

Spring 2011
Industry Study

Final Report
Agribusiness



Industrial College of the Armed Forces
National Defense University
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AGRIBUSINESS 2011

ABSTRACT: U.S. agriculture is a critical source of national power, yet few Americans appreciate the extent of its complexity and vulnerability. While increases in productivity should be able to meet rising demand well into the future, numerous challenges in areas of sustainability, immigration, governance, food safety, and nutrition cause concern for many in and around the U.S. Agribusiness Sector. To ensure the Sector can respond to those challenges and maintain its competitive advantage over the long-term, the U.S. government will need to remain heavily involved while balancing numerous competing priorities and interests of the Sector's diverse components.

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Colonel Patrick Shaw, U.S. Air Force, Faculty
Mr. James Lapse, Faculty
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PLACES VISITED

Domestic:

Whole Foods Market, Springfield, VA
Springfield Golf and Country Club, Springfield, VA
DAI, Bethesda, MD
International Food Policy Research Institute (IFPRI), Washington, DC
Consultative Group on International Agricultural Research (CGIAR)
United States Agency for International Development (USAID)
Virginia Poultry Growers Cooperative, Hinton, VA
Poultry Specialties, Inc, Dayton, VA
Smithfield Foods, Smithfield, VA
United States Senate Committee on Agriculture, Nutrition, and Forestry, Washington, DC
Gladhill Tractor Mart, Inc, Frederick, MD
John Deere Worldwide, Washington, DC
Office of United States Trade Representative, Washington, DC
Southern Maryland Agricultural Development Commission, Hughesville, MD
Villa de Alpacas Farm, LLC, Aquasco, MD
Clagett Farm, Upper Marlboro, MD
United States Department of Agriculture, Agricultural Research Service, Beltsville, MD
Purdue University School of Agriculture, West Lafayette, IN
Purdue University Agronomy Center for Research and Education, West Lafayette, IN
Purdue University Animal Science Research and Education Center, West Lafayette, IN
Huffman and Hawbaker Farms, Lafayette, IN
Roots of Change, San Francisco, CA
Center for Urban Education about Sustainable Agriculture, San Francisco, CA
San Francisco Fish Company, San Francisco, CA
Corison Winery, St. Helena, CA
Frog's Leap Winery, Rutherford, CA
BenDen Farms, Colusa, CA
Lundberg Farms, Richvale, CA
Foster Farms, Turlock, CA
Producers Dairy, Kerman, CA
Greenleaf Farms, Dinuba, CA
Mulholland Citrus, Orange Cove, CA
Orange Cove – Sanger Citrus Association, Orange Cove, CA
SYSCO Foods, Salinas, CA
River Ranch Fresh Foods, LLC, Salinas, CA
Tanimura and Antle Inc., Salinas CA
New Leaf Food Safety Solutions, Salinas, CA
California Agricultural Leadership Foundation, Salinas, CA
Gills Onions, LLC, Salinas, CA
Rancho Cielo Youth Campus, Salinas, CA
Revolution Foods, Oakland, CA
The Chez Panisse, Berkeley, CA
The Chez Panisse Foundation's Edible Schoolyard, Berkeley, CA



International:

I2I consulting, New Delhi, India
National Bureau for Plant Genetic Resources, Division of Germplasm Conservation, New Delhi, India
United States Embassy, New Delhi, India
H.H. Global Sources, Chandni Chowk Market, Old Delhi, India
Azadpur Fruit & Vegetable Market, New Delhi, India
Quick Silver Freight Systems Pvt. Ltd, New Delhi, India
Fresh & Health Enterprises, Ltd., Sonpath, India
Ministry of Agriculture, National Horticulture Board, Gurgaon, India
Ministry of Industry, National Food Institute, Bangkok, Thailand
Thai Rice Exporters Association, Bangkok, Thailand
Ministry of Agriculture and Agricultural Cooperatives, Office of Agricultural Economics, Bangkok, Thailand
Central Foods Retail Company, Ltd., Bangkok, Thailand
Charoen Pokphand Group Co., Ltd, Bangkok, Thailand
United States Embassy, Bangkok, Thailand
Thailand Development Research Institute, Bangkok, Thailand
United States Consulate General, Hồ Chí Minh City, Vietnam
Hồ Chí Minh City Department of Agriculture & Rural Development, Hồ Chí Minh City, Vietnam
Đồng Nai Dairy Cattle Farm, Long Thành District, Đồng Nai Province, Vietnam
Saigon Coop, Nguyễn Đình Chiểu Market, Hồ Chí Minh City, Vietnam
Vissan Limited Company, Hồ Chí Minh City, Vietnam
Institute of Agricultural Science, Hồ Chí Minh City, Vietnam

Organizations that Provided On-Campus Presentations:

United States Department of Agriculture, Research Education and Extension Office (REEO)
United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS)
United States Department of Agriculture, Economic Research Service (ERS)
United States Department of Agriculture, Agricultural Research Service (ARS)
Strategic Solutions
Army National Guard Readiness Center
The Center for Public Integrity
Department of Defense Combat Feeding Directorate
Cargill Incorporated
United States Department of State, Bureau of Economic, Energy and Business Affairs
Monsanto Company
Bunge North America
American Sheep Industry Association
American Wool Council
National Cotton Council
Food and Drug Administration, Center for Food Safety and Applied Nutrition



INTRODUCTION

U.S. agriculture, in its ability to provide food security to the nation, is a fundamental source of national power. For decades, American farmers have provided that security by producing enough inexpensive food to feed not only the entire country but much of the world as well. In doing so, they made the U.S. the world's top food producer - a position that will remain secure well into the foreseeable future.¹ However, despite the remarkable productivity of U.S. agriculture, there are several challenges that, if left unaddressed, could threaten the nation's future food security. These challenges require active coordination and cooperation between private industry and government in order to take into account the diverse perspectives and interests of stakeholders that often result in conflicting policies.

The purpose of this report is to provide a strategic perspective on the U.S. Agribusiness Sector and its contribution to national security. Due to the size, scope, and complexity of the Sector, this report cannot be all inclusive and thus focuses on the initial stages of the food value chain. In doing so, this report examines several aspects of U.S. Agribusiness, including its current condition, the challenges it faces, and the outlook on its ability to respond to the national security needs of the nation in both the near- and long-term time horizons. This report also discusses the role of government and provides recommendations on current policies and practices that affect the Agribusiness Sector's strength and viability. The report and its recommendations are based on academic research and analysis, as well as discussions with food producers, processors, distributors, wholesalers and retailers, farm equipment manufacturers, university researchers, non-profit organizations, think tanks, and government officials in the United States, India, Thailand, and Vietnam.

THE INDUSTRY DEFINED

Agribusiness cannot be described as a single industry but rather as a complex sector comprised of many different industries that are global in scope. Broadly defined, it covers "all economic activity that supports farm production and the conversion of raw farm products to consumable goods."² Additionally, these activities include a number of supporting industries that may or may not be unique or dedicated to agriculture, such as transportation, energy, and biotechnology, as well as public and private entities engaged in policy formulation and regulation. Figure 1 depicts the Agribusiness value chain in the U.S. that begins with inputs and ultimately ends with consumers. The dotted line indicates the scope of this Industry Study.

The sheer scope and complexity of U.S. Agribusiness requires a systematic approach towards analysis since the structure, conduct, and performance of the associated industries vary greatly throughout the value chain. For this paper, the themes of food security, sustainability, and nutrition narrowed the focus of the Agribusiness Industry Seminar onto the initial stages of that value chain, specifically agricultural inputs, production, and food processing, excluding non-food products like cotton and timber. Within these segments alone are 1,401,561 businesses in the U.S. with annual revenues of \$1.3T.³



