

CRS Report for Congress

Agroterrorism: Threats and Preparedness

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Agroterrorism: Threats and Preparedness

Summary

The potential for terrorist attacks against agricultural targets (agroterrorism) is increasingly recognized as a national security threat, especially after the events of September 11, 2001. Agroterrorism is a subset 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.

The goal of agroterrorism is not to kill cows or plants. These are the means to the end of causing economic damage, social unrest, and loss of confidence in government. Human health could be at risk if contaminated food reaches the table or if an animal pathogen is transmissible to humans (zoonotic). While agriculture may not be a terrorist's first choice because it lacks the "shock factor" of more traditional terrorist targets, many analysts consider it a viable secondary target.

Agriculture has several characteristics that pose unique vulnerabilities. Farms are geographically disbursed in unsecured environments. Livestock are frequently concentrated in confined locations, and transported or commingled with other herds. Many agricultural diseases can be obtained, handled, and distributed easily. International trade in food products often is tied to disease-free status, which could be jeopardized by an attack. Many veterinarians lack experience with foreign animal diseases that are eradicated domestically but remain endemic in foreign countries.

In the past five years, agriculture and food production have received increasing attention in the counterterrorism community. Laboratory and response capacity are being upgraded to address the reality of agroterrorism, and national response plans now incorporate agroterrorism.

Congress has held hearings on agroterrorism and enacted laws and appropriations with agroterrorism-related provisions. The executive branch has responded by implementing the new laws, issuing several presidential directives, and creating liaison and coordination offices. The Government Accountability Office (GAO) has studied several issues related to agroterrorism.

Appropriations and user fees for agriculture-related homeland security activities in USDA and DHS have more than tripled from a \$225 million "pre-September 11" baseline in FY2002 to \$797 million in FY2006. Agriculture now receives about 2% of the total non-defense budget authority for homeland security.

Increasing the level of agroterrorism preparedness remains a concern, as do interagency coordination and adequate border inspections. The 110th Congress may consider bills or oversight hearings to address funding and the level of preparedness or coordination to respond to an agroterrorist attack.

This report will be updated as events warrant.

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Agroterrorism: Threats and Preparedness

Agriculture as a Target of Terrorism

Overview of Agroterrorism

The potential for terrorist attacks against agricultural targets (agroterrorism) is increasingly recognized as a national security threat, especially after the events of September 11, 2001. In this context, agroterrorism is defined as the deliberate introduction of an animal or plant disease with the goal of generating fear over the safety of food, causing economic losses, and/or undermining social stability.

An agroterrorist event would usually involve bioterrorism, since likely vectors include pathogens such as viruses, bacteria, or fungi. People more generally associate bioterrorism with outbreaks of human illness (e.g., anthrax or smallpox), rather than diseases affecting animals or plants.

The goal of agroterrorism is not killing cows or plants. These are the means to the end of causing economic crises in the agricultural and food industries, social unrest, and loss of confidence in government. Human health could be at risk if contaminated food reaches the table or if an animal pathogen is transmissible to humans (zoonotic).

While agriculture may not be a terrorist's first choice because it lacks the "shock factor" of more traditional terrorist targets, an increasing number of terrorism analysts consider it a viable secondary target.¹ Agroterrorism could be a low-cost but highly effective means toward an al-Qaeda goal of destroying the United States' economy. Evidence that agriculture and food are potential al Qaeda targets came in 2002 when terrorist hideouts in Afghanistan were found containing agricultural documents and manuals describing ways to make animal and plant poisons.²

Agriculture has several characteristics that pose unique problems:

- Farms are geographically dispersed in unsecured environments (e.g., open fields and pastures throughout the countryside). While some livestock are housed in facilities that can be secured, agriculture generally requires large expanses of land that are difficult to secure.

¹ Peter Chalk, "The U.S. Agricultural System: A Target for al-Qaeda?" *Terrorism Monitor*, March 11, 2005 [<http://jamestown.org/terrorism/news/article.php?articleid=2369398>].

² Susan Collins, "Opening Statement" in *Agroterrorism: The Threat to America's Breadbasket*, Senate Committee on Governmental Affairs, S.Hrg. 108-491, Nov. 19, 2003, [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_senate_hearings&docid=f:91045.wais.pdf].

- Livestock frequently are 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) allowing diseases to infect more animals quickly. Concentration in slaughter, processing also makes large scale contamination possible.
- 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.
- 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.
- International trade in livestock, grains, and food products is often tied to disease-free status. The presence (or rumor³) of certain pests or diseases in a country can quickly stop exports of a commodity, cause domestic consumption to drop, disrupt commodities markets, and can take months or years to recover.
- 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, and the ability to respond to an outbreak.

Thus, the general susceptibility of the agriculture and food industry to bioterrorism is difficult to address in a systematic way due to the geographically dispersed, yet industrially concentrated nature of the industry, and the inherent biology of growing plants and raising animals.

In an attack, the agricultural sector would suffer economically from plant and animal health losses, and the supply of food and fiber may be reduced. The demand for foods targeted in an attack may decline (e.g., dairy, beef, pork, poultry, grains, fruit, or vegetables), while demand for substitute foods may rise.

Economic losses would accrue to individuals, businesses, and governments through costs to contain and eradicate the disease, and to dispose of contaminated products. More losses would accumulate as the supply chain is disrupted from farm-to-fork. Domestic markets for food may drop, and trade restrictions could be imposed on U.S. exports. The economic impact would range from farmers to input suppliers, food processors, transportation, retailers, and food service providers.

³ A May 2005 incident in New Zealand over the supposed release of Foot and Mouth Disease (FMD) was declared a hoax after two weeks of extensive testing and quarantine of Waiheke island [<http://www.maf.govt.nz/mafnet/press/operation-waiheke/index.htm>]. A letter demanded money and changes to tax policies. The response efforts may have cost the New Zealand government about \$716,000 per day (USD).

Significant threats to the currently-held notion of food security could affect our social order. Fear of food shortages moved further from American psyche as the United States from an agrarian society to the industrial and information age. Nevertheless, food remains an important element of everyone's daily routine and is necessary for survival.

Scope of This Report. This report addresses the use of biological weapons against agriculture, rather than terrorists using agricultural inputs or equipment in attacks against non-agricultural targets. For example, the Department of Transportation issued regulations for developing security plans to protect dangerous agricultural materials such as fuels, chemicals, and fertilizers against theft.⁴ Legislation proposed in 2005-2006 (H.R. 3197, H.R. 1389, and S. 1141, 109th Congress) would have restricted the handling of ammonium nitrate, an agricultural fertilizer that can be converted into an explosive. Another example is the concern over misuse of small aircraft, particularly crop-dusters, to spread biological weapons.⁵

This report focuses primarily on biological weapons (rather than chemical weapons) because biological weapons generally are considered the more potent agroterrorism threat. This report also focuses more on agricultural production than food processing and distribution, although the later is discussed.

For more on chemical and biological weapons, see CRS Report RL32391, *Small-Scale Terrorist Attacks Using Chemical and Biological Agents: An Assessment Framework and Preliminary Comparisons*, by Dana Shea and Frank Gottron; and CRS Report RL31669, *Terrorism: Background on Chemical, Biological, and Toxin Weapons and Options for Lessening Their Impact*, by Dana Shea.

Federal Recognition of Agroterrorism

Even before September 11, 2001, and the focus on terrorist threats that ensued, references to agroterrorism and/or agricultural bioweapons can be found in the government, academia, and the press. For example, the Gilmore Commission (on terrorism), in its first report to Congress in 1999, noted that

“... a biological attack against an agricultural target offers terrorists a virtually risk-free form of assault, which has a high probability of success and which also has the prospect of obtaining political objectives, such as undermining confidence in the ability of government or giving the terrorists an improved bargaining position.”⁶

⁴ Agricultural inputs as defined in 49 CFR 171.8 are included in the security plans required in 49 CFR 172.800.

⁵ Security issues and guidelines for agricultural aviation are discussed at [<http://www.agaviation.org/securitypage.htm>].

⁶ Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction (also known as the Gilmore Commission), First Annual Report to the President and Congress: *Assessing the Threat*, December 15, 1999, pp. 12-15, (continued...)

Senator Roberts from Kansas also raised the awareness of agroterrorism with a hearing of the Senate Committee on Armed Services in 1999.⁷

However, as the 20th century ended, agriculture and food production received less attention, or sometimes was overlooked, in federal counterterrorism and homeland security activities. A Presidential directive in 1998 on protecting critical infrastructure did not include agriculture and food. Agriculture was added to this list only in December 2003. Thus, after what many observers claim to be a slow start after September 11, 2001, agriculture now is garnering more attention in the expanding field of terrorism studies and policies.

Agroterrorism received heightened national attention in December 2004 when then-Secretary of Health and Human Services Tommy Thompson said in his resignation speech, “For the life of me, I cannot understand why the terrorists have not attacked our food supply because it is so easy to do.”⁸

Congress has held hearings on agroterrorism and, while addressing terrorism more broadly, has implemented laws and appropriations with provisions important to agriculture. The Government Accountability Office (GAO) has studied aspects of food safety, border inspections, interagency coordination, and physical security with respect to agroterrorism. The executive branch has responded by implementing the new laws, issuing several presidential directives, creating terrorism and agroterrorism task forces, and publishing protection and response plans. The law enforcement community has recognized agroterrorism as a threat, highlighted by FBI and JTTF (Joint Terrorism Task Force) sponsorship of an annual conference on agroterrorism.⁹

The 9/11 Commission (National Commission on Terrorist Attacks Upon the United States) does not make any direct references to agroterrorism or terrorism on the food supply in its 2004 report.¹⁰ However, agriculture obviously would be affected, along with other sectors of the economy, by some of the commission’s recommendations regarding coordination of intelligence, information sharing, and first responders. An evaluation of those separate issues, however, is outside the scope of this report.

