

**Spring 2008  
Industry Study**

**Final Report  
*Agribusiness Industry***

**A Perfect Storm:  
The Dynamics Confronting  
U.S. Agribusiness**



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## AGRIBUSINESS 2008

**ABSTRACT:** Of the countless challenges facing a modern nation-state, two of its most fundamental obligations are to feed its people and to protect them. In the United States today, there is a clear convergence between these fundamental tasks. Linked by a series of converging forces, the long-standing imperatives of sustaining and safeguarding people have become more closely coupled than at any time in history. The U.S. agribusiness industry, a vast and technologically-advanced enterprise, is the secret behind America's ability to feed its own people, and indeed much of the world. Across the U.S., agriculture-related businesses generate more than 13 percent of U.S. Gross Domestic Product (GDP) and employ more than 18 percent of its workforce. Moreover, American agriculture plays a pivotal role in global security, exporting about 30% of its production and providing the basis for food aid around the world. Thus far, American consumers have been largely insulated from the food crises and resulting political unrest that are sweeping aside governments and causing riots around the globe: as a percentage of income, Americans still pay less for their food than the citizens of most other countries. However, a series of converging forces have led to sharp increases in domestic commodity and food prices and continue to apply cost pressures across the agricultural value chain. Those forces include increased global demand, changing diets, pressures on the basics of production (land, water, and fuel), climate change, and security and food safety concerns. Additionally, several U.S. policies are notable for their own distorting impacts on domestic and international markets – namely, the U.S. farm, ethanol, and food aid policies. These policies, along with other dynamics beginning to affect America's food industry, demand prudent steps by U.S. leaders in order to secure recent economic gains and avoid the food-related catastrophes plaguing other countries. Both the U.S. political system and the nature of the industry itself, with millions of disparate members, regulators, and consumers, guarantee that developing new and effective policies will be challenging.

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## PLACES VISITED

### DOMESTIC

West Kern Farm Equipment, Buttonwillow, CA  
 Wegis Ranch, Bakersfield, CA  
 Kern County Water Agency, Bakersfield, CA  
 Benden Farms, Colusa, CA  
 Sacramento River State Park, Colusa, CA  
 Premier Mushroom Growing and Processing, Colusa, CA  
 Indian Harvest Specialty Foods, Colusa, CA  
 Randolph Farms, Delano, CA  
 US Foodservice Distribution Center, Livermore, CA  
 Stamoules Produce, Mendota, CA  
 Paramount Exports, Oakland, CA  
 American President Lines / Port Security, Oakland, CA  
 SYSCO/BSCC Produce, Salinas, CA  
 Mann Packing, Salinas, CA  
 Duda Farms, Salinas, CA  
 Taylor Farms Processing, Salinas, CA  
 Chandler Farms, Selma, CA  
 Huffman and Hawbaker Farms, Tippecanoe County, IN  
 Purdue University, College of Agriculture, West Lafayette, IN  
 Purdue Agronomy and Animal Sciences Farm, West Lafayette, IN  
 Remington Seeds, Remington, IN  
 US Department of Agriculture, Agricultural Research Service, Beltsville, MD  
 Developmental Alternatives, Inc., Bethesda, MD  
 Clagett Farm, Upper Marlboro, MD  
 Campbell Soups, Camden, NJ  
 Penn State Research and Extension Center, Adams County, PA  
 Mason/Dixon Farms, Gettysburg, PA  
 Bear Mountain Packing, Aspers, PA  
 Utz Food Processing, Hanover, PA  
 Smithfield Meat Processing Plant, Smithfield, VA  
 Gadino Vineyards, Washington, VA  
 Needham Farms, Washington, VA  
 Office of the US Trade Representative, Washington, DC  
 USDA Chief of Staff, Washington, DC  
 Senate Agricultural Committee Staff Members, Washington, DC

### INTERNATIONAL TRAVEL

Yangling Agriculture Development Zone, Yangling, Shaanxi Province, China  
 Clone Goats Base, Yangling, Shaanxi Province, China  
 Chuan Kou Village, Yangling, Shaanxi Province, China  
 Caotan Farm, Yangling, Shaanxi Province, China  
 No. 5 Dairy Farm, Yangling, Shaanxi Province, China  
 Chaucer Foods Company, Qingdao, China  
 Shauguog Market, Shauguog, China  
 Wang's Farm, Mr. Wang Jin, Jiaozhou, China  
 Sino Analytica Food Residue Analysis Lab, Qingdao, China

## **Introduction: A Turbulent and Unsettling Year**

Events of the past year have challenged American assumptions about cheap food and generally free movement of goods among nations. Commodity prices have spiked, food prices have risen sharply, and food riots or strikes have erupted in more than a dozen countries. From Argentina to Uzbekistan, hungry people and angry farmers have taken to the streets in desperation, demanding governmental action. Political instability, triggered by food scarcity and prices, has ignited resentment rooted in long-standing inequities within and among nations. The Haitian government collapsed; Malaysia's faltered. Hoping to avoid a similar fate, governments have taken steps to stabilize domestic food supplies and control prices, in most cases turning to trade-distorting tools such as food subsidies or export tariffs. The turmoil triggered by increasing food prices has thus reached from individual consumers around the world, to affect the stability of states and the structure of the international trade system.

This global turmoil stands in stark contrast with the state of the United States farm economy, which is expected to achieve record profitability in 2008. Agricultural cash receipts are projected to reach \$313.2 billion – up 10 percent from 2007 – and the aggregate value of U.S. farms is projected to reach a record \$2.51 trillion.<sup>1</sup> However, the close interaction between U.S. agribusiness and a score of other industries, as well as with global trading partners, makes it nearly impossible to insulate Americans from the international unrest, climbing prices, and elevated trade restrictions that are sweeping the world. As we will see, the U.S. food industry, while healthy by many financial measures, is nonetheless undergoing significant change, driven by many of the same pressures creating turbulence worldwide.

### **Definition of the Industry**

America's complex engine for feeding its people is the U.S. agribusiness industry. While that term may evoke simple images of farming, the modern agribusiness industry is remarkably complex. The catchphrase "from farm to fork," which once sufficed as a shorthand description of the industry, is now woefully inadequate. This definition from the U.S. Department of Agriculture (USDA) captures the industry's breadth and complexity more completely: "All economic activity that supports farm production and the conversion of raw farm products to consumable goods – for example, machinery repair, fertilizer production, farming itself, food processing and manufacturing, transportation, wholesale and retail trade, distribution of food and apparel, and eating establishments."<sup>2</sup>

### **Defining Characteristics**

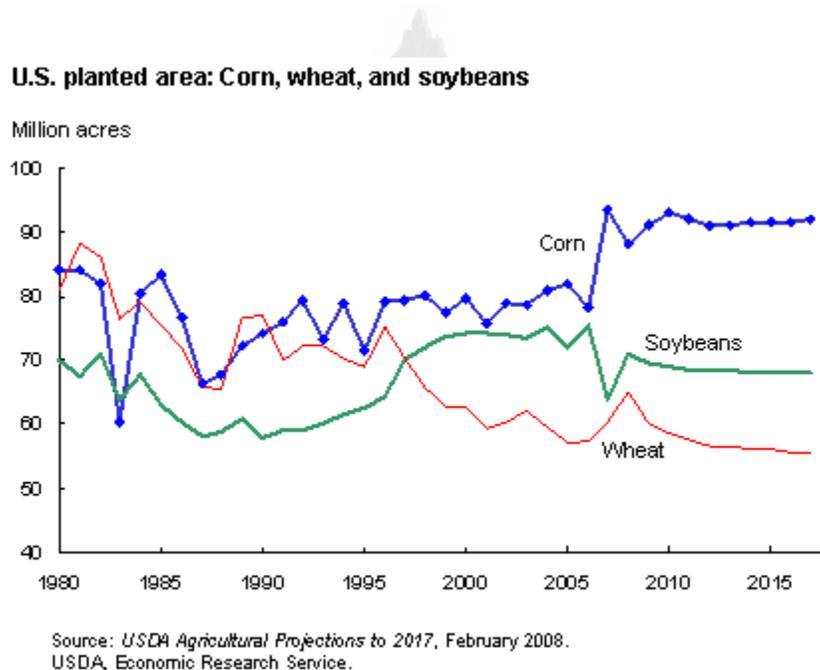
#### **Vast and Complex**

Collectively, agriculture-related businesses comprise a substantial part of the U.S. economy, generating more than \$1 trillion in economic activity annually and employing more than 10 million people<sup>3</sup> – that is, more than 13 percent of U.S. Gross Domestic Product (GDP) and more than 18 percent of its workforce.<sup>4</sup> A few additional figures provide an idea of this industry's vast scale: more than 2.1 million farms sell food inputs to over 25,000 food and beverage processors, who in turn sell processed and packaged products to over 32,000 wholesalers, 112,000 food and beverage retailers, and 377,000 food service companies. The

resulting food and beverages are distributed to over 111 million U.S. households,<sup>5</sup> not to mention millions of overseas consumers of U.S. exports or food aid.

