified Crops and Seeds on Farmers, 2001, at 2

toward GM foods seems to be a natural outgrowth of modern technology. For many, the opportunities for improvement are as compelling as the past transition from animal power to machinery.

In addition to efficiencies in production, GM foods hold promise of reducing pesticide use and thus lowering the damage to the natural environment. However, at the same time, concerns have been raised with respect to the negative side of GM food production. The thought of genetic modification causes many people to pause and consider the far reaching safety and ethical concerns. As corporations have pushed forward their agenda to pursue not only research but also the production of GM foods, challenges as to the legal liability of such initiatives have found their way into the court systems of the world.

In Germany, **Karl Heinz Bablok v. Freistaat Bayern** involved honey contamination. Karl Bablok's beehives were located near land where Freistaat Bayern cultivated GM transgenic maize MON 810 for research. In 2005, MON 810 was detected in Bablok's honey through maize pollen, prompting legal action claiming genetic modification, which entitled Bablok to compensation. The Adminstrative Court of Augsburg ruled the honey was subject to Article 4(2) of Regulation EC No 1829/2002 requiring authorization for GM food. This meant the honey could not be legally marketed. The court ruled that the law was applicable even though this was not an intentional act on the part of Freistaat Bayern.

In Australia, organic farmer Steve Marsh lost his organic certification from the National Association for Sustainable Agriculture (NASAA) when seventy percent of his crops had been contaminated with GM canola. The canola is a Roundup Ready GM crop that is resistant to the pesticide Roundup from Monsanto. At the present time, Marsh is being represented pro bono by

Slater and Gordon Solicitors. An effort is underway by the Safe Food Foundation to raise funds to support the legal case. [6]

In India, The Supreme Court appointed a panel of experts to analyze GM crops. In late 2012, the Court placed a 10-year moratorium on GM crop trials and research. This has proved to be a very controversial decision given India's population growth and the general concern for future food production in that country.

Issues involving GM foods have in recent years been heard in the United Sates Supreme Court. In **Monsanto v. Geerston Seed Farms, 09-475**, Monsanto appealed to the Supreme Court for relief to a ban of their GM alfalfa. The legal issue arose when the Animal and Plant Health Inspection Service (APHIS), decided to deregulate a variety of Monsanto's genetically engineered alfalfa known as Roundup Ready Alfalfa (RRA), which was tolerant of the herbicide Roundup. In doing so, a District Court held that APHIS had violated the National Environmental Policy Act of 1969 (NEPA), by issuing deregulation without preparing an environmental impact statement (EIS). As a result, a District Court rejected the deregulation and prohibited further planting of the alfalfa. In the appeal, Monsanto acknowledged the NEPA violation but challenged the injunction of the District Court. In determining the validity of the District Court's decisions, the Supreme Court submitted a four-factor test and ultimately found that the lower court's decisions did not satisfy the test with respect to deregulation or the nationwide injunction against planting RRA. Thus, the Supreme Court reversed the judgment of the District Court.

Monsanto v. Geerston Seed Farms is an important decision in many respects. Not only did it establish precedent, but also sided with the government agency charged with the oversight. Per

[6] Green Left, Organic farmer lodges court case against GM contamination, April 4, 2012, at 1

the Plant Protection Act (PPA), the Secretary of the United States Department of Agriculture (USDA) by means of APHIS, has the authority to issue regulations related to genetically engineered plants. Although an EIS was not prepared, APHIS did publish a notice in the Federal Register and following many published comments to the notice, ultimately assessed that there was no significant environmental impact.

At the present time, another Supreme Court case involving the intellectual property rights of GM foods is being discussed and debated in **Bowman v. Monsanto.** This case arose when Indiana farmer Vernon Bowman purchased grain from a local grain elevator that is legally supposed to be used for non-planting purposes. The grain had been mixed with Monsanto's Roundup (herbicide or weed-killer) resistant seeds, engineered to allow farmers to kill weeds without damaging their soybean crops. Bowman harvested his crop, and after determining it was Roundup resistant, he saved the grain to plant another crop of soybeans the following year. By doing this, Bowman avoided purchasing the seeds directly from Monsanto, which subsequently claimed patent infringement. The issue before the Court is patent exhaustion which limits how much control patent holders can maintain after an item is sold. Bowman contends that Monsanto can't claim patent rights for seeds that were not purchased by him, hence relieving him of any licensing arrangements. At stake in the Court's decision is a precedent for the reach of intellectual property rights, and ultimately control over the food supply.