Importance of Agriculture in the United States

Agriculture and the food industry are very important to the social, economic, and arguably, the political stability of the United States. Although farming employs

⁶ (...continued)
at [<http://www.rand.org/nsrd/terrpanel>].

⁷ Senate Committee on Armed Services, Subcommittee on Emerging Threats, “The Agricultural Biological Weapons Threat to the United States,” October 27, 1999 [<http://armed-services.senate.gov/hearings/1999/e991027.htm>].

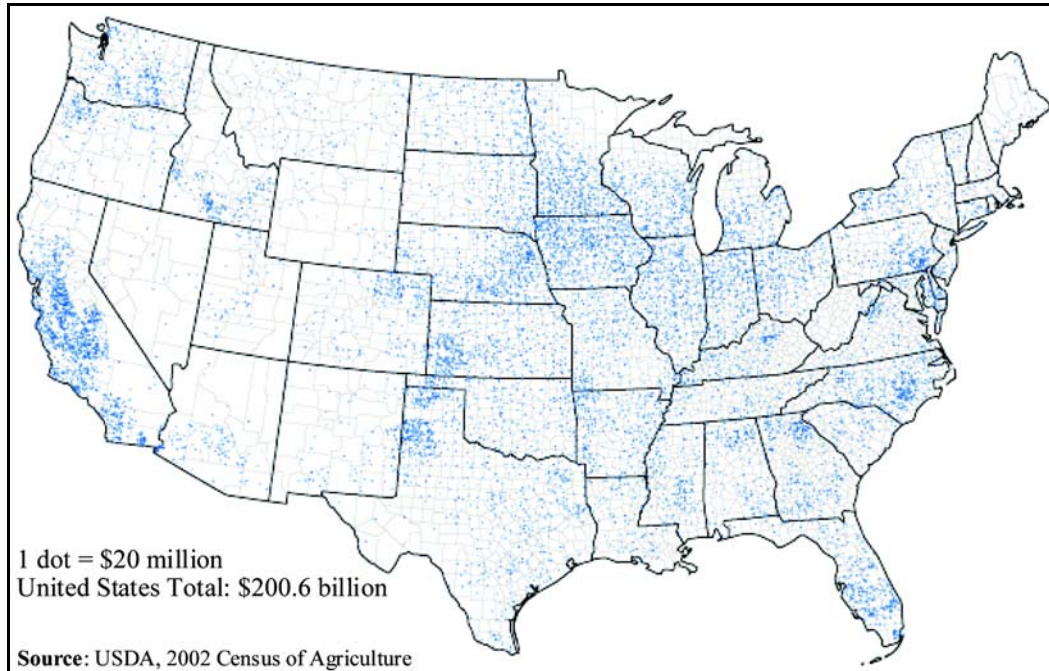
⁸ *New York Times*, “U.S. Health Chief, Stepping Down, Issues Warning,” December 4, 2004.

⁹ International Symposium on Agroterrorism, [<http://www.fbi-isa.org>].

¹⁰ National Commission on Terrorist Attacks Upon the United States, *The 9/11 Commission Report*, July 2004, at [<http://www.9-11commission.gov/report/911Report.pdf>].

less than 2% of the of the country's workforce, 16% of the workforce is involved in the food and fiber sector, 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%.¹¹ Gross farm sales exceeded \$200 billion, and are relatively concentrated throughout the Midwest, parts of the East Coast, and California (**Figure 1**). Production is split nearly evenly between crops and livestock. In 2002, livestock inventories included 95 million cattle, and 60 million hogs. Farm sales of broilers and other meat-type chickens exceeded 8.5 billion birds.¹²

Figure 1. Geographic Distribution of Agricultural Production



Agriculture in the U.S. is technologically advanced and efficient. This productivity allows Americans to spend only about 10% of their disposable income on food (both at home and away from home). Productivity increases over time have allowed the share of disposable income spent on food in the U.S. to fall from 23% in 1929 to 10% in 2003. The United States has the lowest spending on food prepared at home (6.5%) compared to the rest of the world, which ranges from 10%-15% for most developed countries and 30% or higher for some developing countries.¹³

The U.S. produces and exports a large share the world's grain. In 2003, the U.S. share of world production was 42% for corn, 35% for soybeans, and 12% for wheat. Of global exports, the U.S. accounted for 65% for corn, 40% for soybeans,

¹¹ USDA Economic Research Service, *Agricultural Outlook* tables, Table 1 (Key Statistical Indicators), April 2005, at [<http://www.ers.usda.gov/publications/Agoutlook/AOTables>].

¹² USDA National Agricultural Statistics Service, *2002 Census of Agriculture*.

¹³ USDA Economic Research Service, *Food Expenditure Tables*, Tables 7 and 97, at [<http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data>], accessed Jan. 18, 2007.

and 32% for wheat. If export markets were to decline following an agroterrorism event, U.S. markets could be severely disrupted since 21% of U.S. agricultural production is exported (10.5% of livestock, and 22% of crops). The U.S. exported nearly \$60 billion of agricultural products (8% of all U.S. exports), and imported \$47 billion of agricultural products (4% of all U.S. imports), making agriculture a positive contributor to the country's balance of trade.¹⁴

The price of land is directly correlated to the productivity and marketability of agricultural products, and the level of federal farm income support payments. In 2003, farm assets exceeded \$1.3 trillion, with \$1.1 trillion in equity.¹⁵ Land and other real estate accounts for 80% of those assets. Of the 938 million acres of farm land in the U.S., 46% are in crop land, 42% are pasture and range land, and 8% are wood land.¹⁶

Agricultural production in the U.S. is concentrated geographically and on a subset of large farms. 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.

Livestock and poultry production are concentrated in different regions of the country, and in large numbers. Cattle are the least concentrated of the major types of livestock, 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 in a swath from northern Texas through Kansas, Nebraska, eastern Colorado, and western Iowa. The top five cattle-producing states (Texas, California, Missouri, Oklahoma, and Nebraska) produce 35% of U.S. cattle (**Figure 2**).¹⁷

Hog inventories are concentrated in the Midwest, especially Iowa and southern Minnesota, and in North Carolina. The top three hog-producing states (Iowa, North Carolina, and Minnesota) produce 53% of U.S. hogs (**Figure 3**). 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 top three chicken-producing states (Georgia, Arkansas, and Alabama) produce 41% of U.S. chickens (**Figure 4**).

Grain production is concentrated in the Midwest, although other states may contribute significant shares for particular commodities. The top four corn-producing states (Iowa, Illinois, Nebraska, and Minnesota) produce 54% of the crop (**Figure 5**).

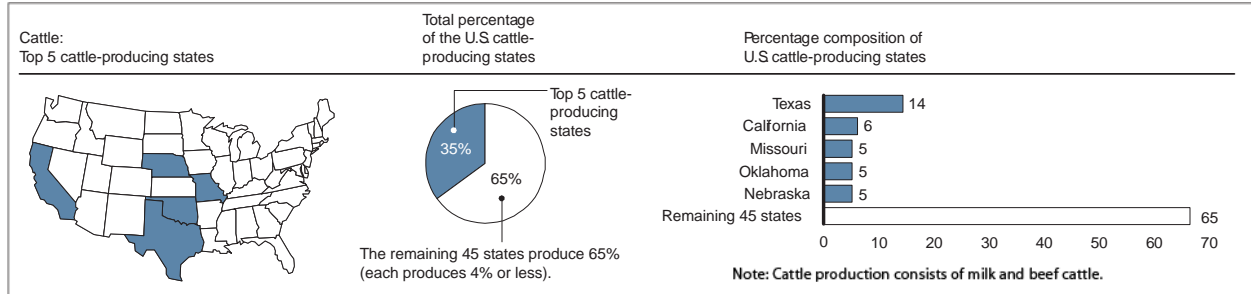
¹⁴ U.S. Census Bureau, *Statistical Abstract of the United States: 2004-05 — Agriculture*, at [<http://www.census.gov/prod/2004pubs/04statab/agricult.pdf>].

¹⁵ USDA Economic Research Service, *Agricultural Outlook* tables, Table 32 (Balance Sheet of the U.S. Farming Sector), April 2005.

¹⁶ USDA National Agricultural Statistics Service, *2002 Census of Agriculture*, June 2004, at [<http://www.nass.usda.gov/census>].

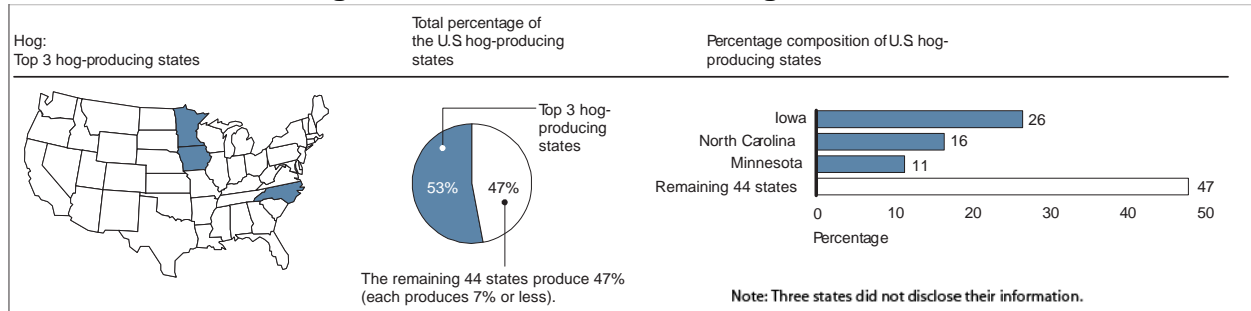
¹⁷ GAO, *Much is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain*, GAO-05-214, March 8, 2005, pp. 10-11, 70-71.