U.S. agriculture is closely intertwined with numerous other industries, such as the ethanol industry, which relies heavily on corn as “feedstock” for ethanol production. The 2007 Energy Independence and Security Act (EISA) drew these industries even closer, through a greatly expanded mandate to blend corn-based ethanol with gasoline, from 4.7 billion gallons of ethanol in 2007 to 9 billion in 2008 and 15 billion by 2015.<sup>6</sup> This requirement has sharply increased demand for corn, pushing corn prices higher. As farmers diverted crop land from crops like soybeans or wheat to corn, prices for other commodities have also risen. Figure 1 shows the sharp rise in corn production in 2007/2008 and the commensurate drop in soybean and wheat production.

In 2008, corn sales alone are expected to reach a record \$48 billion. Aided by high commodity prices, overall crop sales are expected to exceed \$174 billion, the highest figure ever recorded for U.S. crops.<sup>7</sup>



**Figure 1**

## Concentration and Integration

While 2.1 million farms may sound like a large number, that figure has actually decreased by 63 percent since 1900, as farming itself has undergone a profound transformation. In the early 20<sup>th</sup> century, close to half the U.S. work force labored on a large number of small, diversified farms. But those labor-intensive farming operations have given way to a smaller number of large 21<sup>st</sup> century farms, which tend to be intensely mechanized and highly productive. Average farm size has risen 67 percent as land holdings have become concentrated among a smaller group of owners, and farms have become more specialized, from about five

commodities per farm in 1900 to about one per farm in 2000.<sup>8</sup> A phenomenon of “vacating the middle” has taken place, in which farms that remain are either very large operations, with a national or global consumer base, or small-scale operations that market niche-type foods directly to local consumers. This trend has been working for decades, and it seems likely to accelerate, driven by increasing fuel prices, concern for food safety and security, the structure of American farm policy, and the spiraling increase in input costs across the board.

As farms have consolidated, significant horizontal and vertical integration has also been observed elsewhere in the industry. For example, the three largest agrochemical producers – Bayer Crop Science, Syngenta, and BASF – now control about half the *global* market share of farming inputs like seeds and fertilizer.<sup>9</sup> The beef packing industry provides an even more profound example: gone are the days when rural or small town Americans can buy meat from local meatpackers who process local cows, pigs, and poultry. Today, Americans and global markets receive their beef products from a highly-concentrated industry with four packers: Tyson, Cargill, Swift & Co., and the National Beef Packing Co., who represent 83.5 percent of the U.S. market and collectively process over 90,000 head of cattle a day.<sup>10</sup>

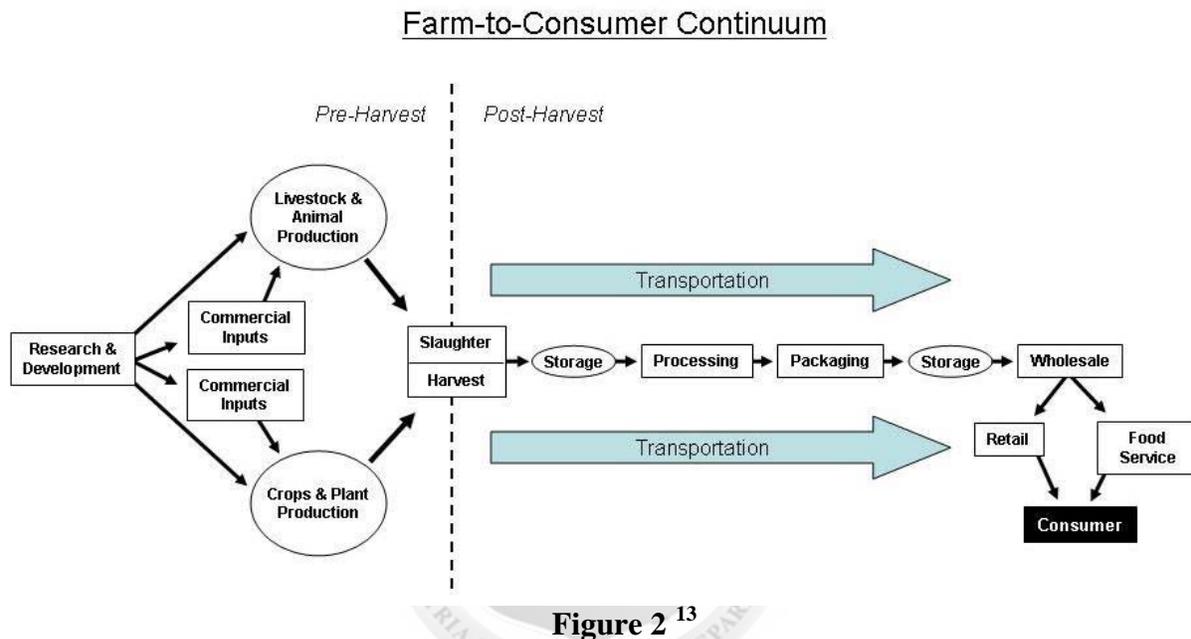
This consolidation has created a tendency toward larger feedlots in fewer states and an industry that is increasingly dependent on cheap, unskilled immigrant labor. Consolidation has provided tremendous economies in terms of purchasing grain and feeder cattle, utilizing labor, processing feed, and marketing fed cattle.<sup>11</sup> A key element of the beef packing industry is its vertically-integrated value chain. A typical meatpacker is vertically integrated across cow and calf ranching operations, feeder cattle suppliers, feedlot operations, meatpacking, and final product distribution. In every area, the meat packer’s goal is to ensure product availability, quality, and quantity, allowing the packing plants to provide a steady, reliable stream of products to consumers. Vertical integration allows changes driven by consumer demand to be developed, tested, and incorporated quickly without disrupting the flow of products, thus reducing risks associated with rapidly changing markets and food trends.

One down side to consolidation is that certain practices associated with consolidation increase risks to the food supply. For example, the current practice of enclosing huge numbers of livestock in consolidated feedlots poses a significant threat to both domestic and international markets, because of the ease and speed with which disease can spread. In an environment in which a single sick animal can destroy a market, feedlot operators must take particular care to protect the animals from communicable disease. The results of a failure to do so can easily be extrapolated from the 2003 case in which Japan halted all U.S. beef imports after the discovery of *one* cow infected with Bovine Spongiform Encephalopathy (BSE) or “mad cow disease.” At the time, Japan was the top U.S. beef importer, having bought 240,000 tons valued at \$1.4 billion in 2003.<sup>12</sup>

Nevertheless, food safety remains one of the strongest arguments in favor of integration and consolidation, because tightly-integrated, habitual relationships with value chain members can allow meat packers to trace contaminants to the source and to take appropriate actions quickly. Increasing public concern about food safety is likely to encourage further integration and consolidation. Similarly, rapidly-increasing transportation costs will tend to accelerate adoption of practices – like consolidation or integration – that allow food chain members to take advantage of economies of scale and consolidated locations.

## Interdependence

While concentration and integration may have reduced the numbers of farms or businesses, U.S. agribusiness nevertheless remains a complex industry. The process of converting inputs to food and getting that food to consumers still involves a high degree of interdependence, both within the industry and among other industries. Figure 2 shows an example of the multiple transitions agricultural products undergo on the journey from farm or ranch to consumer.



If one mentally overlays these representative steps with the figures mentioned earlier – 2.1 million farms and so on – one begins to comprehend the complexities created by the interplay of countless nodes and connections internal to the U.S. food chain.

The industry's close ties with, and heavy dependence on, other industries adds further complexity to managing the nation's food supply. In Homeland Security Presidential Directive (HSPD) 7, President Bush identified seventeen critical infrastructures or industries that "provide the essential services that underpin American society."<sup>14</sup> A review of the list, shown in Figure 3, reveals that agribusiness relies on or interacts with most of the seventeen listed. The most obvious, perhaps, are water, energy, and transportation, but banking and finance and other sectors also play important roles. The Department of Homeland Security (DHS) Office of Health Affairs, with only slight exaggeration, says agriculture and food is "the only sector that must plan for disruption from all other sectors as part of its protection and defense strategies."<sup>15</sup>

The remarkably close ties between agribusiness and other industries of national significance highlights the central role agribusiness fills for the nation. But those ties also mean policies or crises in other industries can impact the nation's ability to grow food and feed its people. Scores of agencies, including some only remotely connected to agriculture, have the authority to make decisions that ultimately impact U.S. agribusiness. Worse, there is no central authority to plan, evaluate, or mitigate those impacts; no person or organization has the ability to control or orchestrate the millions of disparate actors who directly or indirectly influence the U.S. food chain.

| <b>Critical Infrastructure and Key Resources</b> <sup>16</sup> |                                       |
|--|---------------------------------------|
| Agriculture and Food   | Government Facilities                 |
| Banking and Finance  | Information Technology                |
| Chemical   | National Monuments and Icons          |
| Commercial Facilities  | Nuclear Reactors, Materials and Waste |
| Communications   | Postal and Shipping                   |
| Dams   | Public Health and Healthcare          |
| Defense Industrial Base  | Transportation Systems                |
| Emergency Services   | Water                                 |
| Energy   |                                       |

**Figure 3**

### **Dynamics of Change**

Having established a general idea of the scope and complexity of U.S. agribusiness, we turn now to a look at powerful forces that are driving further changes in the food industry. These dynamics have created a perfect storm that is already wreaking significant economic and political damage in many countries. Thus far, Americans have been affected to a much lesser extent. Prudent steps by U.S. leaders will help secure recent economic gains while avoiding the food-related catastrophes plaguing other countries.