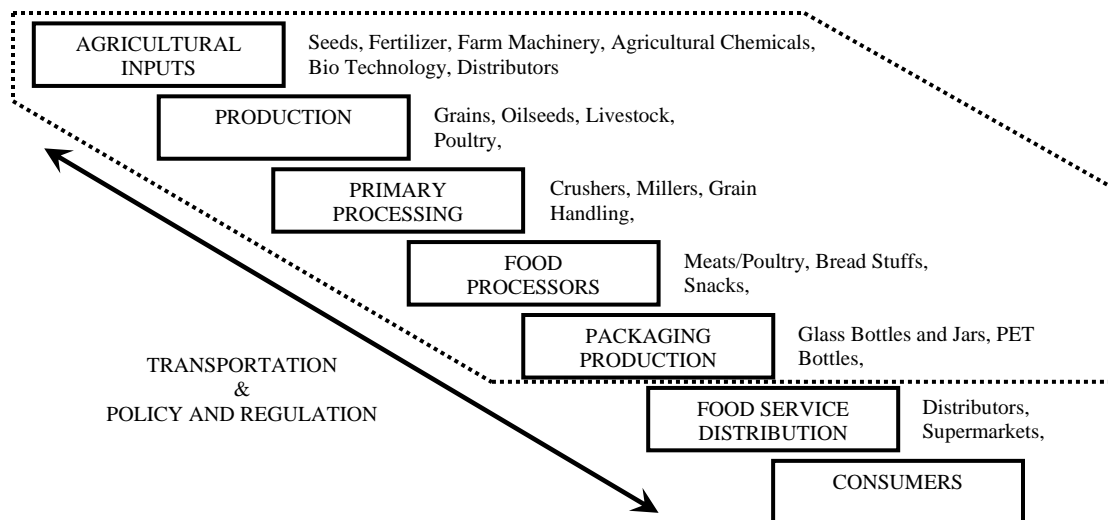


Figure 1: Agribusiness Value Chain

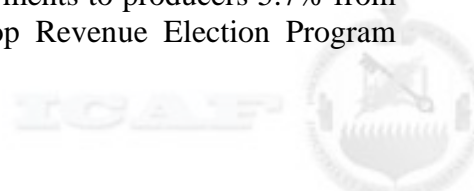
CURRENT CONDITION

The latter half of the 20th century in the U.S. saw a dramatic shift away from small family-owned and operated farms towards large industrial farming operations capable of mass production. This shift produced a heavy reliance on petroleum-based fertilizers, weed and pest control chemicals, and most recently on genetically modified plants, leading to extensive single-crop, or monoculture, farming.⁴ As a result, the U.S. developed a strong competitive advantage that has made it the world's top food producer.

Strategic Environment

Agribusiness in the U.S., as defined in this report, currently comprises 9.5% of the Gross Domestic Product (GDP)⁵ and is responsible for employing 3.5 million people, which represents 1.1% of the U.S. population.^{6,7} These figures contrast significantly with much of the developing world where 40-60% of the population still works on the farm and contributes to over 60% of their nation's GDP.⁸ Another important contrast is the portion of income spent on food. Americans, on average, spend less than 10% of income on food whereas people in parts of the developing world spend upwards of 60-70% and are consequently more deeply affected by price spikes.⁹ These percentages have increased in recent years with the last economic downturn and the 2008 and 2011 spikes in food prices. Rising global demand, brought on by population and economic growth, coupled with restricted supply due to adverse weather in key production areas will likely continue to produce volatility in food prices.

Following a major downturn in 2009, all three measures of earnings (net cash income, net value added, net farm income) are projected to rise at modest levels in for the foreseeable future across the Sector.¹⁰ These projected gains will outpace the expected increases in farm production expenses driven by high demand for farm inputs, a weak U.S. dollar, and increased fuel costs. In addition, the U.S. government expects to reduce payments to producers 5.7% from 2010 levels as a result of implementation of the Average Crop Revenue Election Program



provisions authorized under the Food, Conservation, and Energy Act of 2008.¹¹ The Sector as a whole will also continue to grow, but at a somewhat reduced rate with processors and wholesalers having the most growth and increase in revenues.¹²

Current structure, conduct, and performance within the Sector

The Sector's complexity and scope makes it impossible to characterize with any single business model. The competitive structure ranges from near perfect competition for the commodity farmer to near monopolies for some seed and chemical companies. Within those extremes, there are monopsonies for processors, monopolistic competition for shipping, and oligopolies for farm equipment. Additionally, conduct varies within industries depending on location and/or stratifications within them (e.g., farmers can join cooperatives or contract with large processing facilities to supply product). These disparate structures complicate analysis of the industry and create challenges for regulation and oversight.

Agricultural Inputs represent the first segment of the value chain. Major firms in this segment include Monsanto, which specializes in agricultural productivity, seeds, and genomics, and John Deere, the world's largest manufacturer of farm tractors.¹³ Within the seed industry, the competition is largely monopolistic with Monsanto controlling over 80% of the U.S. corn, soybean, and cotton seed market. Monsanto has a strong global presence holding 25% of the international seed market and has opened research and development facilities in China to expand operations. John Deere competes in an oligopoly made up of a small number of firms, most notably caterpillar Inc., and this group's behavior trends toward monopolistic competition. Deere currently derives 37% of its revenue from outside of the U.S. and Canada and seeks to increase that to 50% by 2018.¹⁴ Both examples (Monsanto and Deere) have had generally increasing revenues and earnings per share but quarter-to-quarter values of these indicators also reflect volatility from 2008 onward.¹⁵

In the Production Segment, one sees continued consolidation of small to mid-sized farms into larger operations. As of 2007, there were 2.2 million U.S. farms, down from over 6.4 million in the 1920s.¹⁶ Currently, the largest 10% of farms account for 81% of the agricultural production in the U.S.¹⁷ At the other end of the scale, the traditional family farm contributes a small fraction of overall production. Due to near perfect competition at the farm level, there is little differentiation between large and small farm products. This leads to low pricing power for the farmer, regardless of size. Large-scale industrial operations are able to overcome low profit margins with high production volume. Small farmers, on the other hand, often rely on other sources of non-farm income to provide their primary means of support.

As examples of the diversity of this segment, agriculture production is comprised of 20 North American Industry Classification Systems (NAICS) codes and is segmented into various types of crops (corn, wheat, soybeans, vegetables, fruits, nuts, etc.), livestock (beef, hogs, chickens, sheep, etc.), and dairy.¹⁸ High commodity prices have generally helped the crop farmers who produce them but not the livestock and dairy sectors that rely on grains for feed. Coupled with the economic downturn and health concerns, the beef industry revenues have been flat since a precipitous drop in 2008. The rest of the production segment has had positive trends which are projected to continue, but with increased volatility. This segment is becoming increasingly dominated by large multinational vertically-integrated corporations such as Archer Daniels Midland, Cargill, and Bunge that interact with the production segment through contract farming.



The Food Processing Segment of the value chain falls between near perfect competition and oligopoly. Depending upon the product, this market is extremely competitive with brand equity and differentiation playing major roles. Within the value chain, processors receive the largest share of the “food dollar” at 18.6 cents in comparison to the 11.6 cents the farmer receives.¹⁹ U.S. food processors comprise 36% of the total share of the Agribusiness Sector, through which \$468 billion of total revenue passes.²⁰

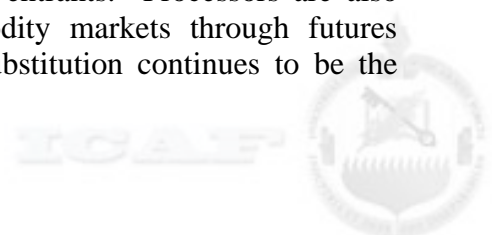
Like production, this segment is comprised of numerous NAICS codes (29 currently) but within each code there are generally fewer businesses. Due to government regulation associated with food safety as well as high capital investment costs, the barriers to entry are highest in this segment with the environment favoring large industrial operations.²¹ Financial performance has been somewhat stagnant for the last several years thus placing increased emphasis on product differentiation.

U.S. food exports in 2010 were \$108 billion and imports were \$79 billion, continuing a trend of surpluses in this area.²² However, imports have slowly been rising, due to increased demand for variety, organic, and out-of-season produce. Countries such as Brazil, Chile, and Mexico have steadily increased commodity crop production and are now offering stronger competition on the global market. These additional production sources alleviate some of the scarcity pressures associated with a growing global population; however, there are issues with sustainability. As a result, many of the large multinational corporations across the value chain are looking globally for continued growth as well as adopting vertical integration.²³ U.S. regulation and trade policies can have a major role in strengthening their traditional competitive advantage in this area.

Domestically, and in much of the developed world, there has been increased attention towards multi-crop, or polyculture, farming operations and organic produce. This trend is largely due to environmental and sustainability concerns. In spite of traditionally higher organic product costs, demand has continued to outstrip U.S. supply. While organics represent just 3% of the total market, large growers are beginning to pursue organic growing practices in order to take advantage of higher margins for those products.²⁴ Additionally, retailers such as Wal-Mart are expanding their offerings into organic branding to increase differentiation and gain a greater share of the market. Polyculture farming continues to find appeal in niche or limited supply applications but it has not proven capable to meet the production capacity required to feed a growing population.