Figure 2. Concentration of Cattle Production



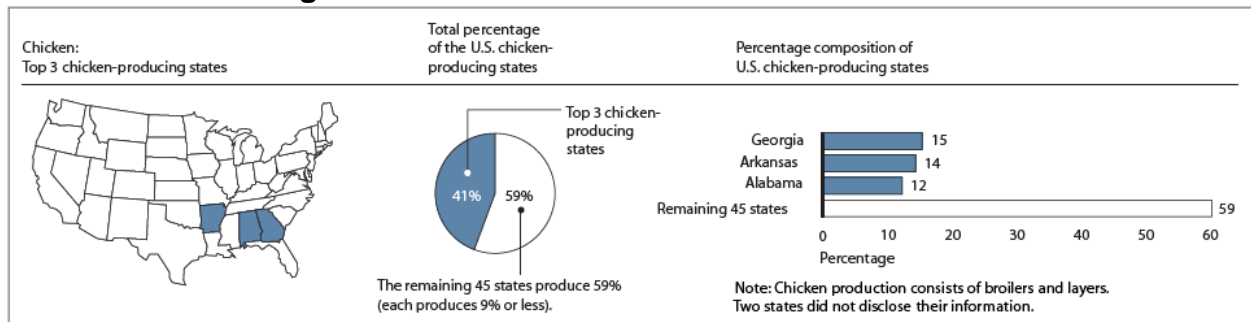
Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Figure 3. Concentration of Hog Production



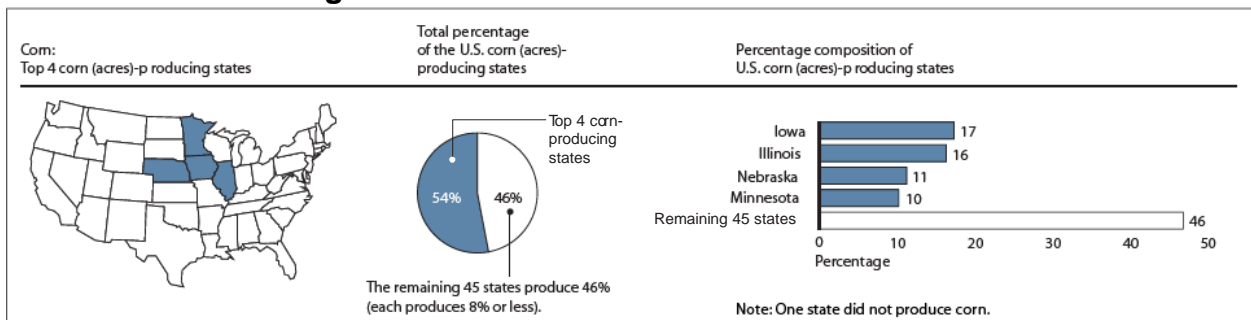
Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Figure 4. Concentration of Chicken Production



Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Figure 5. Concentration of Corn Production



Source: U.S. Department of Agriculture, 2002 Census of Agriculture

Potential Economic Consequences

Economic losses from an agroterrorist incident could be large and widespread.

- First, losses would include the value of lost production, the cost of destroying diseased or potentially diseased products, and the cost of containment (drugs, diagnostics, pesticides, and veterinary services).
- Second, export markets could be lost if importing countries place restrictions on U.S. products to prevent possibilities of the disease spreading. Sanitary and phytosanitary rules in international trade agreements would be important for maintaining export markets.
- Third, multiplier effects could ripple through the economy due to decreased sales by agriculturally dependent businesses (farm input suppliers, food manufacturing, transportation, retail grocery, and food service). Tourism can be affected if access to certain destinations within the country is limited or perceptions of food or personal safety falter.
- Fourth, federal and state governments could bear significant costs, including eradication and containment costs, and compensation to producers for destroyed animals.

Depending on the erosion of consumer confidence and export sales, market prices of the affected commodities may drop. This would affect producers whose herds or crops were not directly infected, making the event national in scale even if the disease itself were contained to a small region.

For food types or product lines that are not contaminated, however, demand may become stronger, and market prices could rise for those products. Such goods may include substitutes for the food that was the target of the attack (e.g., chicken instead of beef), or product that can be certified to originate from outside a contaminated area (e.g., beef from another region of the country, or imported beef). For example, when Canada announced the discovery of mad cow disease (BSE, or bovine spongiform encephalopathy) in May 2003, farm-level prices of beef in Canada dropped by nearly half, while beef prices in the United States remained very strong at record or near record levels. When a cow with BSE was discovered in the United States in December 2003, U.S. beef prices fell, but less dramatically than in Canada.¹⁸

Consumer confidence in government may also be tested depending on the scale of the eradication effort and means of destroying animals or crops. The need to slaughter perhaps hundreds of thousands of cattle (or tens of millions of poultry) could generate public criticism if depopulation methods are considered inhumane or the destruction of carcasses is questioned environmentally. For example, during the United Kingdom's foot-and-mouth (FMD) outbreak in 2001, euthanizing thousands

¹⁸ CRS Report RS21709, *Mad Cow Disease and U.S. Beef Trade*, by Charles Hanrahan and Geoffrey Becker.

of cattle and incinerating the carcasses in huge open air pyres provided poignant television images and difficult public relations situations for the agriculture ministry. Dealing with these concerns can add to the cost for both government and industry.

Depending on the disease and means of transmission, the potential for economic damage depends on a number of factors such as the disease agent, location of the attack, rate of transmission, geographical dispersion, how long it remains undetected, availability of countermeasures or quarantines, and incident response plans. Potential costs are difficult to estimate and can vary widely based on compounding assumptions.

Drawing on the FMD outbreak in the United Kingdom in 2001, Price Waterhouse Coopers estimated that the economic impact was \$1,389 to \$4,477 for each of the 2.6 million head of livestock (cattle, sheep, and hogs) on which indemnities were paid in the U.K. These impacts exceed the value of the animals because of the number of industries affected by the outbreak, ranging from feed suppliers to tourism. Applying the loss ratios from the U.K. incident to the larger U.S. livestock industry, Price Waterhouse Coopers estimates that 7.5 million animals (5.3 million cattle, 1.4 million hogs, and 800,000 sheep) might be destroyed in a similar scale outbreak in the United States. The resulting economic impact could range from \$10.4 billion to \$33.6 billion, using the range of impacts estimated from the U.K.¹⁹

A 2002 National Defense University study estimates that a limited outbreak of FMD on just 10 farms could have a \$2 billion financial impact.²⁰ A study by the USDA Economic Research Service (ERS) outlines the wide-ranging implications of a FMD outbreak in the U.S., assigning probabilities for animal losses but not estimating a dollar loss.²¹ A 1994 study by the United States Department of Agriculture (USDA) on African swine fever suggested that if the disease were to become entrenched in the U.S., the 10-year impact would be at least \$5.4 billion.²² The impact in today's dollars could be much higher.

¹⁹ Beth Lautner and Steve Meyer, "U.S. Agriculture in Context: Sector's Importance to the American Economy and Its Role in Global Trade," Conference Proceedings of the [White House] Office of Science and Technology Policy Blue Ribbon Panel on the Threat of Biological Terrorism Directed Against Livestock, Washington, DC, December 8-9, 2003, at [<http://www.rand.org/scitech/stpi/Bioagpanel>].

²⁰ Henry S. Parker, *Agricultural Bioterrorism: A Federal Strategy to Meet the Threat*, McNair Paper 65, National Defense University, March 2002, at [http://www.ndu.edu/inss/McNair/mcnair65/McN_65.pdf].

²¹ Kenneth H. Mathews and Janet Perry, "The Economic Consequences of Bovine Spongiform Encephalopathy and Food and Mouth Disease Outbreaks in the United States," Appendix 6 in *Animal Disease Risk Assessment, Prevention and Control Act of 2001 (P.L. 107-9): Final Report of the P.L. 107-9 Federal Inter-Agency Working Group*, January 2003, at [http://www.aphis.usda.gov/lpa/pubs/pubs/PL107-9_1-03.pdf].

²² Renlemann and Spinelli, "An Economic Assessment of the Costs and Benefits of African Swine Fever Prevention," *Animal Health Insight*, Spring/Summer 1994.

However, not all assessments agree that the economic consequences of an agroterrorist attack would be large and widespread. A December 2004 report by the Congressional Budget Office (CBO) concludes that the nation's economic loss from an agroterrorist attack

“would probably be small, primarily because the food and agriculture industry is well adapted to the prospect of disruptions from weather, pests, and occasional health incidents.”²³

The CBO report also suggests that the food industry's experience recalling contaminated lots and the existence of commodity support programs “to sustain the incomes of some agricultural producers” might keep economic losses “within the realm of industry experience and current public plans for detection and response.”²⁴

Such a conclusion likely overstates the capacity of traditional farm commodity programs to respond to the scale devastation possible in agroterrorism. The purpose of farm commodity programs is to support farm income when prices and production vary within *normal* year-to-year cycles. They were never envisioned to compensate for losses due to agroterrorism or even widespread pest and disease outbreaks.

The federal farm commodity support programs subsidize about 25 agricultural commodities (such as corn, wheat, soybeans, rice, and cotton). These supported commodities represent about one-third of gross farm sales. The list of commodities that normally do not receive direct support includes meats, poultry, fruits, vegetables, nuts, hay, and nursery products. These non-supported commodities account for about two-thirds of gross farm sales²⁵ and are possibly more likely to be the targets of an agroterrorist attack.

Thus, the food products more vulnerable to attack (meats, fruits, and vegetables) do not have existing federal farm income support programs. Food processors or retailers beyond the farm gate do not receive any commodity support payments. Any federal assistance to producers or processors stemming from an agroterrorist attack would likely come from the emergency transfer authority available to the Secretary of Agriculture²⁶ (for producers) and through supplemental emergency appropriations enacted by Congress (for producers, and possibly processors). Making disaster

²³ Congressional Budget Office, *Homeland Security and the Private Sector*, December 2004, p. 41, at [<http://www.cbo.gov/showdoc.cfm?index=6042&sequence=0&from=7>].