#### **Global Demand**

One of the most obvious pressures on food supply is global population growth, which adds about 80 million more consumers of food each year, worldwide. In combination with other pressures, such as competition for arable land, water, and fossil fuels, adequately nourishing the planet's inhabitants is becoming increasingly difficult.<sup>17</sup> Overall, world food stocks have fallen as nations try to keep pace with population growth. In fact, in five of the last six years, the global population has consumed significantly more grain than farmers produced. Global stocks, which comprised 128 days of food in 1987, have fallen to just 53 today.<sup>18</sup>

The impact of population growth is worsened by the fact that it varies greatly among nations and does not correspond with the distribution of natural resources needed to produce food.<sup>19</sup> For example, countries with the top ten population growth rates include Liberia (4.83 percent), Burundi (3.59 percent), Uganda (3.57 percent), and the Democratic Republic of the Congo (3.39), none of which even approach agricultural self-sufficiency. In contrast, the U.S. ranks 131<sup>st</sup>, with a population growth of 0.89 percent.<sup>20</sup>

Researchers acknowledge that unequal distribution of resources within and among countries has historically played a major role in mass migrations.<sup>21</sup> To the extent that global population growth, particularly in areas that are unstable and lack sufficient food, triggers large-scale movement in search of food and opportunities, that population growth will do more than pressure food supplies: it will raise issues of domestic security and global stability.

Substantial food aid from the United States and other sources is one of the principal tools that can be applied to help mitigate food shortages, thus diffusing situations that can cause large migrations or other destabilizing activities. Given the asymmetric manner in which various regions are affected by climbing population growth, political unrest, or other dynamics, it makes sense for the U.S. to relook how it addresses food aid. This topic is discussed in greater detail in Essay 4 (Improving United States Food Aid) near the end of this paper. As we will see, U.S. policy changes are needed in order for the U.S. to help appropriate organizations ensure the right type of aid gets to the right region promptly.

### **Changing Diets and Consumer Preferences**

Diets are shifting worldwide. This phenomenon has at least two overarching – and related – causes: diet globalization and increased wealth in developing nations. “Diet globalization” refers to the increasing exposure to – and availability of – foods that were not traditionally available in a particular country or region.<sup>22</sup> For example, diets in Asia are becoming increasingly westernized, with increased consumption of wheat-based products, temperate-zone vegetables, and dairy products.<sup>23</sup> Compared to 2000 levels, Asian consumption of milk and vegetables is projected to increase 70 percent and consumption of meat, eggs, and fish is projected to increase 100 percent by 2025.<sup>24</sup>

Growing prosperity is a contributing factor to these and other shifts in traditional diets. As families in developing nations earn more money, they buy more food, but they also add more high-value products, such as meat, fish, fruits, and dairy products.<sup>25</sup> In China, 30 percent of disposable income now goes to nourishment, a significant improvement from Mao Zedong’s time in power, when the figure was nearly 80 percent.<sup>26</sup> This increase in purchasing power has resulted in many Chinese consumers shifting to more high-value food products. Similar shifts are taking place in other developing nations. Of note, high-value food items are often also resource-intensive. For example, it takes seven pounds of grain to produce one pound of beef, and four pounds of grain to produce one pound of pork. Growing prosperity in the developing world is thus increasing demand for meat products and grain production, as well as – indirectly – other inputs required to produce meat and grain.

Convenience and health concerns are also driving changes in food consumption. In many countries, demand is increasing for convenience foods – foods that are processed and packaged in ways that make them easier to cook (if cooking is even required) and to serve. This trend is a function of changing working patterns, such as both spouses working, as well as changes in lifestyle and wealth. Some consumers are also shifting their demand to foods they perceive to be healthier, such as fresh foods sold as organic or prepared foods sold as low-fat or low-sodium. Collectively, the impact of changing diets and preferences comprise another dynamic felt across the food chain, as farmers, processors, and retailers combine efforts to grow, prepare, and deliver a changing mix of food products to global consumers.

### **Pressure on the Basics of Production**

The increasing strain from population growth is exacerbated by secondary effects of that growth, which are manifested in three areas impacting the production of food: loss of arable land, diminishing availability of suitable water supplies, and environmental change attributed to

increased carbon emissions. The rising cost of fuel is also having multiple direct and indirect impacts across the agricultural value chain.

Recent studies by the United Nations (UN) Food and Agriculture Organization (FAO) confirm crop land per capita is rapidly diminishing.<sup>27</sup> Moreover, as farmers try to maximize near-term production to satisfy increased demand, they may in fact contribute to significant long-term challenges. For example, contamination by overuse of fertilizers and pesticides, complicated by pollution from industry, can lead to further crop land losses.<sup>28</sup>

*Domestic Land Pressures.* Dramatic population growth has also manifested itself in the United States. In the past 40 years alone, the U.S. population has grown from 200 million to nearly 304 million.<sup>29</sup> This growth has placed enormous pressure on U.S. urban centers, which have relentlessly pushed outwards, consuming farm land to house the increasing population. The U.S. has over 2.2 billion acres of total land mass, but less than one-fifth is considered prime farm land, and that land is being lost to development at an accelerating rate.<sup>30</sup> The American Farmland Trust estimates two acres of farmland are converted to urban uses *every minute* – some 1.2 million acres per year.<sup>31</sup> Prime farmland requires a unique combination of good soil quality, appropriate minerals, adequate and dependable water supply, and good drainage to prevent erosion or saturated soil. In other words, the qualities that make land ideal for farming also make it ideal for developing residential and urban areas. However, once the conversion from crop land to urban use is made, the transformation is normally irreversible, and pressure on remaining crop land increases correspondingly.

*Declining Water Supplies.* Pressures to feed growing populations are worsened by declining fresh water supplies worldwide. Our international field study program in China brightly illustrated that this competition for water presents an especially critical problem in the developing world, particularly in Africa, the Middle East, South Asia and northern China. In China, for example, where much of the water is already unsuitable for irrigation or drinking, arable land and available water are proportionally mismatched. This disconnect is best demonstrated in northern China, which has 62 percent of the country's suitable crop land but only 18 percent of its water.<sup>32</sup> Dr. Wang Zhinong of the College of Water Resources and Architecture Engineering in China's Yangling Agriculture Development Zone emphasized the impending Chinese water shortage is not just caused by increased demand for agricultural output – it is also being caused by extensive pollution of the country's water supplies. A Chinese study reported 80 percent of waste water flows directly into lakes and rivers without treatment. It also said that of the 700 Chinese rivers evaluated, 50 percent of total river length is polluted, with ten percent completely unusable.<sup>33</sup>

In the U.S., water pollution remains a problem, but not nearly on the scale or proportion of China's destroyed water resources. Nevertheless, water scarcity in parts of the U.S. has at least two significant implications for the agribusiness sector. First, there is growing and intense competition between urban and industrial use of water and agricultural use of water. That competition has already generated some local- or state-level decisions that limit the amount of water farmers are allowed to use. Such limits, in turn, compel farmers to make production decisions that impact U.S.-produced food supplies, such as planting fewer acres or shifting to crops that require less water. This problem is especially acute in California's Central Valley, where agriculture truly is "all about the water," and where the water supply is increasingly under pressure.

A second implication for agribusiness is the increasing attention being drawn to the impact farming practices have on domestic water supplies. For example, tilling crop land – that is loosening soil and turning it over through some mechanical means – or otherwise leaving soil unprotected by vegetation, can lead to erosion by water or wind. This is particularly true on steep slopes where runoff water can concentrate and flow straight downhill, ultimately finding its way to water sources such as rivers, lakes, reservoirs, or aquifers. Agricultural erosion is a major cause of sediment in water sources, because of the large areas involved and the repeated land-disturbing effects of cultivation and grazing.<sup>34</sup> As a result of these concerns, many U.S. farmers have adopted “no till” farming, as well as more carefully monitoring the rotation of agricultural herds on grazing land.