Yet, such cases have also been fought outside of the United States. **Bowman v. Monsanto** resembles the Canadian Supreme Court case **Monsanto Canada Inc. v. Schmeiser** which happened in 2004. The question before the court again was patent rights, this time involving Roundup Ready Canola. Percy Schmeiser had knowingly used the seed from a field which had

been the recipient of pollen blown from another nearby filed planted with Monsanto seed. The Court ruled in favor of Monsanto and held Schmeiser liable for patent infringement.

While some cases are fought over patent infringement, others involve personal injury. In France, **Paul Francois v. Monsanto** was a landmark case that found Monsanto liable for damages to Francois's personal health after he accidently inhaled Lasso, another one of Monsanto's pesticides in the Roundup Ready line of products. The ruling concluded that Monsanto had insufficient labeling warning of the dangers of the product.

These many legal battles are culminations of dramatic changes in agricultural farming that have their roots only 80 years in the past. The table below is a summary of some of the most significant events concerning genetic engineering and genetic modification since 1935:

Date	Event
1935	DNA discovered by Russian Scientist Belozersky
1973	Recombinant DNA created or rDNA at Stanford University
1975	Asilomar Conference convened to create guidelines for sale of GM foods
1980	First Genetically Modified Organism Patent awarded
1982	FDA approves Humulin, insulin produced by genetic engineering
1994	GM foods begin appearing in grocery stores
1996	GM resistant weeds discovered in Australia
1997	Mandatory Labeling in Europe
1999	100 million acres of GM crops worldwide
2003	GM resistant pests found in cotton crops in southern United States
2011	Bt toxins found in the blood of pregnant women with evidence of fetus tranference
2012	French farmer Paul Francois sues Monsanto over exposure to Lasso (Roundup Ready product) and wins
2014	Monsanto's patent on Roundup Ready line of GM seeds will end

Table Derived from [7]

[7] GL Woolsey, GMO Timeline: A History of Genetically Modified Foods, RosebudMag.com, 2012, at 1

Interestingly, while GM crop production is on the increase, so is the demand for organic food, an alternative to chemical based agriculture. "*Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved." [8]*

The Center for Food Safety reports the following key statistics related to organic agriculture: [9]

1. *$31.4 billion in organic product retail sales in 2011*
2. *30-fold increase in organic product retail sales since the passage of OFPA in 1990*
3. *11.6% of organic food market comprised of fruits and vegetables*
4. *9.5% organic food sales growth in 2011*
5. *19% compounded annual growth for organic food sales 1997 –2008*
6. *20,000 organic farms*
7. *3,700 organic farms in California – the highest number of any state*
8. *527,000 jobs created by the organic food industry in 2010 – a 21 % higher rate than conventional food industry*

The increase in interest over organic foods reveals that many people are concerned about the future of agriculture and are appealing to a different model of production. Yet, at the same time, some major organic producers appear to be surrendering to corporate giants such as Monsanto in light of recent court decisions. In fact, Whole Foods Market released a statement on January 21, 2011 which said*: "The policy set for GE alfalfa will most likely guide policies for other GE crops as well. True coexistence is a must."* While some may consider this practical, others view the compromise as "selling out." According to Cummings, *"2/3 of Whole Foods Market's $9*

[8] Online Home Page, available at: www.ifoam.org
[9] Center for For Food Safety, available at: http://www.centerforfoodsafety.org/campaign/organic-and-beyond

billion annual sales is derived from so-called natural processed foods and animal products that are contaminated with Genetically Modified Organisms (GMOs)."[10] Thus, a coexistence compromise stems, in part, from the fact that GM labeling is not required in the United States.