²⁴ *Ibid.*

²⁵ CRS Report RS21999, *Farm Commodity Policy: Programs and Issues for Congress*, by Jim Monke.

²⁶ For pest and disease emergencies, the Secretary of Agriculture has long-standing authority to transfer money from the Commodity Credit Corporation (CCC) to the Animal and Plant Health Inspection Service, both for eradication and control and indemnities to producers (7 U.S.C. 7772, and 7 U.S.C. 8316). Between \$168 million and \$378 million per year has been transferred for 10 or more natural or accidental pest and disease outbreaks in recent years. See CRS Report RL32504, *Funding Plant and Animal Health Emergencies: Transfers from the Commodity Credit Corporation*, by Jim Monke and Geoffrey S. Becker.

payments to individuals who do not normally receive commodity payments is technically more difficult than supplementing regular program payments.

In the end, despite the CBO suggestion that the economic effects of agroterrorism might fall within the realm of normal experience, numerous federal agencies, state agencies, and private corporations continue to prepare for agroterrorism based on the assumption that an attack could exceed the typical experience with naturally or accidentally occurring outbreaks.

A Brief History of Agricultural Bioweapons

Attacks against agricultural production are not new, and have been conducted both by nation-states and by substate organizations throughout history.²⁷ At least nine countries had documented agricultural bioweapons programs during some part of the 20th century (Canada, France, Germany, Iraq, Japan, South Africa, United Kingdom, United States, and the former USSR). Four other countries are believed to have or have had agricultural bioweapons programs (Egypt, North Korea, Rhodesia, and Syria).²⁸

Despite extensive research on the issue, however, biological weapons have been used rarely against crops or livestock, especially by state actors. Examples of state actors using biological weapons against agriculture include Germany's use of glanders against Allied horses and mules in World War I, the alleged use of anthrax and rinderpest by Japan in World War II, and the alleged use of glanders by Soviet forces in Afghanistan in the 1980s.²⁹ Thus, in recent decades, using biological weapons against agricultural targets has remained mostly a theoretical consideration. With the ratification of the Biological and Toxin Weapons Convention in 1972, many countries, including the United States, stopped military development of biological weapons and destroyed their stockpiles.

Although individuals or substate groups have used bioweapons against agricultural or food targets, only a few can be considered terrorist in nature. In 1952, the Mau Mau (an insurgent organization in Kenya) killed 33 head of cattle at a mission station using African milk bush (a local plant toxin). In 1984, the

²⁷ This report considers only "modern" instances of directing weapons against agriculture and food. However, such attacks can be cited for centuries prior to 1900, usually on a much smaller scale than generally conceived today.

²⁸ Monterey Institute of International Studies, "Agro-terrorism," at [<http://cns.miis.edu/research/cbw/agromain.htm>]; University of Minnesota Center for Infectious Disease Research and Policy (CIDRAP), "Overview of Agricultural Biosecurity," at [<http://www.cidrap.umn.edu/cidrap/content/biosecurity/ag-biosec/biofacts/agbiooview.html>]; and Peter Chalk, RAND National Defense Research Institute, "Hitting America's Soft Underbelly: The Potential Threat of Deliberate Biological Attacks Against U.S. Agricultural and Food Industry," 2004, at [http://www.rand.org/pubs/monographs/2004/RAND_MG135.pdf].

²⁹ Monterey Institute of International Studies; and Center for Infectious Disease Research and Policy.

Rajneeshee cult spread salmonella in salad bars at Oregon restaurants to influence a local election.³⁰

Chemical weapons have been used somewhat more commonly against agricultural targets. During the Vietnam War, the U.S. used agent orange to destroy foliage, affecting some crops. Among possible terrorist events, chemical attacks against agricultural targets include a 1997 attack by Israeli settlers who sprayed pesticides on grapevines in two Palestinian villages, destroying up to 17,000 metric tons of grapes. In 1978, the Arab Revolutionary Council poisoned Israeli oranges with mercury, injuring at least 12 people and reducing orange exports by 40%.³¹

Congressional Responses

Hearings on Agroterrorism

From 1999 to 2006, Congress has held five hearings entirely devoted to agroterrorism or agricultural biosecurity, four in the Senate and one in the House, each by a different committee or subcommittee.

The first Congressional hearing on agroterrorism was in October 1999, called by Senator Pat Roberts of the Subcommittee on Emerging Threats in the Senate Committee on Armed Services. The hearing was titled, “The Agricultural Biological Weapons Threat to the United States,” and had both closed and open sessions with different witnesses.³²

Four years later, on November 19, 2003, the Senate Committee on Governmental Affairs held an open hearing titled, “Agroterrorism: The Threat to America’s Breadbasket,” including witnesses from the Administration, state governments, and a private think tank.³³ During the four years between these two hearings when the specter of terrorism was raised after September 11, 2001, a few individual panelists at more general hearings on food safety, homeland security, or terrorism discussed agroterrorism.³⁴

³⁰ Peter Chalk (2004), p. 29.

³¹ Center for Infectious Disease Research and Policy (CIDRAP).

³² Senate Committee on Armed Services, Subcommittee on Emerging Threats, “The Agricultural Biological Weapons Treat to the United States,” October 27, 1999 [<http://armed-services.senate.gov/hearings/1999/e991027.htm>].

³³ Senate Committee on Governmental Affairs, *Agroterrorism: The Threat to America’s Breadbasket*, S.Hrg. 108-491, November 19, 2003, [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_senate_hearings&docid=f:91045.wais.pdf].

³⁴ For example, testimony by Peter Chalk, RAND, “Terrorism, Infrastructure Protection, and the U.S. Food and Agriculture Sector” at the Senate Governmental Affairs Subcommittee on Oversight of Government Management, Restructuring, and the District of Columbia hearing on “Federal Food Safety and Security,” October 10, 2001 [<http://www.rand.org/publications/CT/CT184/CT184.pdf>].

In May 2005, a subcommittee of the House Homeland Security Committee held a hearing titled, “Evaluating the Threat of Agro-Terrorism.”³⁵ Both an open session and a closed session were held with the same two witnesses.

Two months later, in July 2005, the Senate Agriculture Committee held a hearing titled, “Bio-security and Agro-Terrorism.”³⁶ Eight panelists from government, law enforcement, academia, and industry discussed vulnerabilities and preparedness efforts.

In January 2006, the Senate Agriculture Committee’s Subcommittee on Research, Nutrition, and General Legislation held a field hearing in Pennsylvania titled “BioSecurity Coordination.”³⁷ Ten panelists from government, academia, and industry discussed preparedness and coordination issues.

Bioterrorism Preparedness Act (P.L. 107-188)

The Public Health Security and Bioterrorism Preparedness and Response Act (P.L.107-188, June 12, 2002) was enacted in response to vulnerabilities identified following September 11, 2001. Among many provisions affecting public health and general preparedness, the act 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” in sections 211-213, the “Agricultural Bioterrorism Protection Act of 2002”) under rules by the Animal and Plant Health Inspection Service (APHIS) and Centers for Disease Control and Prevention.
- Authorize expanded agricultural security activities and security upgrades at USDA facilities (sections 331-335).
- Address criminal penalties for terrorism against animal enterprises (section 336) and violation of the select agent rules (section 231).

³⁵ House Homeland Security Committee, Subcommittee on Intelligence, Information Sharing, and Terrorism Risk Assessment, “Evaluating the Threat of Agro-Terrorism,” Serial 109-16, May 25, 2005 [http://frwebgate.access.gpo.gov/cgi-bin/useftp.cgi?IPaddress=162.140.64.128&filename=23605.pdf&directory=/diskb/wais/data/109_house_hearings].

³⁶ Senate Committee on Agriculture, Nutrition, and Forestry, *To Review Biosecurity Preparedness and Efforts to Address Agroterrorism Threats*, S.Hrg. 109-457, July 20, 2005, [<http://www.access.gpo.gov/congress/senate/pdf/109hrg/22648.pdf>].

³⁷ Senate Committee on Agriculture, Nutrition, and Forestry; Subcommittee on Research, Nutrition, and General Legislation, *Bio-Security Coordination*, S. Hrg. 109-619, Jan. 9, 2006 [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_senate_hearings&docid=f:30234.pdf].

Expanded FDA Authority over Food. The Bioterrorism Preparedness Act responded to long-standing concerns about whether the Food and Drug Administration (FDA) in the Department of Health and Human Services (HHS) had the authority to assure food safety. FDA was instructed to implement new rules for (1) registration of food processors, (2) prior notice of food imports, (3) administrative detention of imports, and (4) record-keeping.³⁸ Proposed rules began being issued in early 2003; the final set of rules was published in December 2004.³⁹

Registration of Food Processors. The act required FDA to establish a one-time registration system for any domestic or foreign facility that manufactures, processes, packs, and handles food. All food facilities supplying food for the United States were required to register with the FDA by December 12, 2003 (21 CFR 1.225 to 1.243). Registering involved providing information about the food products (brand names and general food categories), facility addresses, and contact information. Restaurants, certain retail stores, farms, non-profit food and feeding establishments, fishing vessels, and trucks and other motor carriers were exempt from registration requirements. However, many farms had a difficult time determining whether they needed to register based on the amount of handling or processing they performed.

Registration documents are protected from public disclosure under the Freedom of Information Act (FOIA). The registry provides, for the first time, a complete list of companies subject to FDA authority, and will enhance the agency's capability to trace contaminated food. Critics argued that registration created a record keeping burden without proof that facilities will be able to respond in an emergency.

Prior Notice of Imports. As of December 12, 2003, importers are required to give advance notice to FDA prior to importing food (21 CFR 1.276 to 1.285). Electronic notice must be provided by the importer within a specified period prior to arrival at the border (within two hours by road, four hours by air or rail, and eight hours by water). With prior notice, FDA can assess whether a shipment meets criteria that can trigger an inspection. If notice is not given, the food will be refused entry and held at the port or in secure storage. Some critics are concerned that the administrative cost of compliance may raise the price of food. Others have argued that perishable imports are subject to increased spoilage if delays arise, or that certain perishables (especially from Mexico) are not harvested or loaded onto trucks before the two-hour notification period. However, implementation of the new system generally has not caused delays and most shippers have been accommodated.