Concerns have also been raised about the runoff of pesticides and herbicides into water supplies. Measurable benefits have been attributed to herbicide use, including yield increases, economic savings for growers and consumers, and reduced soil erosion.<sup>35</sup> According to some sources, without herbicides, production costs for alternative weed control could exceed \$14 billion annually, more than double what the nation's growers spend on herbicide applications. Also, without herbicide use, reduced tillage would be difficult or impossible, leading to more than 150 million tons of increased soil erosion annually.<sup>36</sup>

However, these benefits have not come without cost. U.S. water quality data confirm herbicides and pesticides have reached surface and ground water in parts of the country. U.S. Geological Survey investigations have also revealed contamination of significant portions of the nation's water resources by pesticides. The concentrations of herbicides and pesticides in streams, and in most rivers in agricultural regions, were highest in those areas with the greatest agricultural use.<sup>37</sup>

*Rising fuel costs.* The recent, sharp increase in fuel prices is applying cost pressures literally from one end of the agribusiness value chain to the other end. Every step in the farm-to-consumer continuum (Figure 2) that involves movement by combustion engine is affected by higher gas prices, from planting and harvesting to deliveries to stores and restaurants. Large farms with hundreds of tractors or a small farm with one tractor – nearly all farms have experienced substantial cost increases in several aspects of their operations, all linked to the jump in fuel prices. For example, production, distribution, and application of petroleum-based fertilizers are all more costly than in the past – so much so that farmers are analyzing ways to reduce fertilizer use without substantially decreasing crop yield. Further, many of the value-added steps consumers demand, from milling and drying to extracting, are high-energy processes that are impacted in some way by high fossil fuel costs.

*Climate Change.* Scientific evidence has shown that the rapid global warming of recent decades is mostly due to human-induced climate changes. These weather alterations have occurred due to modifications of the earth's atmosphere from greenhouse gas (GHG) emissions by the burning of fossil fuels and through agricultural activities such as deforestation, land clearing, and soil and animal management.<sup>38</sup> These GHG emissions have disproportionately impacted weather in the lower latitudes and amassed to lead to another potential “perfect storm:” more frequent and serious droughts and extreme floods and storms.<sup>39</sup> This year alone, floods in China and Southeast Asia have forced nearly 3.2 million people from their homes and destroyed over 600,000 acres of crops.<sup>40</sup> GHG emissions have been blamed for glaciers retreating, sea level rising, sea temperatures increasing, tundra regions thawing, decreases in precipitation

levels, and increases in hurricane frequency. Without a reversal in GHG levels, these conditions are expected to intensify in the future.

Reports indicate the farming industry in the United States and globally will have to transform under the effects of climate change. Higher temperatures will influence production patterns, as some crop growth and health may benefit from fewer freezes and a longer growth season, while other vegetation may be damaged by higher temperatures; or indirectly through the temperature effect on water supply and irrigation, on the expansion of insects and plant diseases, and on weed expansion into different regions.<sup>41</sup> This will cause major shifts in the industry to include shifts in livestock production, adjustments in high-value crop and grain production, and modification of irrigation requirements. Some niche growing areas will open, with regions like Greenland and Siberia where fertile soil exists but growing seasons have been too short to accommodate agriculture production in the past; however, other tropical growing areas will close or mutate.<sup>42</sup> Given the potential impacts, climate has a direct impact on food security, and the agricultural community and policy makers must consider new strategies in the face of these changes for the future.

The regions most negatively impacted and most vulnerable lie predominantly in or near the tropics and are predominantly occupied by the poor, who lack either the knowledge or the financial resources to adjust to these climate changes. For example, if some estimates of warming trends prove accurate, India – a country with 326 million people living on less than \$2 per day – could experience a 40 percent decline in agricultural productivity by 2080.<sup>43</sup>

With most tropical areas experiencing excessive population growth, the need for secure access to affordable food is a priority. Indoor and urban farming practices using controlled environments must receive consideration for sustainable agriculture in these regions. Additionally, continued implementation and education of genetically engineered seeds that adapt to prevalent soils and weather conditions must be implemented.

Although the burning of fossil fuels has typically been regarded as the chief contributor to GHG emissions and climate change, studies have highlighted the substantial role agribusiness plays, through methane gas emissions from animal production and nitrous oxide emissions from fertilizer use on cropland and deforestation.<sup>44</sup> Agriculture-related activities account for approximately 20 percent of human-induced GHG emissions, more than the transportation sector.<sup>45</sup>

Agriculture production can also function as a “sink” (which captures and stores carbon) for sequestering carbon in order to lower GHG levels. Agriculture techniques and practices can capture and store carbon as organic matter in agricultural soils through roots, litter, harvest residues, and livestock manure.<sup>46</sup> Soils can hold carbon both underground in the root structure and in plant biomass reducing GHG emissions. Farming techniques to sequester carbon in agricultural soils can be an important component of a climate change mitigation strategy. Incentives and systems are available to assist farmers and the agribusiness to implement processes and practices that will reduce GHG emissions. While environmentalists have focused most of their efforts in combating climate change on seeking alternatives to a petroleum-based transportation system, food system processes deserve equal attention.

## **Farm and Energy Policy**

Certain U.S. policies – most notably farm and energy policies – are also driving change in the food industry. Current U.S. farm policy has its roots in the Great Depression and the Dust

Bowl crisis of the 1930's, both of which created a need to support farmers financially so they could stay in business and continue to produce food for America. Since those times, lobbying by farmers and their supporters has led to an evolving series of Farm Bills – renewed every five years – which now transfer substantial amounts of money to a relatively small group of people. In so doing, recent Farm Bills have moved far afield from the original intent of creating a safety net for all American farmers. By disproportionately compensating farmers and focusing economic benefits on only select crops, U.S. farm policy distorts markets and encourages business decisions – such as farm consolidations and crop shifts– that would not otherwise have occurred. U.S. farm policy, along with its array of subsidies, regulations, spending programs, and land-use restrictions, is discussed in greater detail in Essay 1 (Overhauling the Farm Bill) near the end of this paper.

U.S. energy policy, particularly as manifested in the 2005 Energy Policy Act, has also had a major impact on the food industry, because it transformed the renewable fuel industry into a powerful competitor for food supplies. The act incorporated the first mandate that renewable fuels be mixed into the U.S. gasoline supply – a mandate that compounded the affects of the already-“massive subsidies and tax breaks” granted to domestic ethanol producers.<sup>47</sup> The act (supplemented by the EISA, mentioned earlier) committed U.S. producers to create the capacity for 15 billion gallons of renewable fuels annually by 2015. Until new technologies are developed, which could take many years, nearly all of this mandate will be filled by corn-based ethanol.<sup>48</sup> Thus, tons of corn are continually diverted from agricultural purposes – like livestock feed – to be burned as fuel. Over the past year, nearly 25 percent of the U.S. corn crop was converted to ethanol. Worse, the \$8 billion in federal subsidies paid<sup>49</sup> encourages farmers to shift crop land to corn production in order to get a bigger piece of the action. Three years after the act's passage, we can see that the mandate not only raised fuel costs,<sup>50</sup> but also contributed to food price inflation—in conjunction with a range of other factors, from global demand, to drought in Australia, to increasing fuel costs, to commodity speculation.<sup>51</sup> The challenges created by U.S. ethanol policy are also explored in greater detail in Essay 2 (The Ethanol Dilemma) near the end of this paper.

### **Technology of Production and Distribution**

Major technological advances of the past several years form another dynamic changing the face of domestic and global food industries. In particular, modern biotechnology offers options for mitigating the strains from a growing population hemmed in by limited resources. Specifically, biotechnology has the potential to increase productivity and reduce production costs, the effect of which could be higher incomes and reduced food prices.<sup>52</sup>

In 2007, 247 million acres of genetically modified crops were harvested in 22 countries. Benefits included increased yields, reduced use of pesticides, and reduced agricultural footprints.<sup>53</sup> The production of genetically-modified cotton in India has grown from close to 50,000 acres in 2002 to 1.3 million acres in 2005.<sup>54</sup> Furthermore, scientists are rapidly developing new, adaptive plants that hold much promise. For example, researchers are combining a strain of saltwater-resistant Persian grass with commercial varieties of wheat and have found the combination grows well in salty soils. Additionally, in South Africa, drought-resistant maize plants have produced 30 to 50 percent more than unmodified plants under similar conditions.<sup>55</sup>

Although the promise of biotechnology is tantalizing, some have challenged such programs as untested and risky for the environment or the population. Biotechnology could take three differing directions over the coming years, all of which come with strengths, weaknesses, and challenges. First, if the risks are determined to be too high, developed nations could seek to slow the rapid advances associated with genetically modified crops. Secondly, international agencies could take a “hands off” approach and allow the free market to develop these technologies unabated, but also without encouraging or advocating. Finally, the world community could encourage the further and more rapid development of genetically modified crops.