Business strategies of key firms

Major Agribusiness firms have adopted a variety of strategies to succeed in a very competitive global market. For example, Monsanto, the world’s largest seed supplier, devotes a nearly \$1 billion of its annual budget to research and development (R&D) both in the U.S. and overseas, especially in the area of genetically modified seed products. The formidable patent portfolio Monsanto derives from R&D continues to effectively deter new entrants to the market and maintain its power over buyers to set prices. In contrast, food processors like Archer Daniels Midland (ADM) and Smithfield Foods face considerable power from both suppliers and buyers as the cost of feed has risen markedly. In response, they are becoming more vertically integrated to reduce the power of suppliers and buyers and to deter new entrants. Processors are also pursuing a strategy to mitigate growing volatility in commodity markets through futures contracts and other financial hedging mechanisms. Product substitution continues to be the



biggest threat to the animal processing segment and less so for the more product diversified grain processors. ADM's ability to increase the volume and diversity of its products through expansion and acquisition has made it the market leader in leveraging economies of scale. Its growth has been supported by vertical integration that includes a large and responsive transportation and distribution network.²⁵

Overall, U.S. Agribusiness is quite healthy. Rising global demand should bring various degrees of increased revenue for many in the Sector. However, there are pockets of instability at the small farm level and in geographic regions facing shortages in labor or shrinking availability of natural resources resulting from urban encroachment and climate change. These provide indicators into the broader issues of concern that deal with food security, sustainability, and health of the American population as a result of diet. While U.S. Agribusiness is actively allocating resources to address these issues, more work remains, especially in coordination with the U.S. government.

CHALLENGES

The Agribusiness Industry Study Seminar observed considerable concern amongst government and industry participants pointing to the global challenge of being able to provide the necessary food, feed, fiber, fuel, and other resources to meet the needs of a world population projected to reach 9 billion by 2050.²⁶ Within that long-term view lie several more immediate challenges that must be addressed if U.S. Agribusiness is to maintain its preeminent position in the world. These challenges include: 1) boosting net productivity in a sustainable manner under increasingly volatile and uncertain conditions, 2) providing a stable workforce, 3) improving the consistency of U.S. government policy, 4) protecting the food supply, and 5) improving the health and nutrition in the American diet.

Challenge #1: Boosting net productivity in a sustainable manner

Current projections of world population growth and rising incomes in the coming decades will mean a substantial growth in the demand for food. This growth will be accompanied by significant changes in global diets as rising incomes allow people to replace grains and other staples with proteins, fruits, and vegetables. To meet that growing and changing demand, the U.N. estimates global agricultural output will need to double by 2050.²⁷ Unfortunately, there are several factors working against the achievement of that goal, including, climate change, dwindling natural resources, spoilage, decreasing public R&D, and short-sighted bio-energy policies.

Climate change: While the causes of climate change remain a topic of debate, there is general consensus among scientists and governments worldwide that it is real and many in Agribusiness are beginning to perceive its effects. In areas more reliant on traditions and techniques passed down over generations than on cutting-edge technology, the increasing unpredictability of the weather is making it more difficult for farmers to maintain current productivity levels. For example, rising sea levels and increasing salinity of water tables in Vietnam's Mekong Delta region have impacted production of its rice crop. In India, increasing variability in the monsoon season makes it difficult for farmers to determine when they should plant and harvest their crops.



Dwindling natural resources: For centuries, agricultural output has kept pace with population growth and rising incomes by increasing its use of natural resources such as land and water. This strategy is becoming increasingly difficult to sustain for U.S. producers because arable land is already developed, and in some areas is actually diminishing due to urban encroachment. Some relief exists in other parts of the world, mostly Africa and South America, where the last 10% of arable land remains undeveloped. However, expansion in those regions is difficult due to lack of infrastructure, and is controversial since much of this land is in or near environmentally sensitive areas like the rainforest.²⁸ Furthermore, soil health in many areas is declining as a result of extensive fertilizer use and poor farming practices that deprive the soil of nutrient-rich biomass. The outlook for agriculture's other primary natural resource, water, is also cause for concern. Access to fresh water represents the greatest limiting factor to increased productivity as water tables worldwide are falling by as much as 4-5 feet per year in some areas.²⁹ Currently, 70% of all fresh water in the U.S. is used for agriculture.³⁰ In the future, that percentage will likely decrease as farmers compete against urban areas for access to water resources.³¹

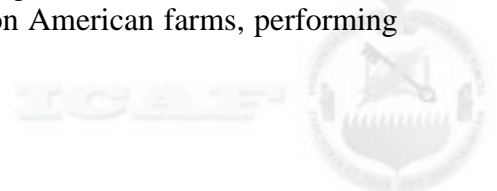
Spoilage: Simply producing more food will not be enough to meet future demand. Reducing the amount of spoilage throughout the world is also critical to increasing the supply of food. Today the world produces more than enough food to feed everyone in it, yet more than one billion people are malnourished. Spoilage, which results in the loss of at least 30% of agricultural products worldwide,³² is a primary factor. In the developed world, waste occurs in grocery stores, restaurants, and the homes of consumers; whereas in the developing world, spoilage results from a lack of modern storage, transportation, and processing facilities. Therefore, increasing productivity where food is needed most will require not only increasing yield per acre at the farm level, but reducing waste throughout the entire food system by investing in infrastructure to reduce the amount of post-harvest spoilage.³³

Decreasing public sector R&D: Despite the fact that the average return on investment for agricultural R&D is more than 40%,³⁴ governments across the globe, including the U.S., have reduced public sector R&D investment as a result of economic pressures. Since it takes years to reap the benefits of such investments, the effects of recent government cuts will not be felt for some time. On the other hand, private investment in agricultural research has increased, but this research is more narrowly focused and primarily benefits the corporations that possess the intellectual property the research produced.³⁵

Short-sighted bio-energy policies: Government policies mandating the use of ethanol have created a market where almost 23% of all corn in the U.S. goes toward the production of fuel for our cars.³⁶ While directly benefiting corn farmers and ethanol producers, the net result has been an increase in food and feed costs throughout the world. This has led many to question whether or not fuel production is the best use of what has become increasingly valuable farmland.

Challenge #2: Providing a stable workforce

Migrant labor is an integral part of U.S. Agribusiness. Migrant workers, at least half of whom are believed to be illegal,³⁷ are a primary source of labor on American farms, performing



the type of work most Americans are unwilling to do at current wage levels. These workers provide several economic benefits, including cheaper food for consumers and additional contributions to the tax base. However, illegal immigration poses a threat to national security and puts a financial strain on local governments. Regardless, how the U.S. chooses to deal (or not deal) with those who are in the country illegally will significantly affect the viability of U.S. Agribusiness and ultimately the consumer's cost of food.

Challenge #3: Balancing Competing Interests in Designing U.S. Government Policy

The government's main vehicle for promoting, regulating, and shaping U.S. Agribusiness is the Farm Bill. However, a common theme throughout the Seminar's discussions with Sector participants was the challenge of inconsistent government policies in this legislation that complicates the development of business strategies and competition in global markets. This challenge is borne out of the government's need to balance the interests of many different stakeholders and will be discussed in detail in the Government Goals/Role section. The essay section addresses the direct national security implications of government food aid policy and highlights the importance of the Agribusiness supply chain to Department of Defense logistics.

Challenge #4: Protecting the Food Supply

Protecting the food supply requires two distinct approaches: food defense and food safety. Food defense seeks to prevent intentional acts such as poisoning and agroterrorism, whereas food safety is aimed at preventing and mitigating the effects of accidental contamination. In seeking to ensure both, the U.S. government has implemented a complex bureaucracy prone to both mission redundancies and gaps. The essay section discusses this challenge and provides recommendations on how the government can improve its food safety and defense capabilities.

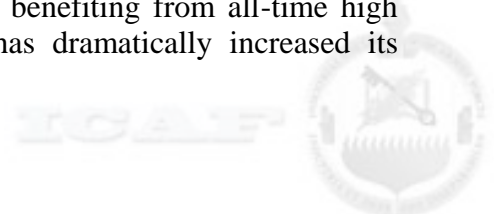
Challenge #5: Improving Health and Nutrition in the American Diet

The current food system provides enough calories for the U.S. population; however, access to a properly balanced and nutritious diet is not available to all. Without proper nutrition, Americans will become less healthy and productive. Health care costs will continue to increase as a result. The essay section discusses these challenges in detail and provides several recommendations.

OUTLOOK

Even with these challenges, the 5 to 10-year outlook for the producers and processors across the Agribusiness Sector is quite positive. Current commodity prices, while volatile, are expected to trend higher, as demand in overseas markets continues to expand. Price of inputs will also continue to rise, affecting the profitability of some in the Sector more than others.