To facilitate compliance, FDA and the Department of Homeland Security (DHS) Bureau of Customs and Border Protection (CBP) integrated their information systems to allow food importers to provide the required information using CBP's existing system for imports. In December 2003, the two agencies agreed to allow CBP

³⁸ For greater detail about these rules, please see CRS Report RL31853, *Food Safety Issues in the 109th Congress*, by Donna Vogt.

³⁹ FDA, "FDA Actions on New Bioterrorism Legislation," at [<http://www.cfsan.fda.gov/~dms/fsbtact.html>].

officers to inspect imported foods on FDA's behalf, particularly at ports where FDA has no inspectors.

Administrative Detention. Upon enactment of the act, FDA obtained the authority to detain food imports under certain conditions. FDA procedures for making detention were issued on June 4, 2004 (21 CFR 1.377 to 1.406). To use the authority, the agency must show credible evidence that a shipment presents a serious health threat. Food may be detained for 20 days and up to 30 days, if necessary. The owners must pay the expense of moving any detained food to secure storage. Perishable foods (e.g., fruits, vegetables, and seafood) are to receive expedited review.

Maintenance of Records. FDA published a proposed rule for record-keeping on May 9, 2003, and issued a corrected final rule on February 23, 2005 (21 CFR 1.363 to 1.368). People or companies that manufacture, process, pack, transport, distribute, receive, hold, or import food (with the exception of farms, restaurants and certain others) must establish and maintain records for up to two years. In the event of a suspected food safety problem, the regulation provides FDA access to records including the facility's immediate supplier, and the immediate customer. Companies can keep the information in any form and use existing records.

The rule limits access to records that may contain trade secrets and prevent disclosure of such confidential information if records are reviewed. FDA is allowed to reduce the record-keeping requirements for small businesses and to exempt farms, restaurants, and fishing vessels not engaged in processing.

Tighter Security for Biological Agents and Toxins. 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.

Extensive registration and background checks of both facilities and personnel were to be conducted in 2003. However, due to delays at the FBI in processing security clearance paperwork, provisional registrations were issued to laboratories that had submitted paperwork by established deadlines.

Homeland Security Act (P.L. 107-296)

The main purpose of the Homeland Security Act of 2002 (P.L. 107-296, November 25, 2002) was to create the Department of Homeland Security (DHS), primarily by transferring parts or all of many agencies throughout the federal government into the new cabinet-level department. In doing so, the law made two major changes to the facilities and functions of the U.S. Department of Agriculture. The Homeland Security Act transferred:

- personnel and responsibility for agricultural border inspections from USDA to DHS (specifically, from the USDA Animal and Plant Health Inspection Service (APHIS) to DHS Customs and Border Protection (CBP)), and
- possession of the Plum Island Animal Disease Center in New York from USDA to DHS.

Transferring Agricultural Border Inspections. Section 421 of the Homeland Security Act authorized the transfer of up to 3,200 APHIS border inspection personnel to DHS. As of March 1, 2003, approximately 2,680 APHIS inspectors became employees of DHS in the Bureau of Customs and Border Inspection (CBP). Because of its scientific expertise, USDA retains a significant presence in border inspection, as described below.

Historically, the APHIS Agricultural Quarantine Inspection (AQI) program was considered the most significant and prominent of agricultural and food inspections at the border. Because of this prominence, AQI was one of the many programs selected for inclusion when DHS was created. Some drafts of the bill creating the new department would have transferred all of APHIS (including, for example, animal welfare and disease eradication) to DHS. Concerns from many farm interest groups about the impact this might have on diagnosis and treatment of naturally occurring plant and animal diseases prompted a legislative compromise that transferred only the border inspection function and left other activities under USDA.

DHS-CBP personnel now inspect international conveyances and the baggage of passengers for plant, animal, and related products that could harbor pests or disease organisms. They also inspect ship and air cargo, rail and truck freight, and package mail from foreign countries.

Although the border inspection functions were transferred to DHS, the USDA retains a significant presence in border activities. APHIS employees who were not transferred continue to pre-clear certain commodities, inspect all plant propagative materials, and check animals in quarantine. APHIS personnel continue to set agricultural inspection policies to be carried out by DHS border inspectors, and negotiate memoranda of understanding to assure that necessary inspections are conducted. APHIS manages the data collected during the inspections process, and monitors smuggling and trade compliance. USDA is also statutorily charged in section 421(e)(2)(A) of P.L. 107-296 to “supervise” the training of CBP inspectors in consultation with DHS.

This separation of duties is designed to allow for consolidated border inspections for intelligence and security goals, but preserve USDA's expertise and historical mission to set agricultural import policies.

Adding Agriculture Specialists. Under the CBP cross-training initiative in 2003 (also known as "One Face at the Border"), CBP inspectors from the former customs, immigration, and agriculture agencies were to be trained to perform inspections in all three areas equally, without specialization, — customs, immigration, and agriculture. However, due to criticism from USDA, inspection unions, and the agricultural industry, DHS created another class of inspectors called "agriculture specialists." Agriculture specialists work mainly in secondary inspection stations in passenger terminals and are deployed at cargo terminals. The cadre of agriculture specialists include former APHIS inspectors who decided not to convert to CBP generalist inspectors plus new graduates from the agricultural specialist training program.

Before DHS was created, APHIS trained its inspectors in a nine-week course that had science prerequisites. The initial DHS cross-training program announced in 2003 had only 12-16 hours for agriculture in a 71-day course covering customs, immigration, and agriculture. This difference in training was one of the reasons DHS was forced to add the agricultural specialist position.

DHS now has an eight-week (43-day) training program for agriculture specialists. The course is taught by CBP and APHIS instructors at a USDA training facility in Frederick, Maryland. Agriculture specialists also receive two weeks of law enforcement training, and can exercise law enforcement authority similar to regular CBP officers. However, CBP does not necessarily allow agriculture specialists to use the full extent of their law enforcement powers.⁴⁰ The first class of agriculture specialists graduated in July 2004.

Regular CBP officers receive about 12-16 hours of agricultural training during their multi-week program at the Federal Law Enforcement Training Center (FLETC) in Georgia. The agriculture module was developed by APHIS and provided to DHS.

Although DHS is training new agriculture specialists, the future size of the agricultural specialist corps is not certain, given the eventual attrition of former APHIS inspectors. Also, details are not available as to how these inspectors will be deployed and how many ports of entry will be staffed with agriculture specialists (compared with the APHIS deployment prior to DHS). Without agriculture specialists, primary agricultural inspections — the first line of defense for agricultural security — may be conducted by cross-trained inspectors with limited agricultural training.

Congressional agriculture committees have been concerned about whether enough attention will be devoted to agricultural inspections by DHS, and whether the United States will be as safe from the introduction of foreign pests as it was under the

⁴⁰ Agriculture specialists do not carry firearms like regular CBP officers. CBP is still deciding whether agriculture specialists will carry mace, batons, or firearms.

previous inspection system. Inspection statistics from the fall of 2003 indicate that 32% fewer insect infestations were found (under DHS) than in the previous year (under APHIS). APHIS officials cite unfilled agricultural inspector positions and difficulty in adequately cross-training former customs and immigration officers to conduct agricultural inspections.⁴¹

The FY2007 DHS appropriations act supports the cross-training initiative under One Face at the Border (H.Rept. 109-699):

The conferees recognize the benefits of cross-training legacy customs, immigration, and agricultural inspection officers as part of CBP's 'One Face at the Border Initiative' and direct CBP to ensure that all personnel assigned to primary and secondary inspection duties at ports of entry have received adequate training in all relevant inspection functions.

A report by the Government Accountability Office in May 2006 found that only 21% of agricultural specialists always receive urgent alerts for agricultural inspection priorities in a timely manner. Moreover the number of canine units (inspection dogs, "beagle brigade") has declined from 140 to 80 since the transfer to DHS, and 60% of 43 canine teams that were tested failed a proficiency test. In a follow-up memorandum, the GAO analyzed a survey of morale among agricultural specialists and found many more negative responses than positive comments. (See "GAO Studies," below.)

For more information about inspection statistics and the new border inspection arrangement that combines the previously separate customs, immigration, and agriculture inspections, please see CRS Report RL32399, *Border Security: Inspections Practices, Policies, and Issues*.

Plum Island Animal Disease Center. Section 310 of the Homeland Security Act transferred the Plum Island Animal Disease Center to DHS. Prior to June 1, 2003, Plum Island was a USDA facility jointly operated by APHIS and ARS (Agricultural Research Service). This transfer includes only the property and facilities of Plum Island; both APHIS and ARS personnel continue to perform research and diagnostic work at the facility, but DHS also may conduct other research at the facility as well.

Plum Island and DHS's plans for a new National Bio and Agro-Defense Facility are discussed later in this report under "Laboratories and Research Centers."

Animal Enterprise Terrorism Act (P.L. 109-374)

The Animal Enterprise Terrorism Act (P.L. 109-374, Nov. 27, 2006) was enacted to expand criminal consequences for damaging or interfering with the operations of an animal enterprise. The Bioterrorism Preparedness Act (P.L. 107-188, Sec. 336) contained less extensive penalties for animal enterprise terrorism.

⁴¹ *Chicago Sun Times*, "Short-Staffed Port Inspectors Missing Insect-Infested Food," August 6, 2004.

P.L. 109-374 prescribes penalties and restitution in Title 18 of the *U.S. Code* for varying levels of economic damage and personal injury involving threats, acts of vandalism, property damage, criminal trespass, harassment, or intimidation. The act covers enterprises that use, sell, or raise animals (or animal products) for profit or educational purposes. With this broad definition, the law applies to both bioterrorism (from foreign sources) and eco-terrorism (from domestic animal rights activist groups).

