Session No. 7070

Food at Rest is Food at Risk

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Introduction

Food at rest is food at risk. The number of opportunities for containment from the farm to the fork can be overwhelming, but with a developed understanding of the risks, a mitigation plan can be developed. Agriculture was identified as a critical infrastructure with the introduction of Homeland Security Presidential Directive 9 (HSPD-9), Defense of United States Agriculture, on January 30, 2004. Agroterrorism is identified under the broader topic of bioterrorism and is defined as 'the deliberate introduction of an animal or plant disease with the goal of generating fear, causing economic losses, and/or undermining social stability.' (CRS RL32521)

Defining Agroterrorism

Often bioterrorism is only thought of as something that causes outbreaks of human illness in the form of anthrax or smallpox, etc, which is true but the broad definition of bioterrorism also includes the idea of agroterrorism, which is a disease that first affects animals or plants. It is difficult to systematically address the threat of agroterrorism due to the fact that it is both a highly dispersed and a highly concentrated industry. Some of these unique industry challenges include:

- Agricultural production is geographically disbursed in unsecured environments (e.g., open fields and pastures throughout the countryside). While some livestock are housed in secure facilities, agriculture in general requires large expanses of land that are difficult to secure from intruders.

- Livestock are frequently concentrated in confined locations (e.g., feedlots with thousands of cattle in open-air pens, farms with tens of thousands of pigs, or barns with hundreds of thousands of poultry). Concentration in slaughter, processing, and distribution also makes large-scale contamination more likely.

- Live animals, grain, and processed food products are routinely transported and commingled in the production and processing system. These factors circumvent natural barriers that could slow pathogenic dissemination.

- The presence (or rumor) of certain pests or diseases in a country can quickly stop all exports of a commodity, and it can take months or years to resume.

- The past success of keeping many diseases out of the U.S. means that many veterinarians and scientists lack direct experience with foreign diseases. This may delay recognition of symptoms in case of an outbreak.

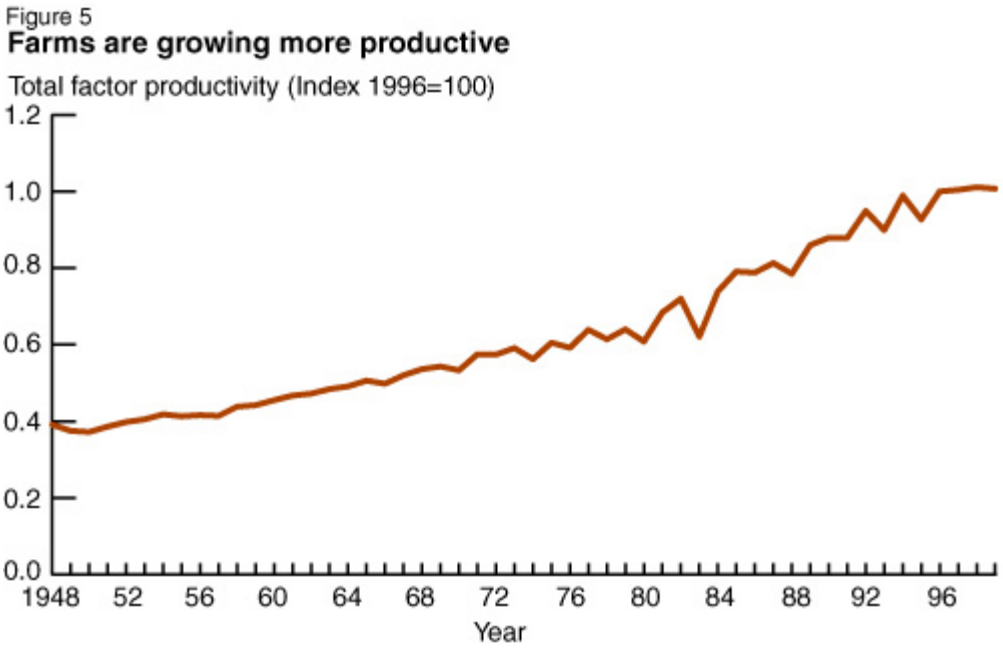
- The number of lethal and contagious biological agents is greater for plants and animals than for humans. Most of these diseases are environmentally resilient, endemic in foreign countries, and not harmful to humans—making it easier for terrorists to acquire, handle, and deploy the pathogens