The producers on the farm will continue to benefit from global demand for increased agricultural production. Commodity producers in particular are benefiting from all-time high prices for corn, soybeans and cotton. China, for example, has dramatically increased its



consumption of U.S. agricultural commodities, with imports of U.S. soybeans in particular tripling in the last ten years.³⁸ While meat producers are currently faced with high feed prices, they are taking advantage of export markets as demand for animal protein is rapidly increasing to meet higher standards of living in places like China, India, Thailand, and Vietnam. Commodity farmers, especially corn farmers, are also beneficiaries of ethanol mandates that have increased demand for their products and the value of their assets. With corn prices at all time highs, the value of farm land in Nebraska has risen 22% since February 2010, allowing farmers to increase their lines of credit which enables them to purchase new equipment and increase overall productivity.³⁹

Another factor contributing to a positive outlook is the expansion of trade. Free trade agreements with Korea, Panama, and Colombia currently in the Senate ratification process will expand new markets for U.S. agricultural products. Further, the Trans Pacific Partnership trade agreements offer 12 expanded markets for Agribusiness. Although it appears completion of the World Trade Organization Doha Round effort to bring down global agricultural trade barriers will be further delayed, trade continues to liberalize rather than retrench.

Lower grain reserves are a cause for concern in terms of national security since there is less ability to absorb unforeseen shocks (e.g., drought, disease) that may abruptly curtail production in the future. However, they are also a telling forecaster of healthy global demand for U.S. grain and efficient, timely production chains within Agribusiness. An excess of grain reserves could indicate sluggish or depressed economic conditions where supply was far outpacing demand.

On the domestic front, new niche markets also exhibit robust growth. Large scale organic marketing continues to produce high profit margins for those large scale agricultural firms that have dedicated part of their business plans to meeting the increasing demand for organic products. Local producers are also benefiting economically from the organic movement. Direct marketing to consumers via membership cooperatives or farmers' markets have provided another small yet highly profitable niche market in the U.S. for organic farmers.

While climate change presents many challenges as discussed above, it also presents numerous opportunities for U.S. Agribusiness. The Green Movement holds great promise for continued economic growth in the Agribusiness Sector as new technologies offer opportunities to reduce energy consumption, leverage waste products and more efficiently deliver water and fertilizer to crops. For example, agriculture and land use change currently contribute to 31% of total global greenhouse gas (GHG) emissions, compared to just 26% from the energy production sector (electricity and heat).⁴⁰ Since it is cheaper to reduce carbon emissions through changes in agriculture as opposed to energy, the potential impact produced with relatively lower investment makes this a very attractive business opportunity.

Another opportunity comes from major venture capital firms which are seriously considering investment in cutting edge agricultural technology.⁴¹ Requirements for sustainable yet intensive production to meet both the increasing demand for food and the environmental protection imperatives of climate change have the potential for new, highly profitable markets. Venture capital offers a private/for-profit finance vehicle that demands high potential rates of return. In the past, agriculture was the sector least likely to offer high rates of return. Since major venture capital firms are poised to enter the agricultural sector for the first time, earnings outlook for the Sector are considered to be good.⁴² For consumers, on the other hand, this indicates the potential for rising future food prices.



In summary, the overall outlook for Agribusiness is healthy as gradually rising food prices and expansion into foreign markets offer great opportunities to improve the Sector's viability for the next 5 to 10 years. The key short-term challenge for the Sector will be not just in meeting higher demand, but doing so in such a way that prevents spikes in food prices that could lead to political unrest. The long-term challenge will be to continue meeting that demand without negatively affecting the environment. To help U.S. Agribusiness meet those challenges, the U.S. government will need to be actively involved, especially in dealing with such things as climate change, dwindling resources, and illegal immigration.

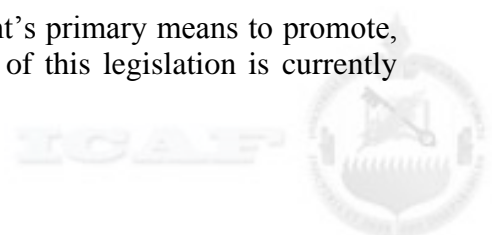
GOVERNMENT GOALS, ROLE, AND RECOMMENDATIONS

The level of government involvement in the Agribusiness Sector is a clear indicator of its importance to U.S. national security. Even though its contributions to national employment and GDP are relatively small, when one accounts for related industries that either provide inputs to or rely on outputs from Agribusiness, the overall contribution to the U.S. economy is quite large. More importantly, healthy food is as important to life as water and oxygen. Without food security a government cannot ensure domestic tranquility, promote general welfare, nor secure the blessings of liberty for its current or future citizenry. For these reasons, food security is vital to political stability, as has been illustrated in recent unrest in the Middle East caused in part by rising food prices.⁴³ Given this reality, few sectors receive more attention from the U.S. government than Agribusiness.

With regard to the Agribusiness Sector, the government has two primary roles: to ensure domestic food security and safety, and to promote and protect the viability of U.S. Agribusiness both domestically and abroad. In fulfilling the first role, the government has three important goals: 1) to stabilize food prices, 2) to ensure access to nutritious food for all citizens (through education and welfare programs), and 3) to ensure the safety of food (from both intentional and unintentional acts). In its other role, the government promotes and protects the viability of U.S. Agribusiness through a variety of mechanisms that are aimed at balancing the playing field for Sector stakeholders. These mechanisms include direct and indirect subsidies, crop insurance and assistance, tariffs, free trade agreements, mandates, and other policies or regulations meant to encourage or discourage certain behaviors. Implementation of these may not necessarily align with market forces and thus produce unintended negative consequences within other parts of the Agribusiness Sector and society in general. The current ethanol mandate is an excellent example of this.

Although well-intentioned, the effects of government involvement have been decidedly mixed. On one hand, the government's role in food safety regulation and nutrition programs has produced benefits for a significant portion of the American population. On the other hand, government involvement aimed at serving specific constituent interests have sometimes produced unintended negative consequences for others. This highlights the fact that balancing tradeoffs and competing interests in such a large and diverse sector is not easy. The main reasons for negative effects of government involvement in Agribusiness are twofold: either the policies have not kept pace with changes in the situation for which they were originally intended, or the second and third order effects of the policies were not anticipated or considered in the creation of the policies.

The Farm Bill, for example, is one of the U.S. government's primary means to promote, regulate, and shape the Agribusiness Sector. The 2012 version of this legislation is currently



under consideration in Congress. Its predecessor, formally called the Food, Conservation, and Energy Act of 2008, was a 1,770-page document detailing 136 federal programs including important non-farming social programs like the Supplemental Nutrition Assistance Program (SNAP; also known as Food Stamps).

To strengthen Agribusiness and its ability to support national security, we make the following policy recommendations, in addition to those specific to the essay section.

Recommendation #1:

To address the challenge of boosting productivity in a sustainable manner, the U.S. should consider a variety of policy options:

- Whether or not climate change is reversible, the U.S. needs to consider measures like a strategic grain reserve that will enable it to weather major disruptions to global supply in the future. Furthermore, to address farmer's continued access to water, the U.S. should accelerate the adjudication of environmental challenges to proposed water projects.⁴⁴

- Regarding bio-energy, the U.S. government needs to conduct a comprehensive cost-benefit analysis of current ethanol mandates. Additionally, it should accelerate the development of alternative sources of fuel that: 1) do not compete with food crops for arable land, 2) do not utilize biomaterial to the detriment of sustainable soil health, and 3) leverage existing infrastructure for production and transportation to the greatest extent possible.

- Regarding R&D, the U.S. government should maintain or increase its current level of investment and seek more opportunities to partner with the private sector on ways to boost total agricultural productivity and the nutritional content of food. Most private sector R&D currently focuses on genetic modifications to improve yields. However, development of new agronomic practices and enhanced infrastructure for the transportation and storage of food to reduce spoilage offer considerable improvements in overall productivity as well. Since genetic modification is a controversial topic, more research and government oversight is needed regarding genetically modified organisms (GMOs). This will support enhanced strategic communications and education programs on safety and the role GMOs can play both in ensuring food security and sustainability.

Recommendation #2:

Confronting the issue of illegal immigration requires new policies that take into account the needs of farmers and workers alike while preserving our borders and national security. One approach is a form of guest worker visa like the Bracero Program that ran from 1942-1964.⁴⁵ Its present day successor is the H-2A visa program that progressive farmers are leveraging to secure legally documented workers on a temporary basis, especially in the southwest with its short winter growing season. However, the administrative costs of compliance with all the terms of the program present a barrier to many other farmers. Therefore, the government should streamline the process for farmers to use the H-2A visa program and consider other incentives, including subsidies to offset costs, to encourage more participation.