Some groups have expressed concern regarding the unknown effects of the rapidly accelerating technologies associated with genetically modified crops. The most significant concerns lie with ecological and food safety issues. Some of the most prominent fears include potential increased herbicide use, harm to non-target species, and potential transfer of non-native allergens from one food product to another – like the introduction of peanut oil to a strain of corn or wheat.<sup>56</sup> To that end, opponents contend that before genetically modified crops are introduced, an effective regulatory structure should be in place and functional. Additionally, some experts advocate a framework that would ensure equity and competition through antitrust regulations which preclude the formation of oligopolies that might otherwise exploit small farmers. A secondary concern lies with trade-related risks for developing countries seeking to export genetically modified goods to nations that may exclude the import of such products. Thus, developing nations may be placed at an economic disadvantage.<sup>57</sup>

The “hands off” approach would look very similar to the current manner in which biotechnology is developing. In this environment, large corporate interests dominate the market and create products that serve to enhance profitability. These genetically modified products often serve to enhance the profitability of customers as well. Such was the case with one Chinese farmer who saved so much on pesticides by using Monsanto’s genetically modified cotton seeds that he doubled his profits over five years. In fact, by some estimates, Chinese farmers have improved cotton profits by five percent a year over the last five.<sup>58</sup> However, leaving this technology principally in the hands of large corporations has negative ramifications as well. For instance, some companies are introducing “terminator seeds” which do not regenerate from year to year. This practice leaves farmers dependent upon specific firms and creates risk that these seeds could transfer sterility to other crops and wildlife.<sup>59</sup> Finally, such companies highly value proprietary rights, and in an attempt to protect their interests, they often place extremely cumbersome requirements on users of their modified seeds.<sup>60</sup>

The world community could more actively embrace biotechnology as a partial solution to providing for the growing population’s agricultural requirements. Genetic modification of seeds has accelerated rapidly since the mid 1990’s, when the first generation altered some aspects of the seed, but left the end product identical to conventional products. At that time, the most significant modification was herbicide and insecticide tolerance. The second-generation of genetically modified plants include improved nutritional value, such as essential vitamins, minerals or enhanced lipid profiles. Third-generation plants, currently under development, will provide specific health benefits in the form of ingestible vaccines for diseases.<sup>61</sup>

## Security Concerns

Another dynamic affecting agribusiness is heightened concern about security, particularly for areas that seem vulnerable to intentional disruption. Unfortunately, the very connectedness of U.S. agribusiness – within and among industries, and within the global economy – presents such a vulnerability. As a DHS document observes, the country’s food and agriculture systems are “extensive, open, interconnected, diverse, and complex structures [that provide] attractive potential targets for terrorist attacks.”<sup>62</sup> The millions of farms and ranches, plants, machines, trucks, and people directly involved in U.S. agribusiness make it difficult to focus security planning or resources on a finite list of highly critical assets. The DHS draft strategic plan acknowledges, “The food sector is replete with accessible ‘critical nodes’ at which food products could be contaminated intentionally.”<sup>63</sup> One should note that unintentional contamination could also occur at any one of millions of nodes, with equally serious results.

The transportation sector in particular introduces major vulnerabilities to the U.S. food supply, because of its integral role in nearly every step of the farm-to-consumer continuum. The many nodes, trans-shipment points, and conveyances that comprise the transportation system increase, geometrically, the opportunities for accidental or intentional interdiction of the food supply. From an economic perspective, the reliance on physical cargo movement makes the agriculture sector vulnerable to price or other shocks generated within the transportation and energy sectors. Soaring fuel costs are one obvious example, but other sector-based shocks, such as a driver or longshoreman strike, could have an almost instant impact on food supply, food prices, or both.

Even the efficiency of the U.S. transportation system introduces risk: the speed with which livestock and other agricultural products move great distances increases the likelihood that local events will become regional or national problems.<sup>64</sup> The globalized economy, with agricultural and food products crossing U.S. borders in both directions, amplifies that risk. As discussed earlier, the 2003 incident involving one cow infected with BSE is an excellent example. In that case, a single cow with BSE had a national-level impact. That fact makes it clear that an intentional infection could have vast, disruptive effects: from severe economic losses affecting farms, businesses, and regions; to slowed or halted international trade; to loss of consumer confidence in the government’s ability to protect the nation’s food supply.

A 2005 Government Accountability Office (GAO) survey of experts confirms the potential for grave economic impact from an intentional infection. The survey reports:

[E]xperts suggest that the economy, not human health, would experience the greatest impact of an agroterrorism attack. An assault on agriculture would cause direct losses from containment measures and eradication of diseased animals, compensation paid to farmers for destruction of agricultural commodities, and a decrease in international trade as export partners impose protective embargoes.<sup>65</sup>

Further, the very containment methods that U.S. authorities would most likely employ – “the highly visible and costly slaughter, incineration, and/or burial of large numbers of animal” – could themselves provide an incentive for terrorists to attack.<sup>66</sup>

As already mentioned, food-related incidents – including unintentional ones – can have another, far-reaching impact: rapid loss of confidence. Depending on the incident, confidence may be lost in the safety of a particular product – like Peter Pan Peanut Butter – or a broader

category, like green leafy vegetables after the 2006 outbreak of E.coli O157:H7 in spinach. A loss of confidence can cut several ways, because it may affect individual businesses or regions, but in extreme cases could also result in widespread concern about the government's ability to defend America's food supply.

Another security concern arises from the agribusiness industry's historically heavy reliance on labor. For much of U.S. history, the agricultural industry has relied heavily on both legal farm workers and illegal immigrants. Many agricultural employers maintain that Americans are no longer willing to perform hard labor at current wages, if at all.<sup>67</sup> Without a strong impetus for change to labor practices and immigration policies, agricultural businesses are likely to continue using cheap, illegal labor in lieu of paying higher wages or paying more money to increase mechanization.<sup>68</sup> The concern for national security should be such an impetus, because security can be threatened by the presence of uncleared and unscrutinized foreigners. However, the concern for national security has actually been subordinated to a desire for cheap labor: many U.S. employers actively recruit illegal aliens as a source of cheap labor. This is evident by the estimated 11.3 million illegal aliens in the U.S.,<sup>69</sup> many of whom came seeking work.

Since the terrorist attacks in September 2001, the country has had a more closed-border approach to immigration policy. Unfortunately, the ability to sanction businesses that hire illegal aliens has been limited by DHS internal policies, under pressure from large businesses. DHS policy has limited the effectiveness of efforts to resolve overall security issues, because agents are directed to focus on illegal workers themselves rather than American businesses that hire them. Performing essential security missions such as apprehending terrorists and criminals, and seizing terrorist weapons and illegal goods, is made difficult by having to deal with the massive number of illegal aliens attempting to cross the U.S./Mexico border to seek employment.

### **Trends and Projections**

Having considered several powerful dynamics that are driving changes in the food industry, we will briefly discuss where those trends are headed. Global population and global demand for food products will continue to increase. With developing nations growing at a greater rate than developed nations, the imbalance between population and resources will continue, triggering at least some migration among nations. Growing wealth in developing countries will continue to increase demand for higher quality foods, although the countries thus affected may change over time – such as when manufacturing shifts from China to Vietnam and other countries with lower labor costs.

Pressures on the basics of production will continue, largely unabated. Urbanization and competition for water will continue, so land and water inputs will become increasingly scarce and thus more expensive. Prices for fuel and other commodities will remain high, since those prices are driven by circumstances beyond agribusiness – even U.S. national – control. High fuel costs will continue to affect everyone in the food chain, from farmers and fertilizer manufacturers to consumers deciding how often and where to shop. Economies of scale will give large growers an advantage in this area, which in turn will lead to further “vacating of the middle” of the industry, as big farms get larger and small farms struggle to stay in business.

The vast, complex nature of the industry makes it likely that additional, more serious food safety incidents will occur. Those incidents, when they happen, will lead to more consumer and governmental pressure on food safety issues. Finally, due to the dynamics discussed thus

far, food prices will remain high relative to the percentage of income Americans have historically spent on food.

## **Recommendations**

Below are several overarching policy recommendations, based on this Agribusiness study group's semester of research, study, and interaction with industry members in the United States and China. Following these recommendations, four essays are presented, covering in greater depth topics the group identified as especially significant. Those topics are: the U.S. Farm Bill, Labor, Ethanol, and United States Food Aid.

### **Farm Policy**

**Recommendation:** Congress should enact a one-time government buyout program to end agricultural subsidies at the end of the current (five year) Farm Bill period.

**Discussion:** Complete elimination of agricultural subsidies and related price supports is necessary to allow market forces to correctly value agricultural products and to allow farmers and other business owners to create and sustain viable businesses. Incorporating buyout payments, rather than simply canceling all subsidies, makes the proposal more politically viable. A buyout program would reduce long-term expenditures, facilitate a healthy free trade policy, and provide transitional support to farmers as they shift away from large, recurring government payments.

### **Energy Policy**

**Recommendation:** American leaders should reexamine U.S. farm and energy policies as they pertain to biofuels. The biofuels component of each policy should be pulled into a new, comprehensive energy policy that balances the nation's energy needs with the need for affordable food and sustained environmental health. The new national energy policy must be supported by implementing policies and active leadership down through state and local governments.

**Discussion:** Market forces should be allowed to establish prices and costs for biofuel production. Biofuel production should be encouraged in order to help reduce dependence on foreign oil and on fossil fuels in general, but market-distorting subsidies should be discontinued. If Americans are truly determined to reduce dependence on fossil fuels, they must embrace conservation and fuel-use reduction strategies. A national conservation strategy would need a combination of volunteer participation, through a change of culture and Pigouvian taxes,<sup>70</sup> and national regulation.