In contrast, GM labeling is required in numerous countries outside of the United States. For instance, the European Union REGULATION (EC) No 1830/2003 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 September 2003 says in part, *"It is necessary to ensure that consumers are fully and reliably informed about GMOs and the products, foods and feed produced therefrom, so as to allow them to make an informed choice of product."* Moreover, REGULATION (EC) No 1829/2003 further states that the law "*ensures that relevant information concerning any genetic modification is available at each stage of the placing on the market of GMOs and food and feed produced therefrom and should thereby facilitate accurate labeling."* Japan ratified a 5% labeling threshold, meaning only products with less than 5% GM can be labeled GM-free. Australia and New Zealand ratified a 1% GM law which states that food with greater than 1% GM must be labeled. Additional labeling laws have been ratified in many parts of Central and South America as well as the Middle East and Africa. [11] Despite the fact that the United States appears to be lagging the world in requiring GM food labeling, there have many grass root movements pushing the agenda forward. In the recent November 2012 elections, Prop 37 (a citizens' ballot that proposed labeling on GE foods in California) lost by a narrow margin of 48.6% to 51.4%. [12]

[10] Ronnie Cummings, The Organic Elite Surrenders to Monsanto: What Now?, Organic Consumers Association, January 27, 2011, available at: http://www.organicconsumers.org/articles/article_22449.cfm
[11] The Center for Food Safety, Genetically Engineered Crops and Foods: Worldwide Regulation and Prohibition, June 2006, at 1-20
[12] Ronnie Cummins, In 2013, Our Fight Against GMO Food Continues, Common Dreams, January 3, 2013, available at: https://www.commondreams.org/view/2013/01/03-9

In addition to labeling requirements for GM food, many countries have instituted liability laws and bans as follows: [13]

Liability Laws: Nigeria, China, Denmark, Germany, Norway, Switzerland

Ban or Moratorium on Commercialization: Algeria, Benin, Uganda, Zambia, Saudi Arabia, Thailand, European Union, Albania, Austria, Bulgaria, Croatia, France, Georgia, Germany, Greece, Hungary, Italy, Luxembourg, Norway, Romania, Spain, Switzerland, El Salvador, Mexico, New Zealand, Bolivia, Brazil, Chile, Venezuela

Ban on Imports: Algeria, Angola, Benin, Ghana, Malawi, Mozambique, Namibia, Nigeria, South Africa, Zambia, Zimbabwe, India, Saudi Arabia, Sri Lanka, Thailand, European Union, Albania, Austria, France Georgia, Germany, Greece, Hungary, Luxembourg, Poland, New Zealand, Brazil, Ecuador

When examining the topic of GM foods from a worldwide perspective, it soon becomes apparent that some countries are out in front of the United States in expressing concerns. In Western Europe, for example, there is much opposition, which has halted continued progress in GM development in many regions. Interestingly, opposition seems to arise in places where there is an abundance of food and higher income families. In other words, people can afford to be skeptical and even critical of technological advances in agriculture in some places more than others. From a purely cost/benefit ratio, developing countries are generally in favor of ways to increase agricultural productivity. Yet, as shown in the above listings, liability laws and bans exist in many countries one might not expect. Considering both the economics and ethics becomes even more complicated when considering the impact on global agricultural trade. With different

[13] The Center for Food Safety, Genetically Engineered Crops and Foods: Worldwide Regulation and Prohibition, June 2006, at 1-20

countries implementing different laws and regulatory schemes, it becomes challenging to manage trade fairness. In fact, the Cartagena Protocol on Biosafety is a big contributor to the increased concerns of future trade disputes; it received its 50 signers in May, 2003 and was ratified. This Protocol basically allows each country to have not only its own regulations, but additionally allows each country to decide what GM products it will import. Even more, the Cartagena Protocol states that lack of scientific evidence of the adverse effects of GM food on human health should not prevent a country from taking action to restrict GM food imports.