Recommendation #3:

Ideally, the purpose of government intervention is to correct imbalances and market failures. Unfortunately, in attempting to serve the desires of specific constituent interests, government policy has a tendency to create as many problems as it solves. Therefore, Congress needs to do a more thorough job evaluating the second and third order effects of the policies under consideration before they are implemented.

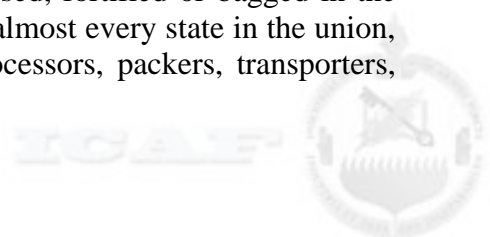
Furthermore, the U.S. should continue its role as a leader in developing the total capacity of world agriculture by helping countries develop their agriculture and infrastructure systems, as well as other sectors like manufacturing and services. Recent focus of U.S. aid has been more on development and less on agriculture itself since the problem has not been a lack of food, but rather poverty. Low technology farming operations have little incentive to increase yields through innovation and mechanization as long as the lowest level agricultural workers have no alternative employment options. While such development strategies may increase foreign competition, those concerns need to be balanced against the benefits of global stability and the potential expansion into new markets.

ESSAYS

Essay #1: National Security Consequences of Reducing or Eliminating “In-Kind” Food Aid By: CDR Steven Brock and Ms. Susan Henry

The United States is the leading provider of international food assistance, contributing over 60% of food aid worldwide. Over the past 50 years, 160 million metric tons of U.S. agricultural commodities donated in-kind have assisted 3 billion people in over 150 countries.⁴⁶ However, the motivations and methods behind this largess are a growing point of political contention both domestically and internationally. Some argue food aid should be a depoliticized international development tool, focused solely on the humanitarian needs of the food insecure. Given current domestic economic conditions, others find it fashionable to argue U.S. international food aid is charity the nation can no longer afford. Both these views fail to fully appreciate the significant economic and security interests embedded in U.S. food aid programs. Projected budget cuts to aid programs, along with proposals to replace traditional in-kind aid with overseas procurement, threaten to jeopardize thousands of U.S. agribusiness and maritime industry jobs. This essay addresses the direct impact reductions in food aid would also have on the Department of Defense and U.S. strategic sealift. In order to ensure the continued viability of a U.S.-flag merchant fleet vital to national security, it recommends in-kind aid programs and associated cargo preference laws be maintained as this country’s primary food aid delivery vehicle.

Title II of the Food for Peace Act (PL 480) is the cornerstone of U.S. food aid, accounting for over 90 percent of both the funds appropriated and the tonnage shipped. The USAID-administered statute authorizes “in-kind” aid in the form of U.S. agricultural commodities purchased by USDA’s Commodity Credit Corporation in U.S. markets. Additionally, 75% of total food aid commodities must be processed, fortified or bagged in the U.S.⁴⁷ PL 480 food aid positively contributes to the economy of almost every state in the union, with benefits accruing not only to farmers but also to food processors, packers, transporters,

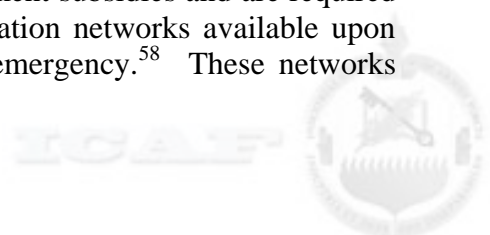


railroads, stevedores, ocean carriers and others.⁴⁸ Based on Department of Commerce statistics, the handling, processing and transport of commodities from the farm to foreign ports of debarkation generated close to \$2 billion in U.S. industry output and \$523 million in household earnings in Fiscal Year 2009.⁴⁹

Critics of in-kind food aid argue that it distorts local markets and retards local economic development. They advocate for local or regional procurement (LRP) in or near the recipient country to strengthen and expand local commercial markets, stimulate local and regional production, reduce emergency food aid requirements, and increase the total amount of food aid available. “In-kind” proponents question the extent to which local food is actually available and cite uncertainties about local logistics and transportation capabilities, the enforceability of contracts, and food quality and safety. Moreover, LRP would eliminate domestic economic and security benefits that have been at the core of Food for Peace policy. While only fifty cents of every dollar of U.S. in-kind food aid can be attributed to the cost of the food procured, the remaining 50 cents invested in the agribusiness supply chain helps build and maintain the domestic political consensus for U.S. food aid.⁵⁰ While LRP authorities should be preserved for use in circumstances where in-kind aid is not feasible, the domestic benefits that accrue from in-kind aid are vital to safeguarding the political support for foreign aid across constituencies vested in the agribusiness and maritime industries. LRP authorities may be appropriate to meet urgent food needs pending the arrival of Title II aid, or when the in-kind aid available from the U.S. is not acceptable to the recipient country.⁵¹ Apart from these or other similar exceptions, however, in-kind aid under Title II should continue as the primary basis for U.S. food aid. Accordingly, U.S. negotiators must ensure that in-kind aid is preserved as an option in the ongoing re-negotiation of the international Food Aid Convention.⁵²

A coherent policy incorporating use of both in-kind and LRP donations, as appropriate, will facilitate U.S. food aid objectives as well as U.S. agribusiness and other related economic interests. Moreover, of direct import to the Department of Defense, in-kind aid also contributes to the health of the U.S. merchant marine and supports U.S. sealift capability. Reductions to in-kind aid could have a direct impact on the strength of the U.S. merchant marine and the U.S.-flag fleet that delivers that food aid. The Cargo Preference Act that accompanied the 1954 food aid legislation mandated that at least 50% of the tonnage of cargoes generated by federal programs be transported on U.S.-flag ships. In 1985, in the face of a rapidly disappearing U.S.-flag merchant fleet, and over strong opposition from Farm Belt legislators, Congress increased this indirect subsidy, mandating at least 75% of agricultural commodities require U.S.-flag transport.⁵³ The U.S. Maritime Administration states cargo preferences are necessary to provide a revenue base that will retain and encourage a privately owned and operated U.S.-flag merchant marine vital to providing essential military sealift capability and a cadre of skilled American seafarers.⁵⁴ The U.S. TRANSCOM Commander has also consistently defended cargo preferences as necessary to preserve a strong and viable U.S.-flag fleet.”⁵⁵

Both the cargo preference and Maritime Security programs provide incentives to retain privately owned U.S.-flag ships and their U.S. citizen mariners for commercial and national defense purposes.⁵⁶ By allocating a percentage of federal cargoes to U.S.-flag vessels, the cargo preference program provides an economic incentive for vessel owners to pay the higher costs associated with U.S.-flag registry and to employ U.S.-citizen crews.⁵⁷ Operators participating in the Maritime Security Program (MSP) also receive direct government subsidies and are required to make their ships and global intermodal commercial transportation networks available upon Secretary of Defense request during times of war or national emergency.⁵⁸ These networks



include logistics management services, infrastructure, terminal facilities and U.S. citizen merchant mariners to crew government and commercial fleets.⁵⁹ Higher shipping costs on U.S.-flag vessels might reduce the amount of U.S. agricultural commodities that can be procured with Food for Peace funding, but approximately half of U.S.-flag ships depend on cargo preference mandates associated with Food for Peace aid programs.⁶⁰

Mandated U.S. government cargos account for over half of the tonnage transported by the U.S.-flag fleet, and Title II food aid accounts for about one third of that preferred cargo.⁶¹ In FY08, the U.S. shipped 2.2 million tons of Title II food aid, requiring approximately 20% of the U.S.-flag fleet total capacity.⁶² If in-kind food aid volume is eliminated or reduced, the current size of the U.S.-flag fleet could be expected to contract in response to the reduced demand for transport. Using LRP to the exclusion of in-kind food aid could potentially result in a corresponding 20% reduction in U.S.-flag fleet tonnage (the equivalent of 12-15 ships). U.S. vessels would be compelled to re-flag to foreign registries of convenience in order to obtain labor and regulatory cost advantages necessary to compete under current global, free market conditions. Most of the ship losses would come in aid-optimized container and bulk carriers. These make up approximately half of the 60-ship U.S. Maritime Security Program (MSP).⁶³ As ships re-flag, infrastructure and ocean freight jobs would also migrate abroad. Some estimate that 4,000 ocean freight jobs—to include critical seagoing citizen mariners-- could be lost, resulting in a further loss of 35,000 related jobs in the U.S. economy.⁶⁴ Importantly, a portion of these U.S. citizen mariners who man the U.S.-flag fleet are also required to man TRANSCOM's Surge Fleet and Ready Reserve Force vessels in times of conflict or national emergency.⁶⁵

The Maritime Administration is currently conducting a thorough study of cargo preference laws “to ensure that they most effectively support the delicate balance of commercial viability and readiness which is so critical to our sealift capability.”⁶⁶ The Department of Defense should complement the Maritime Administration study with its own military sealift risk analysis to accurately assess the impact of changes to food aid policy—and, thus, food aid shipments—on national security sealift requirements and military readiness. If food aid is reduced, the U.S.-flag fleet's loss of revenue from agricultural cargo preferences could, conceivably, be replaced by direct government subsidies. However, replacing federal revenue-generating cargo preference mandates with increased government spending in an era of austerity and deficit reduction may not be politically tenable. To the extent the U.S. hopes to preserve a strategic sealift capability without increasing federal discretionary spending, U.S. policymakers should ensure sufficient levels of in-kind food aid are available for transport under the cargo preference program to preserve the U.S.-flag merchant fleet's viability as a national security asset. This will, at the same time, further both domestic economic interests and international humanitarian needs.