An agro-terror attack may not cause any human casualties and still be considered as to be a successful attack. An agroterrorism event would cause economic losses to individuals, businesses and governments due to the costs to contain and eradicate the disease, as well as to dispose of the contaminated products. These losses would multiply through the food chain, from the farm to the fork, as food supplies are interrupted and possible trade sanctions are imposed on US exports. The demand for specific foods may decrease based on which sectors are targeted (e.g., dairy, beef, pork, poultry, grains, fruit, or vegetables), while demand for other types of food may rise due to food substitutions.

The Importance of Agriculture in the United States

In 2000 only 1.9% of the work force of the United States was employed in agriculture and the agricultural percentage of the GDP in 2002 was 0.7% (USDA – ERS, 2005). The food and fiber sector of the US workforce employs 16% of the workforce, ranging from farmers and input suppliers, to processors, shippers, grocers, and restaurateurs. In 2002, the food and fiber sector contributed $1.2 trillion, or 11%, to the gross domestic product (GDP), even though the farm sector itself contributed less than 1%. Gross farm sales exceeded $200 billion, and are relatively concentrated throughout the Midwest, parts of the East Coast, and California. Production is split nearly evenly between crops and livestock.

Agriculture in the U.S. is highly advanced and productive. This productivity allows Americans to spend less than 11% of their disposable income on food, compared with a global average of 20-30%. (Parker, 2002).



Note: Productivity captures the increase in production not accounted for by the growth in quantity of inputs used, and is expressed as total factor productivity (the ratio of total outputs to total inputs). When total factor productivity is rising over time, a greater level of production can be obtained from the inputs used. Productivity changes result from changes in efficiency, the scale of production, and technical change.
Source: Economic Research Service, USDA, Agricultural Research and Productivity Briefing Room, http://www.ers.usda.gov/briefing/AgResearch/.

Figure 1.

Although the number of farms in the 2002 Census of Agriculture totaled 2.1 million, 75% of the value of production occurs on just 6.7%, or 143,500, of these farms. This subset of farms has average sales of $1 million annually, and averages 2,000 acres in size.

The U.S. produces and exports a large share the world's grain. In 2002, the U.S. exported $53 billion of agricultural products (8% of all U.S. exports), and imported $42 billion of agricultural products (4% of all U.S. imports), making agriculture a positive contributor to the balance of trade. The U.S. share of world production was 39% for corn, 38% for soybeans, and 8% for wheat. The U.S. accounted for 23% of global wheat exports, 54% of corn exports and 43% of soybean exports. If export markets were to decline following an agroterrorism event, U.S. markets could be severely disrupted since 22% of U.S. agricultural production is exported (10% of livestock, and 23% of crops).

Livestock and poultry are concentrated in various regions of the country, and in large numbers. In 2002, the inventory included 95 million cattle and calves, and 60 million hogs and pigs. Farm sales of broilers and other meat-type chickens exceeded 8.5 billion birds.

Cattle are the most widely distributed, given the prevalence of small cow-calf herds throughout the country and pockets of dairy on the West Coast, upper Midwest, and Northeast.

However, beef cattle feedlots are particularly concentrated from northern Texas through Kansas, Nebraska, eastern Colorado, and western Iowa.

Hog inventories are concentrated in the Midwest, especially Iowa and southern Minnesota, and in North Carolina. The production of broilers for poultry meat is concentrated throughout the Southeast, ranging from the Oklahoma-Arkansas border up to the Delmarva Peninsula (Delaware-Maryland-Virginia).