GAO Studies

Since 2002, six reports from GAO have found gaps in federal controls for protecting agriculture and food. Findings from the first four reports are summarized in testimony for the Senate hearing on agroterrorism on November 19, 2003.⁴²

In the first report, following the European outbreak of foot and mouth disease in 2001, a 2002 GAO study found insufficient guidance for border inspectors and an overwhelming volume of passengers and cargo for inspectors to process.⁴³

Regarding prevention of BSE (“mad cow disease”), a 2002 GAO report found shortcomings in documentation for imports and enforcement of federal feed ingredient bans.⁴⁴

A 2003 GAO study on security improvements at food processing companies found that federal agencies, particularly the Food and Drug Administration (FDA), did not have authority to impose requirements or assess security flaws.⁴⁵

Regarding livestock disease research at USDA’s Plum Island lab in New York, a 2003 GAO report found that people without adequate background checks had access to secure areas, and that security personnel on the island had limited authority.⁴⁶ In response to GAO’s security concerns about Plum Island, DHS announced that armed Federal Protective Service personnel would supplement security on the island beginning in June 2004.

⁴² GAO, *Bioterrorism: A Threat to Agriculture and the Food Supply*, GAO-04-259T, November 19, 2003.

⁴³ GAO, *Foot and Mouth Disease: To Protect Livestock, USDA Must Remain Vigilant and Resolve Outstanding Issues*, GAO-02-808, July 26, 2002.

⁴⁴ GAO, *Mad Cow Disease: Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts*, GAO-02-183, January 25, 2002.

⁴⁵ GAO, *Food-Processing Security: Voluntary Efforts Are Under Way, But Federal Agencies Cannot Fully Assess Their Implementation*, GAO-03-342, February 14, 2003.

⁴⁶ GAO, *Combating Bioterrorism: Actions Needed to Improve Security at Plum Island Animal Disease Center*, GAO-03-847, September 19, 2003.

A 2005 GAO report summarized the issues of agroterrorism and what federal agencies are doing to prepare.⁴⁷ It found numerous vulnerability assessments and working groups had been prepared to prioritize and oversee activities. Efforts at interagency coordination were also underway, but some were seen to be in the early stages with more coordination necessary. The report also cited a lack of veterinarians trained in foreign animal diseases and response capacity, lack of rapid diagnostic tools, and lack of rapid vaccine deployment and protocols.

In the conference agreement for the FY2005 Consolidated Appropriations Act (P.L. 108-447, H.Rept. 108-792), conferees expressed concern over agricultural border inspections and research at Plum Island following the transfer of these activities in 2003 from USDA to DHS. They requested a GAO report on interagency coordination between USDA and DHS regarding agriculture inspections.

The conferees are aware of ongoing concerns within the agriculture sector that the transfer of these responsibilities [border inspection and research] may shift the focus away from agriculture to other priority areas of DHS. In order to ensure that the interests of U.S. agriculture are protected ... the conferees request the Government Accountability Office to provide a report ... on the coordination between USDA and DHS (H.Rept. 108-792).

Accomplishments in interagency coordination that GAO cited in the 2006 report⁴⁸ include training of both agricultural specialists and cross-training of regular border protection officers. Agriculture specialists now have access to classified data systems, allowing better targeting of agriculture inspections. DHS also created “agriculture liaisons” in district field offices to assure agriculture issues are heard, and improve operations at ports of entry.

However, problems in coordination or inspection performance were cited in several areas. DHS had not developed performance measures for agriculture inspections, but was still using USDA-APHIS measures which did not reflect all DHS activities. Staffing and related staffing performance measures were also lacking. Agriculture specialists are not always notified of urgent inspection alerts issued by APHIS; a survey suggests only 21% of agriculture specialists always receive alerts in a timely manner. The number of canine units (inspection dogs, “beagle brigade”) has declined from 140 to 80 since the transfer to DHS, and 60% of 43 canine teams that were tested failed an APHIS proficiency test. Several financial management issues also were problematic. While user fees were less than program costs, DHS was unable to provide APHIS with information of actual costs by type of activity, and USDA was sometimes slow to transfer user fees to DHS.

⁴⁷ GAO, *Much is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain*, GAO-05-214, March 8, 2005.

⁴⁸ GAO, *Management and Coordination Problems Increase the Vulnerability of U.S. Agriculture to Foreign Pests and Disease*, GAO-06-644, May 19, 2006.

In a follow-up memorandum, GAO analyzed the open-ended questions in a survey of morale among agricultural specialists.⁴⁹ GAO found many more negative responses than positive comments. About 60% of agricultural specialists surveyed thought they were doing fewer inspections than before the transfer to DHS, and 29% were concerned that the agricultural mission is declining. An estimated 64% thought their DHS managers did not respect their work, and 29% expressed concern about working relationships with non-agriculture inspectors.

Executive Branch Responses

Shortly after September 11, 2001, USDA created a Homeland Security Staff in the Office of the Secretary to develop a department-wide plan to coordinate agroterrorism preparedness plans among all USDA agencies and offices. Efforts have been focused on three areas: food supply and agricultural production, USDA facilities, and USDA staff and emergency preparedness.⁵⁰ The Homeland Security Staff also has become the department's liaison with Congress, the Department of Homeland Security (DHS), and other governmental agencies on terrorism issues.

The White House's National Security Council weapons of mass destruction (WMD) preparedness group, formed by Presidential Decision Directive 62 (PDD-62) in 1998, included agriculture, especially in terms of combating terrorism. Many observers note that, as a latecomer to the national security table, USDA has been invariably overshadowed by other agencies.

In addition to the following Presidential directives and actions, many departments and agencies in the executive branch have undertaken efforts to improve preparedness for agroterrorism. Many of these actions are discussed later in this report under "Countering the Threat."

HSPD-7 (Protecting Critical Infrastructure)

In terms of protecting critical infrastructure, agriculture was added to the list in December 2003 by Homeland Security Presidential Directive 7 (HSPD-7), "Critical Infrastructure Identification, Prioritization, and Protection."⁵¹ This directive replaces the 1998 Presidential Decision Directive 63 (PDD-63) that omitted agriculture and food. Both of these critical infrastructure directives designate the physical systems that are vulnerable to terrorist attack and are essential for the minimal operation of the economy and the government.

⁴⁹ GAO, *Homeland Security: Agriculture Specialists' Views of Their Work Experiences After Transfer to DHS*, GAO-07-209R, Nov. 14, 2006.

⁵⁰ USDA Homeland Security Staff, "Homeland Security Efforts," May 2004, at [<http://www.usda.gov/homelandsecurity/factsheet0504.pdf>]; and National Research Council, *Countering Agricultural Bioterrorism*, 2003, p. 150.

⁵¹ HSPD-7: [<http://www.whitehouse.gov/news/releases/2003/12/20031217-5.html>].

These directives instruct agencies to develop plans to prepare for and counter the terrorist threat. HSPD-7 mentions the following industries: agriculture and food; banking and finance; transportation (air, sea, and land, including mass transit, rail, and pipelines); energy (electricity, oil, and gas); telecommunications; public health; emergency services; drinking water; and water treatment.

HSPD-9 (Defending Agriculture and Food)

More significant recognition came on January 30, 2004, when the White House released Homeland Security Presidential Directive 9 (HSPD-9), “Defense of United States Agriculture and Food.”⁵² This directive establishes a national policy to protect against terrorist attacks on agriculture and food systems.

HSPD-9 generally instructs the Secretaries of Homeland Security (DHS), Agriculture (USDA), and Health and Human Services (HHS), the Administrator of the Environmental Protection Agency (EPA), the Attorney General, and the Director of Central Intelligence to coordinate their efforts to prepare for, protect against, respond to, and recover from an agroterrorist attack. In some cases, one department is assigned primary responsibility, particularly when the intelligence community is involved. In other cases, only USDA, HHS, and/or EPA are involved regarding industry or scientific expertise.

The directive instructs agencies to develop awareness and warning systems to monitor plant and animal diseases, food quality, and public health through an integrated diagnostic system. Animal and commodity tracking systems are included, as is gathering and analyzing international intelligence. Vulnerability assessments throughout the sector help prioritize mitigation strategies at critical stages of production or processing, including inspection of imported agricultural products.

Response and recovery plans are to be coordinated across the federal, state, and local levels. A National Veterinary Stockpiles (NVS) of vaccine, antiviral, and therapeutic products is to be developed for deployment within 24 hours of an attack. A National Plant Disease Recovery System (NPDRS) is to develop disease and pest resistant varieties within one growing season of an attack in order to resume production of certain crops. The Secretary of Agriculture is to make recommendations for risk management tools to encourage self-protection for agriculture and food enterprises vulnerable to losses from terrorism.

HSPD-9 encourages USDA and HHS to promote higher education programs that specifically address the protection of animal, plant, and public health. It suggests capacity-building grants for universities, and internships, fellowships and post-graduate opportunities. HSPD-9 also formally incorporates USDA and agriculture into the ongoing DHS research program of university-based “centers of excellence.”

As a presidential directive, HSPD-9 addresses the internal management of the executive branch and does not create enforceable laws. Moreover, it is subject to change without Congressional consent. While Congress has oversight authority of

⁵² HSPD-9: [<http://www.whitehouse.gov/news/releases/2004/02/20040203-2.html>].

federal agencies and may ask questions about implementation of the directive, a public law outlining an agroterrorism preparedness plan would establish the statutory parameters for such a plan, and, as a practical matter, might result in enhanced oversight by specifically identifying executive branch entities responsible for carrying out particular components of such a plan.⁵³

In implementing HSPD-9, the USDA Homeland Security Staff and other agencies are drawing upon HSPD-5 (regarding the national response plan) and HSPD-8 (regarding preparedness). Implementing many of the HSPD-9 directives depends on the executive branch having sufficient appropriations for those activities.