### **The Basics of Production (Land, Fuel, and Water)**

#### *Land*

**Recommendation:** While zoning and other land-use decisions should remain at local levels, the Federal government must establish overarching policies that encourage better tradeoff

decisions between managing urban growth and preserving agricultural land. Congress and the Administration should actively pursue new partnerships with states that have a demonstrated capability to provide land management and protection activities. State and local governments must undertake urban planning cooperatively, ensuring they balance the need for larger urban areas with the imperative of maintaining sufficient crop land.

**Discussion:** Federal and lower-level policies that foster increased yields and production and promote agricultural profitability would contribute significantly toward keeping U.S. farms viable while allowing urban development to continue. Such policies should be used in combination with land management policies, the most effective of which include easements, growth management laws, and local zoning ordinances. Collectively, these tools can provide the incentives and protocols to protect farm lands from encroachment, thus contributing to the long-term sustainability of American agribusiness.

#### *Fuel*

**Recommendation:** Agricultural producers need to retain excise tax exemptions for fuel used on the farm in addition to incentives to reduce fuel consumption. Manufacturers also need incentives to produce fuel efficient machinery and production systems through tax incentives and direct payments based on efficiencies.

**Discussion:** The costs and availability of fossil fuels as a production input are affecting the costs and types of production processes being employed in America. Petroleum based products include fuel for the vast machinery requirements, nitrogen-based fertilizers, and inputs for drying, storing, and processing agricultural products and livestock.

#### *Water*

**Recommendation:** A national strategy is needed to guide America's policy on water as a strategic, non-renewable resource.

**Discussion:** Water rights are legendarily contentious, and provide the perfect example of the difficulty of concerted action in areas critical to the health of this industry, given the competing interests and governing bodies at all levels of the federal system. However, it seems clear that the national strategic imperatives surrounding water allocation demand a national approach to coordinating allocation and adapting to scarcity. Congress should assign one existing federal agency the lead in addressing the water resource challenges that face America in general and agribusiness in particular. Given the consequences of worldwide regional shortages of accessible, quality water reserves, the U.S. should also actively pursue international cooperation in water research. Research in new methods of water purification, waste treatment, and consumption reduction can yield at least partial solutions to U.S. and international concerns about major, impending water shortages.

### **Security and Aid Topics**

#### *Labor*

**Recommendation:** To meet immediate agribusiness needs, immigration reform targeting farm labor and employer sanctions is necessary, with a focus on transparency and

national security. The issue of immigration must be addressed in the near term for a viable, competitive, and sustainable agribusiness industry. A reformed national immigration policy must provide for a legal, cost-effective workforce, in a transparent and enforceable immigration system.

**Discussion:** An understanding of the geo-political situation and the internationally integrated economy are necessary in projecting the future U.S. labor situation and in crafting an American immigration policy that can be supported by businesses and legislated in Congress. Americans may be willing to pay more for their food in order to ensure all workers are legal, but as the costs of farm inputs continue to rise and those costs are passed to consumers, consumers are likely to become less willing accept further price hikes.

#### *Food Aid*

**Recommendation:** The United States should focus on an integrated aid system that supports nutrition, health care, market development, agricultural education and other long-term investments in building developing nations' ability to escape hunger's grasp.

**Discussion:** The U.S. Food Aid program provides only 40 percent of its program budget in actual food relief. The impact of American food aid in reducing hunger has fallen short of its potential, while Congress thus far refuses to relax the restrictions they placed on the process through the Farm Bill. The fact that 60 percent of the United States' food aid helps support American agribusiness interests and the U.S. maritime industry has been a key factor in Congress's support for the restrictive rules in this program. Clearly, there are disparate interests that must be rationalized if the U.S. is to remain a leader in helping the world's poor.

#### **Research and Development**

**Recommendation:** Congress should provide increased public funding for agriculturally-related research and development.

**Discussion:** Advanced technologies such as biotechnology offer great promise for diminishing the hunger crisis in developing nations. However, profit motive typically leads corporations involved with such emerging technologies to focus on products that will contribute the most to corporate profits. Unfortunately, maximizing the benefits for regions that most need assistance often requires developing technologies (like modified seeds) for unique climates, pests, and soil types<sup>71</sup> – in other words, products that cannot be sold to a huge, global market. By granting public funds for research and development for low-density applications, the U.S. government can encourage companies to develop technologies that will specifically address the requirements of under-developed regions. These technologies in turn can provide far-reaching benefits in productivity and nutritional value, factors which will enhance the competitiveness of farmers in developing nations.

## Essay 1: Overhauling the Farm Bill

### Background

Since the founding of the United States, farmers have received needed support through a series of government programs ranging from distribution of crops and land resources to subsidies and favorable tax incentives. During the height of the Dust Bowl and Great Depression, government support was formalized in the first Farm Bill intended to give farmers relative financial stability. Subsequent to its first implementation in 1933, the Farm Bill has been renewed on a recurring basis and is now sent through legislation every five years. In its current format, the bill governs federal farm, food, and conservation policy, directly impacting food stamps for low-income families, agricultural research, and investment in food safety, economic development in rural areas and support to the people who grow and harvest our food. The basic Farm Bill has remained relatively unchanged despite dramatic changes in globalization, demographics, availability of land resources and agricultural production. Likewise, the range and importance of interest groups and lobbyists involved in agriculture has expanded, even while the direct contribution of farming to national gross domestic product (GDP) has declined over time.<sup>72</sup>

Whereas farmers once accounted for 20 % of the U.S. population and agriculture made up nearly 8% of the GDP; farmers now account for less than 2 % of the population and agriculture is less than 1% of the GDP.<sup>73</sup> Hence, the Farm Bill in its current format is out of synch with 21<sup>st</sup> century realities and requires substantial reform.

### Effects of Current Policies

Recent Farm Bills are widely blamed for the increased cost of food, environmental degradation, fiscal burdens, and the failure of global trade. This fallout is largely attributed to the impact of political lobbyists and receptive politicians who supported lucrative subsidies and other policies that threaten to detach agricultural production from the objective of efficient production of food for consumers.

The first commodity program, price support, restricts supply by limiting imports through tariffs and restricts domestic production using quotas or marketing allotments, such as the sugar and dairy programs. Although these programs are less costly in terms of government expenditures, they raise market prices directly. This is much more distorting to production and consumption since it restricts supplies and raises food costs. Payment is given for minimal production, distorting global markets and trade. This distortion issue was under considerable scrutiny by the World Trade Organization during the recent Doha Rounds. The sugar program alone costs U.S. consumers an estimated \$1.5 to \$1.9 billion per year.<sup>74</sup>

Income support programs, the second type, provides government payments to farmers in the form of marketing loans, direct payments and counter-cyclical programs. Farmers who grow the major field crops of wheat, feed grains, oilseeds, cotton and rice are eligible. Payments are concentrated in those areas of the country with major production. No support is given for fruits and vegetables or livestock production, except for dairy.

Agricultural production is also supported indirectly by programs that increase the demand for products. The ethanol program supports corn and sugar prices by diverting the commodities to energy production. Corn-based ethanol production projections currently exceed the 2005

Energy Act renewable fuels program mandate. More land is now being dedicated to growing corn for ethanol than other crops needed for food consumption, impacting world food production and price.<sup>75</sup>

Large commercial farms earning \$250,000 or more in sales make up 9 percent of all farms, yet received over 50 percent of government payments. Current law allows subsidies to farmers with annual adjusted gross income of as much as \$2.5 million. An annual average of \$16.5 billion in commodity payments has been distributed in the past five years.<sup>76</sup> This is the direct result of the type of commodities targeted by the specific commodity programs grown on large farms and in large volume. About 60 percent of farms were debt-free in 2005, compared to 40 percent in 1985, which emphasizes the health of the farm industry.<sup>77</sup>

At a time when the farm economy is booming with record commodity prices, farm income and exports, it is unacceptable to increase the size and scope of government while increasing taxes to the people who pay for it. It is time to bring reform to farm policies and programs.

## **Recommendations**

Current farm policies and programs have far too much government involvement with costs far in excess of the benefits they can reasonably provide. A sweeping reduction in government entitlement programs would benefit farmers and the public. Agricultural policy can serve two broad objectives: the efficiency and prosperity of agriculture as an industry and the well-being of farmers and rural residents, as well as the nation as a whole.<sup>78</sup> A Farm Bill with deep cuts in subsidies and trade barriers will save U.S. taxpayers tens of billions of dollars during the next decade, while potentially opening markets abroad for tens of billions more in American exports across the economy.

The farm community will not lose nearly as much as taxpayers gain when payments end. An end to \$16 billion in annual budgetary cost of farm programs will generate an additional \$3 billion in real gains to the economy; the government's costs of operating the agencies for subsidy payment, support and crop insurance programs.<sup>79</sup> This could be done through a one-time payment government buyout program that replaces existing subsidies and price supports. This policy option would reduce long term expenditures, facilitate a healthy free trade policy, and provide transitional support to farmers.<sup>80</sup> To be good policy, a commodity program must, at least, generate benefits to U.S. society that exceed the costs incurred to pursue these goals.