The Federal Government and Agroterrorism

On November 19, 2003, the Senate Committee on Governmental Affairs held a hearing titled, "Agroterrorism: The Threat to America's Breadbasket," including witnesses from the Administration, state governments, and a private think tank. This was the first congressional hearing devoted entirely to agroterrorism since October 27, 1999. At that time, the Subcommittee on Emerging Threats of the Senate Committee on Armed Services held a hearing titled, "Agricultural Biological Weapons Threat to the United States."

The Public Health Security and Bioterrorism Preparedness and Response Act (P.L.107-188, June 12, 2002) contained several provisions important to agriculture. These provisions accomplish the following:

- Expand Food and Drug Administration (FDA) authority over food manufacturing and imports (particularly in sections 303-307).

- Tighten control of biological agents and toxins ("select agents" as discussed in sections 211-213, the "Agricultural Bioterrorism Protection Act of 2002") through rules issued by the Animal and Plant Health Inspection Service (APHIS) and the Centers for Disease Control and Prevention (CDC).

- Authorize expanded agricultural security activities and security upgrades at USDA facilities (sections 331-335).

- Address criminal penalties for terrorism against enterprises raising animals (section 336) and violation of the select agent rules (section 231).

In December 2002, the USDA Animal and Plant Health Inspection Service (APHIS) issued regulations to reduce the threat that certain biological agents and toxins could be used in domestic or international terrorism. APHIS determined that the "select agents" on the list have the potential to pose a severe threat to agricultural production or food products.

The select agent regulations (9 CFR 121 for animals, 7 CFR 331 for plants) establish the requirements for possession, use, and transfer of the listed pathogens. The rules affect many research institutions, including federal, state, university, and private laboratories, as well as firms that transport such materials. The laboratories have had to assess security vulnerabilities and upgrade physical security, often without additional financial resources. Some have been concerned that certain research programs may be discontinued or avoided because of regulatory difficulties in handling the select agents.

Possible Pathogens for an Agroterror Event

Of the hundreds of animal and plant pathogens and pests available to an agroterrorist, it is likely that less than two dozen represent significant economic threats. Determinants of this level of threat are the agent's contagiousness and potential for rapid spread, and its international status as a "reportable" pest or disease (i.e., subject to international quarantine) under rules of the World Organization for Animal Health (also commonly known as the OIE, the Office International des Epizooties).

A widely accepted view among scientists is that livestock herds are much more susceptible to agroterrorism than crop plants. Much of this has to do with the success of efforts to systematically eliminate animal diseases from U.S. herds, which leaves current herds either unvaccinated or relatively unmonitored for such diseases by farmers and some local veterinarians. Once infected, livestock can often act as the vector for continuing to transmit the disease, facilitating an outbreak's spread, especially when live animals are transported. Certain animal diseases may be more attractive to terrorists because they can be zoonotic, or transmissible to humans. (CRS, RL 32391).

In contrast, a number of plant pathogens continue to exist in small areas of the U.S. and continue to infect limited areas of plants each year, making outbreaks and control efforts more routine. Moreover, plant pathogens are generally more technically difficult to manipulate. Some plant pathogens may require particular environmental conditions of humidity, temperature, or wind to take hold or spread. Other plant diseases may take a longer time than an animal disease to become established or achieve destruction on the scale that a terrorist may desire.

Countering the Threats

The goal of the U.S. animal and plant health safeguarding system is to prevent the introduction and establishment of exotic pests and diseases, to mitigate their effects when present, and to eradicate them when feasible. In the past, introductions of pests and pathogens were presumed to be unintentional and occurred through natural migration across borders or accidental movement by international commerce (passengers, conveyance, or cargo). However, a system designed for accidental or natural outbreaks is not sufficient for defending against intentional attack.

The National Research Council outlines a three-pronged strategy for countering the threat of agroterrorism:

- Deterrence and prevention.
- Detection and response.
- Recovery and management.

Although no intentional terrorist attacks on crops or livestock have occurred in the United States, government agencies and private businesses have not taken the threat lightly. Because of the importance of brand names in marketing, many agribusinesses have prepared response plans or added security measures to protect their product line, looking at threats ranging from the source of their inputs to their retail distribution network. Since the terrorist attacks of 2001, countering agroterrorism is an increasing priority among food producers nationwide at all levels of production, from the farm to the fork.