National Response Plan (NRP)

Homeland Security Presidential Directive 5 (HSPD-5) called for a National Response Plan (NRP) to coordinate federal bureaucracies, capabilities, and resources into a unified, all-discipline, and all-hazards approach to manage domestic incidents, both for terrorism and natural disasters. The National Response Plan, developed by DHS, was unveiled in December 2004.⁵⁴

The NRP addresses agriculture and food in two annexes at the end of the plan. The first is in terms of emergency support. The Emergency Support Function (ESF) annexes to the NRP seek to coordinate federal interagency support by describing the roles and responsibilities of departments and agencies. USDA is the coordinator and primary responding agency for ESF #11, the “Agriculture and Natural Resources Annex,” which addresses:

- Provision of nutrition assistance by determining nutrition assistance needs in disaster areas, obtaining appropriate food supplies, arranging for delivery of the supplies, and authorizing disaster food stamps,
- Control and eradication of animal and plant pests and diseases,
- Assurance of food safety and food security, including food safety inspection at processing plants, distribution, retail sites, and ports of entry; laboratory analysis of food samples; food borne disease surveillance; and field investigations, and
- Protection of natural and cultural resources and historic properties.

The NRP also contains “incident annexes” that address specific hazard situations requiring special attention. The incident annexes describe the policies, possible situations, operating procedures, and responsibilities most relevant when responding to a particular type of incident, such as agroterrorism. The NRP has a placeholder for a “Food and Agriculture Incident Annex,” but this section is the only incident annex that is not yet published.

⁵³ For a related discussion on the role of Congress with respect to executive actions, see CRS Report RS20846, *Executive Orders: Issuance and Revocation*.

⁵⁴ Department of Homeland Security, *National Response Plan*, December 2004 [http://www.dhs.gov/dhpublic/display?theme=14&content=4264].

Public-Private Partnerships

National Infrastructure Protection Plan (NIPP). The National Infrastructure Protection Plan was developed to unify and enhance the protection of critical infrastructure through public-private partnerships. It provides a coordinated approach to establish national priorities and goals. The sector partnership model encourages formation of Sector Coordinating Councils (SCCs) and Government Coordinating Councils (GCCs). DHS provides guidance, tools, and support so that these groups can work together to develop and coordinate a wide range of infrastructure protection activities.⁵⁵

Sector Coordinating Councils are self-organized, self-run, and self-governed organizations of key stakeholders within a sector, serving as the government's principal point of entry into each sector. A Government Coordinating Council is the government counterpart to a SCC, comprised of federal, state and local representatives, enabling coordinating across government agencies and jurisdictions.

The Food and Agriculture Sector Coordinating Council (FASCC) has seven sub-councils with representatives from private corporations and associations, including:⁵⁶

- Agricultural production inputs and services
- Animal producers
- Plant producers
- Processors and manufacturers
- Restaurants and -food service
- Retail
- Warehousing and logistics

The agriculture SCC has been successful among the early SCC's, and is used by DHS as a model for developing other sector councils. The FASCC's recent accomplishments include reviewing and commenting on drafts of the National Infrastructure Protection Plan, developing a Food and Agriculture Sector Specific Plan (SSP), sharing best practices, identifying gaps in security or preparedness, and striving to improve communications and information sharing capabilities among companies and government.

Strategic Partnership Program Agroterrorism (SPAA). The Strategic Partnership Program Agroterrorism initiative is another public-private partnership to assess vulnerabilities in the agriculture and food industry. Four government agencies including DHS, USDA, FDA, and FBI collaborate with private industry and states

⁵⁵ Department of Homeland Security, *National Infrastructure Protection Plan*, Draft 2.0, January 2006, [<http://www.ni2ciel.org/NIPC/Revised-Draft-NIPP-v2.0.pdf>].

⁵⁶ Food and Agriculture Sector Coordinating Council, [<http://cipp.gmu.edu/psprograms/FoodAgSCC.php>].

to conduct site surveys of specific private industries within the agriculture industry.⁵⁷ The intent is to:

- Determine critical points in the food and agriculture system that may be the target of a terrorist attack,
- Identify early indicators and warnings that would signify planning and/or preparation for an attack,
- Develop a focus for intelligence collection strategies around these indicators and warnings, and
- Develop mitigation strategies for early detection, deterrence, disruption, interdiction, and prevention.

In 2005, the SPPA began working with the Food and Agriculture Sector Coordinating Council and the Government Coordinating Council to identify about 50 sites to visit in 2006-07. The sites are to span the entire food production cycle.

Information Sharing and Analysis Center (ISAC). An Information Sharing and Analysis Center is an industry contact point to federal law enforcement and intelligence community (including the Federal Bureau of Investigation, Central Intelligence Agency, and National Security Agency). The objective to detect potential threats, assess, prevent attacks, and investigate and respond to attacks against critical infrastructure.

The Food and Agriculture ISAC was created in February 2002. Members generate information on many of food safety and bio-security related topics such as security threats, food system vulnerabilities, product contamination, microbial isolates, and reports of consumer illness from food. The information is shared confidentially with the law enforcement and intelligence community, with the expectation that relevant intelligence will returned to the industry.⁵⁸

The ISAC network is similar to an FBI program for public-private information sharing called Infragard. In 2005, a new FBI program called AgGard was created to encourage members of the agricultural community to use a secure internet connection to share information and alert each other, state and local law enforcement, and the FBI of suspicious activity.

Laboratories and Research Centers

Since September 11, 2001, and the ensuing recognition of agroterrorism as a threat to critical infrastructure, the United States has expanded its agricultural laboratory and diagnostic infrastructure. New federal laboratories have been completed, existing facilities have been upgraded, and networks of federal, state and university laboratories have been created to share information and process samples.

⁵⁷ Food and Drug Administration, "Strategic Partnership Program Agroterrorism (SPPA) Initiative," August 2005, [<http://www.cfsan.fda.gov/~dms/agroterr.html>].

⁵⁸ Food and Agriculture Information Sharing and Analysis Center, [<http://www.fmi.org/isac>].

National Bio and Agro-Defense Facility (NBAF). The Department of Homeland Security is proceeding with plans to replace the aging Plum Island Animal Disease Center with a new “National Bio and Agro-Defense Facility” for research on high consequence foreign animal diseases. Congress has appropriated funds for planning and site selection. DHS is beginning the conceptual design process, and has reviewed submissions from universities and other locations interested in hosting the new facility.⁵⁹ In August 2006, it selected a long list of 18 sites in 11 states for further consideration.

Currently, the premier U.S. facility for research on foreign animal diseases is the Plum Island Animal Disease Center, located on an island off the northeastern tip of Long Island, NY. The property of Plum Island was transferred from USDA to DHS in the Homeland Security Act (P.L. 107-296), although personnel from both USDA and DHS still conduct research there. Built in the 1950s, many experts agree that the 50-year old Plum Island facility is nearing the end of its useful life and unable to provide the necessary capacity for current biosecurity research. Plum Island is the only facility in the United States that is currently approved to study high-consequence foreign livestock diseases, such as foot-and-mouth disease (FMD), because its laboratory has been equipped with a specially designed BSL-3 bio-containment area for large animals that meets specific safety measures.

Live FMD virus may be used only at coastal islands such as Plum Island, unless the Secretary of Agriculture specifically authorizes the use of the virus on the U.S. mainland (21U.S.C. 113a). Because of this geographical restriction in statute, some observers question whether the proposed NBAF should be built on the mainland or on an island similar to Plum Island. Locating the facility in regions where cattle or other livestock are raised may pose too great a risk if security features are breached by terrorism, critics say.

Biosafety levels (BSLs) are combinations of laboratory facilities, safety equipment, and laboratory practices. The four levels are designated in ascending order, by degree of protection provided to personnel, the environment, and the community.⁶⁰ BSL-1 laboratories handle pathogens of minimal hazard. The highest level laboratories, BSL-4, handle high-risk, life-threatening diseases with a high risk of aerosol transmission. Only a handful of BSL-4 labs exist in the U.S., including a CDC lab in Athens, Georgia, and an Army lab in Ft. Dietrick, Maryland. Agricultural BSL labs can house large animals for experiments, and thus are less common than regular BSL laboratories. The Plum Island Animal Disease Center and the USDA National Veterinary Services Laboratories (NVSL) in Ames, IA, are the only BSL-3 agriculture facilities in the United States.

As the number and importance of zoonotic diseases increase (such as with the recent discovery of Nipah and Hendra viruses, and the ongoing concern over foot and

⁵⁹ DHS, “National Bio and Agro-Defense Facility,” [http://www.dhs.gov/dhspublic/interapp/editorial/editorial_0762.xml].

⁶⁰ Centers for Disease Control and Prevention (CDC) and the National Institute of Health (NIH), *Biosafety in Microbiological and Biomedical Laboratories*, 4th edition, 1999, [<http://www.cdc.gov/od/ohs/biosfty/bmb14/bmb14toc.htm>].

mouth disease), scientists increasingly need BSL-4 laboratories to study zoonotic pathogens and BSL-4 agriculture facilities to work with those pathogens in host animals. The U.S. currently has no BSL-4 agricultural facility; instead, scientists must conduct experiments at facilities in Winnipeg, Canada, or Australia.⁶¹

The concept for the NBAF was first outlined in the FY2006 budget request for DHS. At that time, the estimated design and construction cost was \$451 million. The current time line calls for construction to be completed in FY2013.⁶² DHS began the process in FY2005 by using \$3 million for a planning and feasibility study. In FY2006, Congress appropriated \$23 million specifically for the NBAF in the DHS appropriations act (P.L. 109-90). The FY2007 DHS appropriation (P.L. 109-295) furthers that commitment with a second installment of \$23 million for pre-construction activities.