Essay #2: Food Protection

By: CAPT William Koyama and Lt Col Amy McCain

Protecting the food supply includes two distinct approaches: food safety and food defense. Food safety focuses on preventing and mitigating the effects of accidental contamination. Food defense seeks to prevent intentional acts such as poisoning and agroterrorism, which is defined as the deliberate introduction of an animal or plant disease with the goal of generating fear, causing economic loss, and/or undermining social stability⁶⁷. This



essay describes the major issues surrounding food safety and food defense and offers several recommendations for U.S. policymakers.

Food Safety

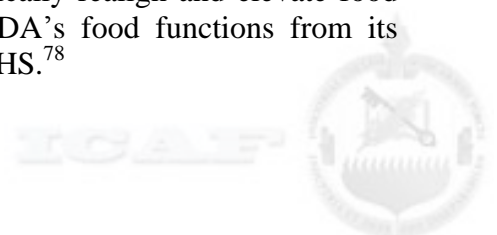
Although the U.S. enjoys one of the highest levels of food safety in the world, recent events have called for improvements in the system. Within the last 20 years, our food supply system has experienced some dramatic changes. Crop production has shifted to a monoculture and manufacturing and food processing have become much more integrated. Also, distribution has become more globalized, allowing for a greater variety of foods to be offered to a wider population over a greater distance in a shorter period of time. This means that the effect of one instance of food contamination is amplified quickly across a larger population and geographic area.⁶⁸ In 2009, the CDC estimated the occurrence of 76 million cases of food borne illness with 325,000 hospitalizations and an estimated 5,000 deaths.⁶⁹ USDA's Economic Research Service has estimated that the medical costs and productivity losses from missed work associated with food borne illnesses are about \$7 billion annually.⁷⁰ This is in addition to the tens of millions of dollars that firms often lose when they impose a recall.⁷¹ Clearly, the combination of health and economic risks make the food safety system a target for improvement.

The U.S. federal food safety system is very complex and fragmented. Fifteen agencies are responsible for administering more than 30 laws related to food safety with about 70 interagency agreements in place to coordinate these efforts. The U.S. Government Accountability Office (GAO) reported that this caused inconsistent oversight, ineffective coordination, and inefficient use of resources.⁷² Since the GAO assessed food safety as a high-risk item in 2007, more attention was given to the issue by the government as well as industry and consumer groups.

On January 4, 2011, President Obama signed the Food Safety Modernization Act (FSMA) into law granting the largest expansion of FDA's food safety authorities since the 1930s.⁷³ The FDA identified 5 key facets of this legislation: Preventive controls, Inspection and Compliance, Imported Food Safety, Response, and Enhanced Partnerships.⁷⁴ The legislation requires comprehensive, prevention-based controls across the food supply, increases the frequency of FDA inspections of all facilities and gives the FDA mandatory recall authority for all food products.⁷⁵ However, the appropriation of funding to execute the actions has not yet been provided. Given that the costs of these outbreaks are currently \$7 billion dollars annually in addition to the costs to the individual firms, the estimated \$1.4 billion dollars required over a five-year period is worth the investment.

The fractured and complex U.S. federal food safety system is a source of confusion, ineffectiveness and waste. Many countries that have established a single agency to lead food safety management found improvements in food safety operations through increased coordination among entities involved in food safety activities, streamlined communications, clearer responsibilities and reduced gaps in oversight and improved accountability and transparency.⁷⁶

In 2009, the Robert Wood Johnson Foundation proposed a solution by focusing on strategically reorganizing the existing food safety system. Their proposal includes immediate, medium-term and long-term steps.⁷⁷ The immediate steps have already been completed or are included in the FDA FSMA. The medium-term step, to strategically realign and elevate food safety functions at HHS, could be completed by separating FDA's food functions from its medical product functions to create a food safety agency within HHS.⁷⁸



The first long-term step is to modernize meat and poultry inspection laws. The food safety changes enacted in the FSMA focused on FDA-regulated foods and did not address foods under the jurisdiction of USDA. Food safety incidents and concerns regarding USDA-regulated meat and poultry products are well documented. The second long-term step, setting a long-term goal to integrate federal food safety agencies, would allow for a progressive approach toward a reformed system. This system would move toward long term change while still addressing shorter-term issues.

The FSMA is a good first step in addressing a complex system with so many stakeholders, but the efforts must continue. Congress must ensure that the funding is available to implement the changes they have put in place. For transparency purposes, as the FDA budget is reviewed each year, it should produce documentation on their accomplishments and goals for the new regulations and legislation. Incremental changes should be made with the long-term goals in mind, as proposed by the Johnson Foundation model – integrate federal food safety agencies.

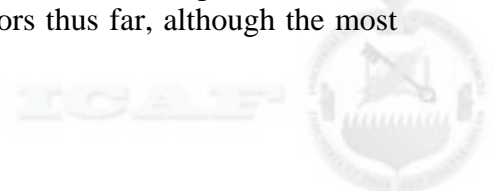
Food Defense

All of the issues and recommendations for increasing food safety apply to food defense, but in considering food defense, an added layer of effort is required, both on the part of government and the private sector. When encountering opposition to the expenditure of any resources towards food defense, the common question is posed; “if it is so easy to conduct agroterrorism, why hasn’t it happened on a large scale?” This, however, is the wrong question to be asking. It is akin to, in August of 2001, asking, “if it is so easy to hijack airliners and use them as missiles, why hasn’t it happened?”, and using the inability to prove a negative as justification for not acting on valid analysis at least with reasonable measures. Currently, both livestock and crops are generally undefended from individuals who might seek to introduce harmful pathogens to the system, and the modern U.S. food system is more integrated and industrialized than ever, making it more susceptible to having single point attacks result in wide ranging damage.

Intentional attacks on crops may take on one or more of several forms. Of the three main types; fungus, bacterium, and virus, fungus appears to be the most readily accessible and easiest to spread. While anthrax, botulism, and plague may be better known, greater control of these agents has been put in place in the years following 9/11⁷⁹. Much easier to obtain would be some fungi such as Philippine Downey mildew, Brown Stripe Downy mildew (both available in Pakistan) and Asian Soybean Rust (available in South America). The downy mildews would be targeted at corn while the Asian soybean rust targeted at soybean fields. Crop yield losses could range from 10% to 80% where effected. These fungi all have in common that they can be spread through the wind, as well as seed and rain in the case of the downy mildews. There is virtually no way to protect these crops simply due to the open nature and vast areas they are farmed in.

As our livestock operations have modernized, they have become more concentrated than ever. “Typically, a cattle feedlot can contain 50,000 to 800,000 animals at any given time. Poultry operations can house up to one million birds at a single facility.”⁸⁰ Because of this intense concentration, the introduction of highly contagious diseases becomes a prime target for agroterrorism. The size of the facilities and lack of current security measures means easy access, and the close proximity of the animals means a great effect for a small initial input of toxin.

Direct attacks on food in latter stages of the production chain are also possible, and in fact account for most of the recorded bioterror/agroterror events that have taken place to date in the U.S. These attacks have largely been the result of single actors thus far, although the most



infamous attack was carried out as early as 1984 in Oregon by followers of the Bhagwan Rajneesh⁸¹. While no deaths occurred as a result of the Rajneesh attack, the economic and psychological impacts were significant. In fact, from all of these forms of possible attack, it is likely that the actual death or sickness toll would be relatively small, especially given some of the advances in rapid detection and containment of pathogen introduction prior to mass consumption. The economic impact, however, could be devastating to the U.S. Agribusiness Sector. Immediate recall of the products from an identified facility would be put into place, but by attacking several different sources/food processing plants, terrorists could cause widespread recalls and losses with only small numbers of attackers and minimal amounts of agent. Immediate recalls would likely result in losses in the millions, and possibly result in individual companies going out of business altogether.