At the center of the tempest is the World Trade Organization (WTO) whose mission is to reduce the barriers to international trade. In the absence of an agreed upon core international standard for GM products, the Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) agreements help to alleviate trade bias against GM products. Basically, these agreements allow trade restrictions to protect human, animal, and plant life and the environment but encourage the use of applicable international standards and guidelines that may exist. Further, SPS states that countries cannot apply a higher standard than what is present in an international guideline unless there is a valid risk based on scientific assessment. While TBT is more lenient and flexible, the intent of both agreements is to align countries with international interests at stake. [14]

While the legislative and regulatory process in the United States has been slow to address GM concerns such as labeling, liability law, and bans, judicial cases have continued to be fought in other related areas of concern. In **Johnson v. Paynesville Co-op**, the state of Minnesota

[14] Kym Anderson and Chantal Pohl Nielsen, GMOs, Food Safety and the Environment: What Role for the Trade Policy and the WTO?, 2003, at 5,6

Supreme Court deliberated two issues, namely: 1) can drift from pesticide application be considered as trespassing against nearby organic farms? 2) what is the meaning of federal regulations for organic farming as it relates to the application of pesticides? Johnson sued the Paynesville Co-op for pesticide drift contamination of soybean plants which were contaminated due to the application of herbicides and lost organic certification per 7 C.F.R. Section 205.681. Organic Foods are addressed in the Organic Foods Production Act (OFPA) found in 7 U.S.C. sections 6501-6523 and in the National Organic Program (NOP) found in 7 C.F.R. Section 205. Under OFPA, foods labeled as organic must be certified as such and must comply with NOP to gain certification. 7 C.F.R. Section 205.202 (b) says in part that land producing organic crops must "*have no prohibited substances applied to it for a period of 3 years immediately preceding harvest of the crop."*

Following a dismissal, Johnson appealed and was granted a summary judgment based on a new Minnesota intentional tort which re-defined trespass action and held that it can arise from pesticide overspray directed to another agricultural property. However, the Minnesota Supreme Court eventually held that pesticide drift was negligence, but not trespass. Moreover, the Minnesota Supreme Court held that 7 C.F.R. Section 205.202 (b) regulates the organic farmer and not the actions of third parties. The Court also limited the negligence claims allowing no recovery for the loss of organic certification or loss of the organic label on the crops that were drifted on. This was a major defeat for organic farmers in Minnesota and in many ways defines the plight of the organic farmer.

In the face of growing concern over GM foods, one naturally wonders whether organic agriculture is the solution. Hence, we many consider the following questions: If the organic

brand is controlled by major corporations, how would production be different than conventional agriculture? Is organic cost-effective, especially when it comes to sustaining the rate of population growth? How is organic food regulated and how does this impact quality and cost?

For many, organic farms are associated with small farms. While there is a definite appeal to this model, it's probably not very cost effective. Efficiency general comes when farming happens on a larger scale. In the article "The Problem With Organic Food" [15] the author presents an example of such inefficiency with respect to food miles as follows: *"The concept of "food miles"—the idea that consumers should think about the distance their food travels to get to them—has acquired some cachet. The implication is that the number of food miles reflects the environmental cost of transportation. However, because of economies of scale, industrial agriculture captures efficiencies in transportation that small farms do not, so not every food mile is equally efficient. If you drive to your local farmers' market to buy a few items from a farmer who has driven a truck several hours to be there, the number of food miles is relatively small; but compared to conventional agricultural products, the efficiency of each food mile is much lower."*

But, what happens when organic is done on a large scale? In some cases it seems compromises are made that challenge the way one might think of organic farming. For example, when the company Horizon bought out the Organic Cow brand of milk, the labeling changed to "ultra pasteurized". This process subjects the milk to high temperatures which extends the freshness date to allow transport over long distances. However, this process also kills many vitamins and enzymes and some contend that it renders the milk to the same or less nutritional value as

[15] Abigail Haddad, The Problem With Organic Food, June 10, 2008, available at: http://www.american.com/archive/2008/june-06-08/the-problem-with-organic-food

conventional pasteurized milk. [16] In order to mass produce food inexpensively, there may be a tendency for organic practices to adopt what is being done in conventional farming. In fact, the evidence indicates that this has already occurred in some cases, prompting articles that attempt to dispel myths surrounding organic farming. For example, in [17] the following "organic myths" are presented:

- Organic farms don't use pesticides
- Organic foods are healthier
- Organic farming is better for the environment

Initially, much of the early development of organic standards arose from an interaction between producers and consumers in the private sector. Over time and the development of longer and extended supply chains, more rigorous standards and quality systems were formed. The first European Regulation EEC 2092/91 was created in 1991, followed by EEC 2078/92 which introduced further support options. Today, organic food in the European Union is under EC/834/2007, which is the European Council Regulations.[18] In the United States organic farming is under the jurisdiction of the FDA and particularly the USDA, the same as conventional agriculture. Of course, each country throughout the world is different, which adds complexity to importing food. One solution to address this worldwide need is the International Federation of Organic Agriculture Movements (IFOAM). IFOAM's Organic Guarantee System (OGS) is designed to a) facilitate the development of organic standards and third-party certification worldwide, and to b) provide an international guarantee of these standards and

[16] Abigail Haddad, The Problem With Organic Food, June 10, 2008, available at: http://www.american.com/archive/2008/june-06-08/the-problem-with-organic-food
[17] Christie Wilcox, Mythbusting 101: Organic Farming, Scientific American, July 18, 2011, available at: http://blogs.scientificamerican.com/science-sushi/2011/07/18/mythbusting-101-organic-farming-conventional-agriculture/
[18] International Federation of Organic Agriculture Movements EU Group, Organic Food and Farming, 2010

organic certification. [19] There are presently IFOAM affiliates in 120 countries. In a nutshell, the mission is to unite the organic world.

Humans have certainly made much progress in the field of agriculture in recent decades. Following the Green Revolution, retrospection has led many to criticize this introduction of the modern technology path to greater food production. While many see this as a great achievement, others form an opposing position based on a philosophical perspective. For example, the Green Revolution increased the food supply, which some argue has been a contributing factor in a worldwide surge in population growth. The same technology that solves many perceived problems in turns appears to create others. The recent advent of genetically modified foods has ushered in a new "Green Revolution," yet with it comes many concerns and questions. These issues are now being played out in the world's judicial systems, which are now setting precedent for the coming generations. In addition to the judicial concerns, the evidence reveals that the regulations of the world's food supply are truly complex and diverse. Without an international standard in place, the quality of GM and organic foods can vary despite attempts at labeling. Hence, not all such foods may be created equal.

Forecasting the future of agricultural production is difficult. However, by employing a model of learning from the past it seems evident that progress will continue as demands upon our civilization are made. The uncertainty revolves around the unknown since we have now crossed a threshold into unchartered territory when it comes to the long term effects of tampering with the inherent genetic traits given by the natural world. Moreover, while a healthy debate continues in judicial forums, perhaps it may be best to remain open minded with respect to both GM and

[19] Online Home Page, available at: www.ifoam.org

organic foods. Instead of taking sides in opposition, perhaps there is wisdom in finding common ground and looking for ways of learning from each approach. In [20] Christie Wilcox recommends the following balanced perspective:

"As far as I'm concerned, the biggest myth when it comes to organic farming is that you have to choose sides. Guess what? ***You don't.*** *You can appreciate the upsides of rotating crops* and *how GMOs might improve output and nutrition. You, the wise and intelligent consumer, don't have to buy into either side's propaganda and polarize to one end or another. You can, instead, be somewhere along the spectrum, and encourage both ends to listen up and work together to improve our global food resources and act sustainably."*

Regardless of where one might stand on the many debates, whether GM vs. organic, or GM manufacturers vs. farmers, etc., we all need food to survive. To that end, one can only hope that scientists, researchers, farmers, consumers, legislators, lawyers, and regulators can co-exist and work together to solve the many issues that will continue to confront food production in the modern world.

[20] Christie Wilcox, Mythbusting 101: Organic Farming, Scientific American, July 18, 2011, available at: http://blogs.scientificamerican.com/science-sushi/2011/07/18/mythbusting-101-organic-farming-conventional-agriculture/