Summary

In the wake of the events of September 11, 2001, it must be understood that the terrorist threat exists in the nation at all times, and it is certainly possible that some form of agroterrorism, perhaps in conjunction with biological or chemical threats, could happen and therefore, preparation is necessary. This is especially true in the realm of agroterrorism, where such an incident, even one that is in reality relatively minor, could have severe effects on consumer confidence, the supply-and-demand economy, and the various associated businesses that would be affected by some form of terrorism-caused outbreak related to an American farm. Agroterrorism won't carry the shock value that bombings and hijackings do, and the effect on human life may not be as severe, but significant economic issues can arise that affect many facets of the population beyond the farmer. These issues could expand all the way out to U.S. import and export markets, to the federal government itself, which could incur significant costs to contain and eradicate the threat, as well as potentially compensating farmers for destroyed animals. Such a destruction of animals en masse because of the discovery of a terrorist threat could also raise environmental and other health issues that must be addressed, using more time and resources at all levels.

After 9/11/01, there was a significant increase in the attention paid to a variety of terrorist threats, both large and small. But for various reasons, there was less attention paid to agroterrorism. This has been addressed in the last couple years, through acts such as Homeland Security Presidential Directive 7, which added agriculture to the list of critical infrastructure that must be protected. Homeland Security Presidential Directive 9 took this a step further by establishing a national policy to protect against terrorist attacks on agriculture and food systems. In addition, the President's annual budget request to Congress now includes a cross-cutting budget analysis of homeland security issues, and from USDA, six agencies and three offices receive or have requested funding related to homeland security. Such funding is categorized based on six mission areas (functions), as defined in the National Strategy for Homeland Security.

There have only been a limited number of occurrences of agroterrorism on United States soil. Maladies that could potentially strike in large scales against herds of cattle and other types of animals have been thought to be dealt with through vaccination and other programs to educate farmers on their potential dangers. However, scientists now believe that livestock herds are much more susceptible to agroterrorism than crops, because current herds either are not vaccinated against threats or are relatively unmonitored against such threats, because they those threats have been thought to be eradicated previously. Certain animal diseases may be more attractive to terrorists because they can be transmissible to humans.

The Agricultural Bioterrorism Protection Act of 2002 created the current, official list of animal pathogens that are of greatest concern for agroterrorism. The act requires that these lists be reviewed at least every 2 years. In addition, there is overlap between the CDC and APHIS because some pathogens on the list may not cause a disease, but may cause symptoms such as food poisoning or responses in the central nervous system. One pathogen, Foot and Mouth Disease (FMD) is mentioned often when agroterrorism is discussed, because of its ease of use, ability to spread quickly, and potential for tremendous economic damage. There is a similar list of plant pathogens, as well, as required by the Agricultural Bioterrorism Protection Act of 2002. The goal of the U.S. animal and plant health safeguarding system is to prevent the introduction

and establishment of exotic plants and diseases to mitigate their effects and eradicate them where necessary/possible. Part of this effort requires coordination and cooperation between federal agencies to not only safeguard domestic product and resources, but also those that may be imported in from foreign countries. Through inspection of cargo and the requirement of importers to report specific types of cargo that could fall into an agroterrorism issue, agencies have the power to fight the entry of foreign diseases or agents. However, should a foreign animal disease be discovered, whether accidentally or intentionally introduced, the Secretary of Agriculture has broad authority to eradicate it or prevent it from entering this country. The use of these authorities is fairly common. Federal quarantines and restrictions on interstate movement within the U.S. are also common for certain pest and disease outbreaks.

The federal government has, through the involvement of many agencies and offices, taken steps to prevent agroterrorism wherever possible, and to respond to an incident should an outbreak occur.

During this presentation we will examine in more depth chemical, biological, and physical hazards that have the potential to harm the food supply as well as steps to take to appropriately mitigate these hazards.

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