Congress and the president should seize the opportunity to bring America's farm sector into an open global market. The Farm Bill must be reformed and the long-term interests of Americans as consumers, producers, taxpayers, and citizens of the world should not be sacrificed for the short-term interests of a small minority of farmers and special interest groups.

## **Essay 2: Overcoming the Labor / Security Trade-off**

### **Background**

For decades the U.S. agriculture industry has depended heavily on immigrant workers to fill labor intensive jobs. Unfortunately, 70% of the 2.5 million immigrant workers engaged in U.S. agriculture were illegal aliens according to Department of Labor estimates for fiscal year 2006.<sup>81</sup> Despite the obvious affront to homeland security, weak government enforcement of

immigration laws coupled with dramatic increases in agriculture input costs are likely to result in continued employment of illegal laborers. Absent a willing and available workforce, agribusiness is prone to outright failure in select segments of the industry with adverse impacts on American and global consumers. The symbiotic relationship between American agriculture and illegal immigration is in direct conflict with national security and presents a challenging dilemma for law enforcement and policy makers throughout government.

While the majority of illegal immigrants crossing the U.S. / Mexico border do not pose a direct threat to national security, the sheer volume of illegal border crossing attempts overwhelms government agencies charged with law enforcement. In fiscal year 2007 alone, U.S. Border Patrol agents documented 876,704 arrests of people attempting to enter the U.S. illegally,<sup>82</sup> during the same period in which agents seized 1.9 million pounds of marijuana at the border. By all indications, a substantial number of the apprehended illegal immigrants were destined for agribusiness and other labor-intensive jobs. This flood of attempted illegal border crossings places incredible demands on border security agents and severely impedes their primary missions of apprehending terrorists and criminals and seizing weapons, narcotics and other illegal goods.

The conflict with illegal activity at the border is aggravated by U.S. employers actively soliciting immigrant labor. Employers argue that American citizens will not perform relatively low paying, labor-intensive jobs and they cannot stay in business without employing foreign workers. This has promoted a sustained influx of illegal immigrants and in too many cases has contributed to exploitation of illegal immigrants already in the U.S. Some employers of illegal workers leverage knowledge of their illegal immigration status as a means of circumventing fair labor laws, paying lower wages, and holding back other benefits, because of the constant threat of deportation.

### **Effects of Current Policies**

In recent months, amnesty for illegal aliens has been touted in many forums as the best solution for the country's immigration problems. However, during the Reagan Administration, amnesty was enacted, but ultimately backfired as formerly-illegal workers, with their new-found legal status, left the agriculture workforce and sought other mainstream employment. The resulting gap in the agribusiness workforce then acted as a magnet for a new wave of illegal immigration, effectively offsetting many of the perceived benefits of the amnesty effort and creating a new dilemma for employers and the government.

By law, employers are required to first seek U.S. workers in order not to displace them from potential jobs. However, if an employer cannot entice enough Americans to work in agriculture, the employer can petition the State Department for H-2A/ Agricultural visas in order legally to arrange for foreign workers. Unfortunately, the State Department only grants approximately 50,000 H-2A visas per year, an absurd fraction of the estimated 1.75 million illegal immigrants employed annually.

As a result of the incredible deficit of available work visas, a thriving industry has emerged for temporary job agents who act as middle men, procuring inexpensive workers for agribusiness. These job agents, who are of questionable legitimacy, allegedly conduct appropriate employment checks, verify immigration work status, and relieve employers of the administrative burden and liability of hiring workers. In reality, many job agents never check legal statuses, and some have been found to hire illegal aliens deliberately. Unfortunately, this

approach has contributed to further exploitation of illegal immigrants as well as routine dodging of legal immigration requirements.

## **Recommendations**

Absent further advances in mechanization and an available, cost-effective labor force, certain segments of the agribusiness industry are prone to outright failure. Hence, the U.S. must implement transparent immigration policy reform that both permits an ample labor supply and protects U.S. security. First and foremost, reform must entail a dramatic increase in the number of visas and guest workers permits. These permits should have a set timeframe during which foreign workers can live and work in the U.S. After the permits expire, workers should be required to return to their countries of origin to reapply for future permits or eventually to pursue U.S. citizenship. This system must be combined with actual enforcement of employer sanctions for violating immigration laws. Also, a biometrics-based identification card should be introduced, along with employment scanner systems that reinforce accountability, security, and ease of entry for recurring agribusiness employment.

These proposals will promote legal compliance, provide a sustainable agricultural workforce, and protect individual rights of the workers themselves. Furthermore, they will dramatically reduce the number of immigrants attempting to enter the U.S. illegally. In turn, agencies charged with protecting U.S. borders will be able to refocus their efforts on terrorists, terrorist weapons, criminal aliens, and narcotics.

## **Essay 3: The Ethanol Dilemma**

### **Background**

Since the initial fuel shortages experienced in the mid seventies, the United States and other nations have been looking for alternative energy sources to augment or replace fossil fuels. This search and the will to support alternative energy sources has waxed and waned through the last forty years as the price for oil has fluctuated from the lows of the late 1990s to today's highs of over \$130 dollars per barrel.

Initial commercial ethanol production started around 1975, followed by the creation of a subsidy in the Energy Policy Act of 1978, intended to increase farm income and enhance energy security. In its pure form, ethanol is water-soluble, biodegradable, and non-toxic to the environment, resulting in less damage (than other fuel additives) in case of accidental spillage during production or transportation. When mixed with gasoline, ethanol helps reduce tailpipe emissions, promotes more complete fuel combustion, and results in twelve percent less greenhouse gas than is produced by gasoline.<sup>83</sup> However, ethanol is not yet a carbon-neutral energy source, meaning that the carbon generated by producing and burning it is not yet offset by the carbon absorbed by corn plants during the growing season.

Influenced by ethanol's relatively environmentally-friendly characteristics and an effective farm lobby, the 1990 Clean Air Act and subsequent Energy Policy Act of 2005 passed, making ethanol the main oxygenating component for gasoline. Since the implementation of the Energy Policy Act, and then the 2007 Energy Independence and Security Act (EISA), production of ethanol has grown from 3.4 billion gallons in 2004 to over 8 billion gallons in 2007.

Estimated total production for 2008 is over 11 billion gallons, which will consume up to 30 percent of the domestic U.S. corn crop.<sup>84</sup>

### **Effects of Current Policies**

The demand for ethanol production feedstocks is raising demand and prices for corn and sugarcane to new highs in spite of the seemingly “super-production” of these commodities. The increasing demand for energy, causing the subsequent increasing demand for fuels and the shifting of traditional food crops to fuel sources is going to have major impacts in environmental, social, and economic welfare across the United States.

A major concern of many is the conversion of traditional food crops into fuel. Corn, the current primary ingredient for ethanol, is not a true staple food for most Americans. However, corn is one of the primary ingredients for meat production. The draw of the ethanol market as a consumer of corn clearly creates competition between fuel and feed, and a lower supply of feed – or much higher feed prices – could very well drive meat producers from the market. If market forces were later to drive up meat prices or corn markets were to stabilize and corn and feed prices fall, those meat producers may attempt to return to the market, but decisions to close down such resource-intensive operations are often essentially irreversible.

Most experts agree consumers are going to see higher food prices. For Americans who are used to paying about ten to thirteen percent of their income on food (home and away-from-home combined),<sup>85</sup> increases of two to three percent will be significant. However, low-income U.S. consumers spend a much greater proportion of their income on food, so this increase will affect them disproportionately. Their limited ability to adjust other areas of their budgets means food price increases will be much more dramatic for them.

In another down-side to the ethanol boom, increased corn production is leading farmers to use more nitrogen-based fertilizers on their fields, contributing to problems downstream with the Gulf of Mexico paying the price with its so-called “dead zone.” While not the sole cause of that environmental degradation, the nitrogen runoff fertilizes algae blooms, which sink to the ocean floor they die, suffocating everything that cannot get out of their way. In recent years, the dead zone has grown to an estimated 7,900 square miles.<sup>86</sup>

An additional concern among critics of the government’s ethanol focus is that farmers, in their efforts to plant ever-increasing acres of corn, will try to take land designated as protected under the Conservation Reserve Program and put it into production.

Finally, the majority of the world’s poor relies, directly or indirectly, on agriculture for their incomes, and they may benefit from higher commodity prices. On the other hand, since the poor also spend a large share of their income on food, and food prices rise because of ethanol production, the net impact on poverty is uncertain and will likely differ from region to region.<sup>87</sup>

### **Recommendations**

The current ethanol subsidy of \$0.51 per gallon was originally intended to support creation of a new market and to help farmers by shoring up low corn prices. Now that the market is mature and corn prices are high, the subsidy should be eliminated. Also, mandates for producing specific and increasing quantities of renewable fuels – which currently are filled primarily with corn-based ethanol – should be rescinded. As stated earlier in this paper, U.S.

leaders must develop a comprehensive energy policy that balances the nation's energy needs with the need for affordable food and sustained environmental health.