Secondary effects would also take place. The export markets would be shut down, and because investigations take time, those markets would be filled from other global sources. It is likely that the U.S. market share would never permanently recover. Finally, the simple faith that the American public has in the government to provide for the common defense would be called into question-and even more so than in the case of 9/11, it would likely be very personal for almost all citizens, as food is much more basic to survival than air transportation.

Since the establishment of the Department of Homeland Security, significant strides have been made in the way of defining the threats, creating high level concepts for detection and for recovery after an agroterror attack, and generally elevating awareness of this threat to Congress and the Executive Branch.

Still, one need only speak to local farmers, poultry growers, or even meat company executives, to realize that a major loop has not yet been closed in the area of agroterror prevention. Many experts believe that the most effective approach in dealing with agroterror will require a three-pronged effort coordinating and exploiting the strengths of federal, state/local, and commercial entities. Since U.S. Agribusiness is commercially owned and operated, these private businesses have perhaps the greatest stake in assuring safety of their product, but without the help of government on the levels of security and law enforcement, and in the realm of policy and enforcement thereof, the private sector will not be able to effectively secure against agroterror on its own. The single most pressing recommendation for action in the realm of food defense would be to accelerate programs which bring the federal efforts together with local law enforcement and the industry leaders. "The majority of State and local law enforcement agencies are financially and strategically unprepared to respond to agroterrorism."⁸² While federal programs have brought the FBI and DHS officials together, they have not meshed with the levels that actually are the first line of defense.

Essay #3: Improving health and nutrition in the American diet
By: Lt Col Tara Routsis and Ms. Ronnie Schneider

Nutrition is not just about eating food, it is about eating the right amount of the right foods. The 2010 U.S. National Security Strategy calls for the promotion of global health and recognizes the fact that when children are sick, development stalls.⁸³ Malnourished children are not healthy and pose a risk to the future of their nation. The nutrition children consume today is critical in their brain development, productivity, and health later in life.



Food Secure, But There Is More to Living than Just Food

Nutritional deficiencies are harmful to an individual's health, productive capacity and income-earning abilities, as well as the capabilities to function in society.⁸⁴ Malnutrition⁸⁵ can appear in underweight or overweight children. Although the U.S. is considered a food-secure nation, the U.S. Department of Agriculture (USDA) conducted a survey of American households in 2008, which showed that 14.6 percent were food insecure at some time during that year. While malnutrition in underweight children is easier to identify, it actually decreased in 2008 to 4.5 percent of the children in the U.S. However, over the past few years, malnutrition in overweight children continues to climb.⁸⁶ Both of these are harmful and have lasting impacts.

Contrary to what many may believe, malnutrition is also prevalent in overweight children and has its own set of effects. Overweight children have a higher chance of obesity, Type 2 Diabetes, high cholesterol, high blood pressure, some types of cancer, and heart disease, as well as emotional health issues such as social discrimination and depression.⁸⁷ They are also at risk for suffering from micronutrient deficiencies such as zinc, iron, and iodine, which can cause cognitive defects.⁸⁸ Obesity presents a greater risk for "cardiovascular disease, stroke, certain types of cancer, osteoarthritis,"⁸⁹ infertility, sleep apnea, bone and joint problems and lower academic achievement.⁹⁰ Among 2 to 5 year olds, 25 percent are either obese or overweight. Since it is so hard to reverse obesity and its effects, experts recommend that prevention is the key.⁹¹ In children 6 years old, the obesity rate has doubled in the past 28 years.⁹² Finally, the Centers for Disease Control and Prevention reports that 80 percent of overweight children aged 10 to 15 became obese by the time they are 25 years old.⁹³

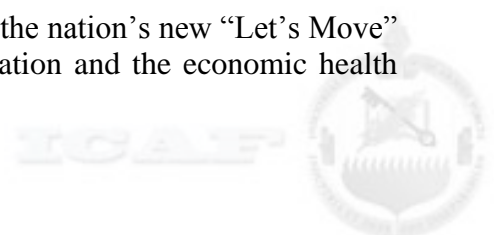
Nutrients: Required for Healthy Living

There are two types of nutrients: macronutrients and micronutrients. Macronutrients (carbohydrates, fats, protein, and water) are needed in large amounts and provide energy to the body. Micronutrients are vitamins and minerals and are required in smaller quantities. Micronutrients help to convert macronutrients into useable forms.⁹⁴

Each micronutrient a diet is lacking can cause serious health problems, not just for the individual but also for the community and nation. The UN World Food Program found that iron deficiencies (the most common deficiency in the world) "damages productivity and cuts GDP by 2 percent in some countries."⁹⁵ Vitamin A, Iron, and Iodine are the leading deficiencies.⁹⁶ Iron deficiencies cause anemia and fatigue, and hinder cognitive development; iron-deficient children are mentally handicapped by the equivalent of 5 to 10 IQ points. Iodine deficiencies prevent the brain from developing properly which can cause severe mental delays and physical stunting.⁹⁷ Finally, Vitamin A is required for the "normal functioning of the visual system, growth, and development, resistance to disease, and reproduction, and deficiencies compromise the body's immune system."⁹⁸ Other micronutrient deficiencies such as zinc, selenium, iron, copper, vitamins A, C, E and B-6, and folic acid - even mild ones - have important influences on immune responses.⁹⁹ These deficiencies, which are caused by a lack of vitamins and minerals in the diet, can cause "serious long-lasting consequences for individual well-being and economic growth."¹⁰⁰ Science shows that even a mild or moderate case of nutrient deficiency causes growth impediment, impaired learning ability and, later in life, low work productivity.

U.S. Government Challenges

First Lady Michelle Obama put it well when she launched the nation's new "Let's Move" program: "The physical and emotional health of an entire generation and the economic health



and security of our nation is at stake.”¹⁰¹ The health of Americans is important to the U.S. government, especially the probability of growing healthcare costs. In addition, as more and more Americans are overweight, obese, or unhealthy, the recruitment pool for the military declines.

With almost one third of the children in the U.S. being overweight or obese, the nation’s healthcare system will see a huge impact. Higher rates of cardiovascular health problems such as high blood pressure and high cholesterol, and increased blood sugars, which lead to higher rates of Type 2 Diabetes, will only continue to compound rising health expenses in the U.S.¹⁰² More than 25 percent of U.S. healthcare costs are related to obesity; as a result the nation’s health spending increased 2 percent faster than the Gross Domestic Product over the past 30 years.^{103, 104, 105} As if these potential healthcare issues were not enough, University of California research gives evidence to the possibility that “DNA damage from micronutrient deficiencies is likely to be a major cause of cancer.” This study found that the 25 percent of Americans who eat the most fruits and vegetables had half the cancer rate of those 25 percent who ate the fewest fruits and vegetables.¹⁰⁶

Another U.S. government concern is the future of the nation’s military. Today’s obese children affect the military strength tomorrow. The prime military recruiting ages in the U.S. are 17 to 24. In 2010, a non-profit group composed of senior retired military officials reported 27 percent of this demographic are ineligible to join the military because they are overweight. The study called this trend “a potential threat to our national security.”¹⁰⁷ This study also showed that more than 140,000 recruits failed the military entrance physical between 1995 and 2008 because of weight problems (a 70 percent increase over that period).¹⁰⁸

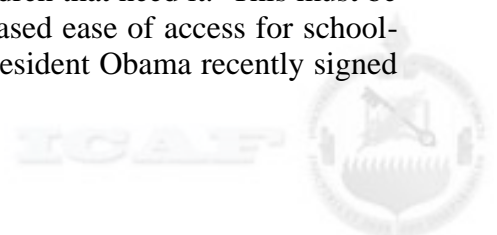
Recommendations for a Healthy Nation

Americans must eat a diverse selection of healthy foods including fresh fruits and vegetables in order to be healthy. Research shows that eating “whole-plant foods slows digestion and allows better absorption, and a more favorable balance of essential nutrients per calorie.”¹⁰⁹ In January 2011, the U.S. government released its latest nutritional guidelines, and amongst other advice specifically spelled out that we must “Eat Less” and suggested making fruits and vegetables cover at least half of the plate at a meal.¹¹⁰ The U.S. must now persuade its people to eat right by educating them on what foods to choose, making those foods accessible and affordable, ensuring healthy foods get to the children that need it, and mandating a restaurant food-labeling program.

Educating Americans on how to make the wisest choices in selecting foods is the first key to ensuring a healthy nation tomorrow. Not only should schools introduce the food pyramid and the need for eating fresh fruits and vegetables, they must also educate young children on proper portion sizes.