Biofuels are certainly still necessary, as part of a comprehensive plan to help reduce dependence on foreign oil and on fossil fuels. Because individual communities may benefit from the presence of an ethanol plant, local communities can provide incentives to cooperatives or corporations interested in establishing plants. Local governments should consider establishing incentives designed to create a “bundling effect,” combining ethanol plants with local sources of feedstock, power generation for plant operation, feedlots, and other processing facilities for by-products. Local authorities would need to establish metrics based on economic factors (such as job creation, community investment, and tax revenue) and social factors (such as environmental, greenhouse gas reduction, and worker quality of life).

At the federal level, the government should continue to require that a biofuel be added to gasoline, for oxygenation as well as to help reduce dependence on foreign oil, but specific biofuel production quotas should be eliminated. The government must also continue to resist “picking a winner” by mandating the use of a particular biofuel. Instead, market forces should be allowed to determine which products are exchanged in the marketplace, as well as their associated quantities and prices.

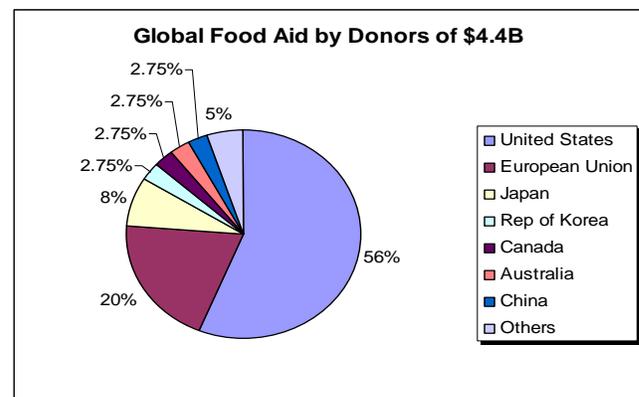
Finally, the new, comprehensive energy policy should be designed to foster whole-hearted embrace of fuel conservation strategies. Fuel-efficient cars and trucks, public transit, green energy appliances, and alternative energy sources can help improve America's energy independence. A more effective combination of incentives and penalties for individuals, commercial enterprises and government agencies is necessary.

#### Essay 4: Improving United States Food Aid

##### Background

More than 800 million people worldwide receive some type of food assistance. Developed countries, Non-Government Organizations (NGOs), and private foundations provide over 5.2 million tons of food valued at \$4.4 billion to poor nations each year. The United Nation's World Food Program's biggest donor is the United States, which provides almost half of the dollar value of international food aid donated around the world. The U.S. Department of Agriculture's Foreign Agricultural Service (FAS) provides U.S. agricultural commodities to impoverished countries through direct donations and concessional programs.

Food programs face new challenges as world grain prices have skyrocketed, due to an escalating boom market in biofuels in the United States, which diverts production away from feeding people and livestock and to the energy sector. Crude oil prices, now more than \$130 dollars per barrel, have led to increases in transportation and fertilizer costs, which in turn generate pressures on farmers to remain viable by raising prices or cutting input costs. These conditions, along with extreme weather conditions around the globe, have generated what some call the “perfect storm” for driving a huge escalation in world prices.<sup>88</sup> Fluctuating prices from all these conditions has led speculators to enter the grain markets seeking



quick returns, again pushing prices upward. At the same time, fast-emerging markets and the growing middle class in developing countries like China and India are demanding food supplies at the expense of much poorer nations. In combination, these factors led to a 41 percent surge in prices of wheat, corn, rice, and other cereal grains in just the first five months of 2008.<sup>89</sup>

### **Effects of Current Policies**

Paradoxically, sharp increases in food and food prices forced the United States Agency for International Development (USAID) to slash food assistance in early 2008. The higher outlays for basic commodities, increased shipping expenses from the United States, and security costs associated with grain distribution consumed an increasingly larger part of the USAID budget and left the agency with a \$120 million deficit five months into its 2008 Fiscal Year Budget. “We’re in the process now of going country by country and analyzing the impact of commodity price increase on each country. Then we’re going to have to prioritize,” said Jeff Borns, director of USAID’s Food for Peace program in March 2008.<sup>90</sup> These cuts will have a particular impact on food relief efforts in Latin America, Central Asia and Africa.

With the United States supplying half the world’s food aid, any change to its operations seriously threatens millions of lives. Charities have estimated U.S. agricultural aid will fall from 2.6 million tons in 2007 to 2.2 million tons in 2008 due to cost increases.<sup>91</sup> The program’s budget shortfall is expected to grow to \$200 million by the end of the fiscal year. Many charities, NGOs, and other state aid agencies reacted to the USAID news by saying it was time for all to rethink the approach to agriculture and humanitarian relief efforts.

Humanitarian relief exports of food into vulnerable markets can breed a number of problems, not the least of which is commercial displacement of local agricultural products. Local producers are unable to compete with the imported products and small traders find themselves priced out of their own markets. Price spikes and their potential have a devastating impact on already struggling local farmers and markets in rural areas during emergencies. Recent analysis has shown that under some circumstances food aid can harm local production and agricultural markets, undermine long-term food security, and is often not the most efficient use of resources for alleviating poverty.

Ironically, there is no global shortage of food, even with increased world costs and the biofuel spike. The capacity and technology to produce sufficient and increased high-quality food to meet the needs of the world’s growing population is not in doubt. Often, malnutrition and hunger are the result of regional conflicts or policy failures within the nations in question. The issue is not a shortage of food; it is more a shortage of political will. Although the trading system can and should help people meet global food demands at the lowest cost and least environmental impact, misguided trade and agriculture policies, in both developed and developing countries have prevented international markets from operating efficiently. In particular, the U.S. Farm Bill and subsidy programs place small farmers in developing countries, especially ones in regions most impacted by hunger, at a disadvantage.<sup>92</sup>

In regions where there are warring factions, food production and food aid typically declines considerably. Food is often the primary tool for military action against the other military force. Crops, water resources, and infrastructure assets are often destroyed by the warring groups. Distribution centers and food relief are not always able to mitigate the losses in rural poverty areas until stability is established. Zimbabwe, once a prosperous breadbasket of Africa, has been reduced to widespread poverty and chaos due to militaristic factions and

corruption. Short of military occupation, which the United States found to be a short-lived venture during its Somalia relief efforts, humanitarian relief can only be done on the fringes by NGOs during times of conflict.

In conflict or crisis, it may take months for aid to reach stricken areas, because most of the food originates from the U.S., and U.S. law stipulates that 75 percent of all food aid must be transported on U.S.-flagged vessels. This policy's inefficiency is underscored by a U.S. GAO determination that U.S. bulk carriers cost almost 78 percent more than foreign bulk carriers over the same routes and shipping the same commodities.<sup>93</sup> While the U.S. Department of Transportation's Maritime Administration (MARAD) reimburses USAID and USDA to cover the higher costs of using U.S. carriers, the reallocation normally takes more than five months.<sup>94</sup> Further, U.S. deliveries sometimes create the opposite effect from what was intended: deliveries sometimes arrive well after a crisis and are often in full competition with local farmers, who have trouble competing with the free or reduced-price food.<sup>95</sup>

## Recommendations

The best food aid the United States can provide is an integrated program that supports nutrition, health care, market development, agricultural education, and other long-term investments in building developing nations' capacity to break out of the grasp of hunger. A whole-of-government effort is required to support this effort. An extensive review and overhaul of U.S. food aid policies should be undertaken to foster an evolution toward a more flexible and efficient program. Key policy changes necessary include: providing more aid by purchasing and distributing locally-grown food, rather than flooding local markets with U.S. food; relaxing or repealing the 75%-U.S.-carrier rule for shipping food that does come from the U.S.; and improving the timeliness of any aid shipped from the U.S.

Food aid should explicitly support the larger effort of improving food production in developing nations. The World Bank and regional development banks should also expand their own programs to support this effort and prioritize increasing agricultural productivity in developing countries through technology.

## Conclusion

For all of America's history, its agribusiness industry has unfailingly fed the American people. Today, that industry is more vast, technologically advanced, and interwoven throughout the U.S. economy than any other industry in the country. The envy of most other nations, it feeds not only 350 million Americans daily, but exports massive quantities of food through the market and aid programs. The U.S. farm economy is expected to achieve record profitability in 2008, and Americans continue to pay less for their food than do people in most other countries. Nonetheless, some of the same pressures creating turbulence worldwide are driving significant changes in the U.S. food industry. Strong domestic leadership is needed, coupled with well-considered analysis of the myriad trade-offs associated with trying to direct further change in this complex industry. Outdated farm, ethanol, labor, and food aid policies should be replaced with policies appropriate for current realities, including a robust farm sector, high commodity prices, and a highly-interactive global economy. With the right decisions, U.S. leaders can ensure American agribusiness will continue to provide quality, safe, and affordable food to Americans while remaining a breadbasket to the world.

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