The next step is to provide access to healthier foods. Government policy, primarily the Farm Bill, subsidizes production of corn and other products that make their way into a surprising array of foods. Soft drinks sweetened with high fructose corn syrup are a primary driver of obesity in children. Some people who would like to choose healthier foods are financially unable to do so. Agricultural policy changes to encourage production of fruits and vegetables should make those items more affordable.

Another initiative is to ensure healthy foods get to the children that need it. This must be implemented through nutritious school lunch programs and increased ease of access for school-aged children to nutritious meals when they are not at school. President Obama recently signed



the Healthy, Hunger-Free Kids Act, a bill aimed to reduce bureaucratic rules and procedures, allow more children to access school meal programs, and ensure higher-quality school lunches.¹¹¹ The school lunch program and the food stamp benefit program, now called the Supplemental Nutrition Assistance Program, are helpful; however, the U.S. must take a stronger strategic stance and look for more innovative ways to get the food to those in need. Although the U.S. is food secure, approximately one out of every four children in America is still at risk of going hungry.¹¹² An innovative school nurse in Arkansas worked with a local food bank to discretely, send backpacks home with hungry children. This program, now supported by Feeding America (the leading domestic hunger-relief charity), has caught on in several states as The “Backpacks for Kids” program, designed to provide weekend and holiday food to children that rely on school meals.¹¹³ Congresswoman Dina Titus suggests “at the federal level we can and should be doing more to support vital programs like Backpacks for Kids,” as she introduced the Weekends Without Hunger Act. This act “would build on their efforts.”¹¹⁴ These are positive initiatives, and the U.S. should continue to look for even more innovative distribution methods.

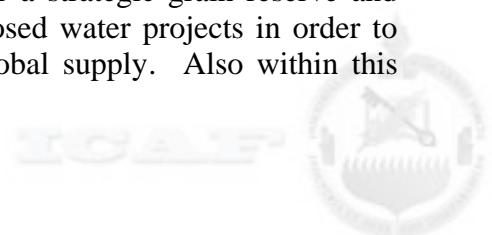
The final step to help Americans choose healthier foods is to initiate a mandatory restaurant food-labeling program. The U.S. needs to consider the health of its people over the inconvenience and cost to the restaurant industry. While the government mandated food labels for groceries years ago, labeling in fast food restaurants (one of our nation’s largest culprits of introducing fats to young people) is not federally mandated. A USDA study stated that the increase in caloric intake among Americans could be attributed to the increase in eating out. The USDA suggested eating out led people to eat more and/or eat higher calorie foods. In 1970, 26 percent of food spending was on eating out, and in 2005, it rose to 41 percent.¹¹⁵ In fact, in 2009, the fast food industry spent over \$4.2 billion in marketing campaigns to target children.¹¹⁶

Even though Americans have access to fresh fruits and vegetables any time of the year, they do not or cannot choose these foods on a daily basis. It is so simple, cheap, and fast to grab a burger and fries for dinner. Americans must change their eating habits, and the government should support them in doing so. Malnutrition is real and is a problem in the U.S. today. The future prosperity and security of the nation are in jeopardy unless this issue is addressed.

CONCLUSION

For decades, the U.S. Agribusiness Sector has been a source of national power in its ability to provide more than enough safe, nutritious food for the nation and a significant portion of the world as well. In order to maintain the position as the world’s top food producer, the U.S. must address several challenges, including: boosting net productivity in a sustainable manner under increasingly volatile and uncertain conditions, providing a stable workforce, improving the consistency of U.S. government policy, protecting the food supply, and improving the health and nutrition in the American diet. In order to address these challenges, all actions will require active coordination and cooperation between private industry and government in order to take into account the diverse perspectives and interests of stakeholders that often result in conflicting policies.

This report has made several recommendations to address these challenges. To boost productivity in a sustainable manner, the U.S. needs to consider a strategic grain reserve and accelerate the adjudication of environmental challenges to proposed water projects in order to enable the country to weather potential major disruptions to global supply. Also within this



challenge, the U.S. needs to conduct a comprehensive cost-benefit analysis of current ethanol mandates and accelerate the development of alternative sources of fuel. Although the U.S. is facing major budget constraints, it must maintain or increase its current level of R&D investment and seek more opportunities to partner with the private sector on ways to boost total agricultural productivity and the nutritional content of food. Additionally, the U.S. must begin to address the issue of illegal immigration by streamlining the process for farmers to use the H-2A visa program and perhaps offering subsidies to offset its costs.

Overall, Congress needs to do a more thorough job evaluating the second and third order effects of the policies under consideration before they are implemented. Furthermore, the U.S. should continue its role as a leader in developing the total capacity of world agriculture by helping countries develop their agriculture and infrastructure systems, as well as other sectors like manufacturing and services.

With respect to food protection, Congress must first ensure that the funding is available to implement the changes they have put in place. Incremental changes should be made with the long-term goal of integrating federal food safety agencies. To address food defense, the U.S. must accelerate programs that bring the federal efforts together with local law enforcement and the industry leaders. In order to improve American health and nutrition, the U.S. policies must aid in educating Americans on how to make the wisest choices in selecting foods, providing access to healthier foods, implementing nutritious school lunch programs, and initiating a mandatory restaurant food-labeling program.

The U.S. Agribusiness Sector is a vital and important part of the U.S. economy and security. It has risen to the many challenges of the past and there is every reason to believe that it will in the future. The government can assist in these efforts with the right level of involvement in the Sector. With proper governance, U.S. Agribusiness will retain its position as the world's top food producer and continue to provide high quality, safe, and affordable food to Americans and much of the world.



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⁴ A monoculture is the cultivation of a single crop within a given area. This approach reduces the competition for environmental resources and eases treatment of pests and crop harvesting. Unfortunately, this approach also makes the crops (or livestock for that matter) more susceptible to the spread of disease. Conversely, the polyculture approach seeks to increase biodiversity through crop interspersion, rotation, and beneficial weeds. While more labor intensive, there are benefits in disease resistance as well as a reduction in environmental stresses.

⁵ Derived from "World Economic Outlook Database". International Monetary Fund. April 2011 and IBISWorld Industry Report NN004, "Agribusiness in the U.S.", April 2011.

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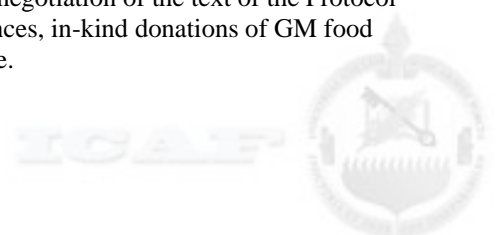
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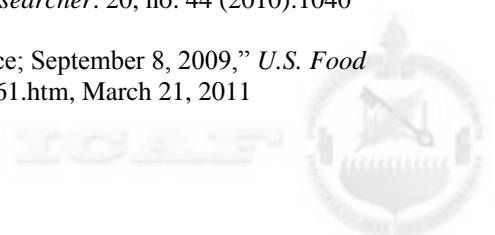
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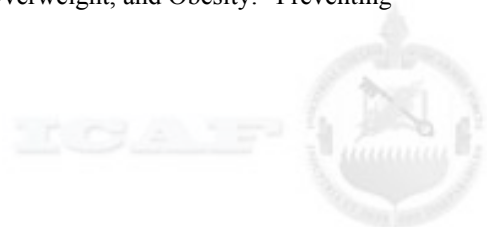
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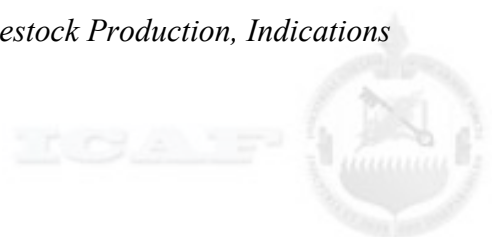


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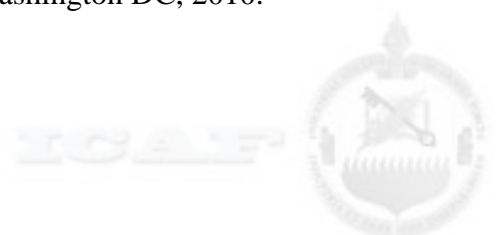
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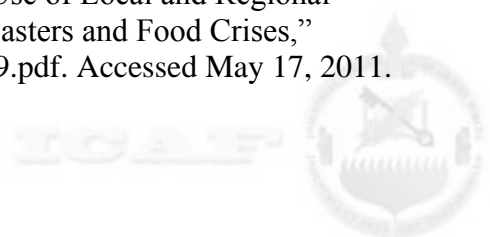
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