With the FY2006 appropriation, DHS issued a request for “Expressions of Interest” (EOI) in January 2006.⁶³ Parties interested in hosting the facility (such as federal agencies, State and local governments, private industry, and universities) were invited to reply by March 31, 2006. Evaluation criteria for site selection include capacity for research, workforce availability, construction and operation, and community acceptance. DHS received 29 expressions of interest from 20 states and the District of Columbia. In August 2006, DHS released a subset of 18 sites in 11 states that will be considered further.⁶⁴ By the end of 2006, DHS expects to narrow the list further and initiate an Environmental Impact Statement (EIS) analysis. A final location will be chosen early in 2008.

Conceptual design began in April 2006 by soliciting architect and engineering firms. DHS plans to award this contract later in 2006, with conceptual design to begin shortly thereafter. This level of design is not site specific and can proceed concurrently with site selection and environmental impact statements. The conceptual design process may update the current projected total cost of \$451 million. Construction is scheduled to begin in FY2010 and be completed in FY2013.

USDA Laboratories. Within USDA, several agencies have upgraded their facilities to respond better to the threat of agroterrorism by expanding laboratory

⁶¹ James Roth, DVM. “Agroterrorism: Hazards to Livestock and Public Health,” presentation to International Symposium on Agroterrorism, May 2005 [http://www.fbi-isa.org/library/roth_files/frame.htm].

⁶² DHS, “NBAF Timeline” [http://www.dhs.gov/interweb/assetlibrary/NBAF_Timeline.pdf].

⁶³ DHS, “National Bio and Agro-Defense Facility (NBAF): Notice of Request for Expression of Interest for Potential Sites,” Federal Register, Vol. 71, p. 3107 [http://www.dhs.gov/interweb/assetlibrary/NBAF_EOI.pdf].

⁶⁴ The August 2006 subset of potential sites after the first cut include 18 locations in the following 11 states: California, Georgia, Kansas, Kentucky/Tennessee, Maryland, Missouri, Mississippi, North Carolina, Oklahoma, Texas, and Wisconsin. Other locations expressing interest but removed from consideration include Alabama, Arkansas/Louisiana, Arizona, Colorado, Florida, Iowa, North Dakota, New Mexico, Pennsylvania, District of Columbia-based organizations with sites in New Jersey, Florida, Texas, and California, and the Plum Island Animal Disease Center.

capacity and adding physical security. These programs include the ARS research on foreign animal diseases at the Plum Island Animal Disease Center in New York (the physical facility is now managed and operated by DHS) and the ARS Southeast Poultry Research Lab in Athens, Georgia.

Three major USDA laboratories are consolidating operations in a new BSL-3 agriculture facility in Ames, Iowa, called the National Centers for Animal Health. These include the ARS National Animal Disease Center (NADC), the APHIS National Veterinary Services Laboratories (NVSL), and the APHIS Center for Veterinary Biologics (CVB). The complex will be USDA's largest animal health center for research, diagnosis and product evaluation. The NVSL is especially visible because it makes the final, official determination for the presence of most animal diseases when samples are submitted for testing.

USDA also cooperates with other federal agencies on counterterrorism research and preparedness, including the ARS and APHIS partnership with the U.S. Army Medical Research Institute for Infectious Diseases at Ft. Detrick, Maryland. The Ft. Detrick site offers USDA access to additional high-level biosecurity laboratories, including a BSL-4 laboratory. In the recent past, USDA has conducted research on soybean rust at Ft. Detrick.

Laboratory Networks. Several laboratory networks have been created for animal, plant, food, and general bioterrorism issues. The primary goals of these networks are to improve the diagnosis and detection of a deliberate or accidental disease outbreak. Primary examples are the CDC-led Laboratory Response Network (LRN), the USDA-funded National Plant Diagnostic Network (NPDN) and its sister group the National Animal Health Laboratory Network (NAHLN), and the joint FDA/FSIS Food Emergency Response Network (FERN).

- **Laboratory Response Network (LRN).**⁶⁵ The Laboratory Response Network, created by CDC, is a national and international network of about 140 laboratories equipped to respond quickly to acts of chemical or biological terrorism, emerging infectious diseases, and other public health threats and emergencies. The network includes federal labs (CDC, USDA, FDA), state and local public health labs, military labs, food labs, environmental labs, veterinary labs, and international labs in Canada, the United Kingdom, and Australia.
- **National Plant Diagnostic Network (NPDN).**⁶⁶ The National Plant Diagnostic Network is a collective of land grant university plant disease and pest diagnostic facilities organized by USDA. The national network is led by five regional labs (Cornell, Florida, Michigan State, Kansas State, and California at Davis) and one support lab (Texas Tech). The NPDN facilitates the initial detection, positive identification, national notification, and

⁶⁵ Centers for Disease Control and Prevention (CDC). "Facts About the Laboratory Response Network" [<http://www.bt.cdc.gov/lrn/factsheet.asp>].

⁶⁶ National Plant Diagnostic Network [<http://www.npdn.org>].

coordinated response to pests and pathogens by intentional, accidental, or natural means. By using common communications and laboratory testing protocols, the network allows efficient, timely, and secure exchange of plant disease information.

- **National Animal Health Laboratory Network (NAHLN).** This network, created by USDA and the American Association of Veterinary Laboratory Diagnosticians, augments federal resources with extensive state and university laboratories to allow better detection and response to animal health emergencies. These labs provide timely and consistent methods, and meet epidemiological reporting standards. The USDA National Veterinary Services Laboratory (NVSL) serves as the central reference laboratory. State and university labs perform non-emergency surveillance testing, provide surge capacity during outbreaks, assist with epidemiologic investigations, and conducting followup surveillance.
- **Food Emergency Response Network (FERN).** The Food Emergency Response Network was established jointly by the Food and Drug Administration (FDA) and the Food Safety and Inspection Service (FSIS), and integrates at least 72 state and federal laboratories that analyze food samples implicated in threats, terrorist events, or contamination. It links local, state, and federal information to allow officials to prevent or respond to incidents of contaminated food.

Another important network, albeit not a laboratory network, is the **Extension Disaster Education Network (EDEN)**.⁶⁷ EDEN is sponsored by USDA, and links extension educators from various states and disciplines to share resources. EDEN helps extension agents build relationships with local and state emergency management networks, provide educational programs on disaster preparation and mitigation to citizens and local leaders, train extension personnel for appropriate roles during disasters, and collaborates during recovery.

DHS Centers of Excellence. In April 2004, the DHS Science and Technology Directorate announced the department's first university research grants for agriculture as part of its "centers for excellence" program.⁶⁸ The University of Minnesota and Texas A&M will share \$33 million over three years. Texas A&M's new Center for Foreign Animal and Zoonotic Disease Research will study high consequence animal diseases. The University of Minnesota's new Center for Post-Harvest Food Protection and Defense will establish best practices for the management of and response to food contamination events. Texas A&M is partnering with four universities and will receive \$18 million; Minnesota is partnering with ten universities and will receive \$15 million.

⁶⁷ Extension Disaster Education Network [<http://www.eden.lsu.edu>].

⁶⁸ DHS press release, April 27, 2004, at [<http://www.dhs.gov/dhspublic/display?content=3515>].

The House Appropriations Committee addressed agroterrorism research in report language for the FY2004 homeland security appropriations bill. The “centers for excellence” program appears to fit the type of research the committee suggested.

Agro-terrorism research. The Committee is familiar with potential agro/bioterrorism vulnerabilities, from animal and plant diseases to food chain introductions. While some agro-terrorism research is already being done by the Department of Agriculture, the Committee is aware of the need for more such research, particularly in the areas of threats to field crops, farm animals, and food in the processing and distribution chain. The Homeland Security Act of 2002 provides for coordination of research between the Department of Homeland Security (DHS) and other relevant federal agencies in various areas of research. Because the Department of Agriculture (USDA) already possesses mechanisms, authorities, and personnel to carry out needed agro/bioterrorism research, the Committee expects to see effective coordination between the USDA and the DHS to move such research forward in an effective and expeditious fashion. The Committee expects USDA to coordinate with DHS to identify research gaps and develop a plan, to include research priorities, for proceeding to fill such gaps. Further, the Committee expects that non-government entities selected to carry out research will be ones with proven expertise in agriculture research, and strong familiarity with USDA animal and plant diagnostic laboratories and practices (H.Rept. 108-193).

Federal Funding to Respond to Agroterrorism

This report treats federal **funding** for agroterrorism preparedness broadly, including **appropriations** and **user fees**, both within USDA and DHS. However some general activities that support agroterrorism preparedness, such as certain intelligence and warning functions performed by the FBI and CIA, often cannot be identified exclusively as agriculture spending, and thus cannot be included in this report. However, items that can be identified specifically to agroterrorism preparedness within the budgets of USDA and DHS are included.

The President’s annual budget request to Congress includes a government-wide cross-cutting budget analysis of homeland security issues, as mandated by the Homeland Security Act of 2002 (P.L.107-296, section 889).⁶⁹ The budget request includes details on the most recently passed appropriations law and the previous fiscal year. Comprehensive details on agroterrorism funding are difficult, if not impossible, to compute while appropriations bills are being debated in the House and Senate. Legislative language rarely mentions specific amounts for agroterrorism, and report language usually mentions only a few agroterrorism related items that the appropriations committees wish to highlight. For a comprehensive accounting, analysts must wait until the President’s budget is released.

⁶⁹ *FY2007 Budget of the United States Government: Analytical Perspectives*, “3. Homeland Security Funding Analysis,” [<http://www.whitehouse.gov/omb/budget/fy2007/pdf/spec.pdf>], and “Appendix: Homeland Security Mission Funding by Agency and Budget Account,” at [http://www.whitehouse.gov/omb/budget/fy2007/pdf/ap_cd_rom/homeland.pdf].

In USDA, five agencies and three offices receive homeland security funding:

- Agricultural Research Service (ARS)
- Animal and Plant Health Inspection (APHIS)
- Cooperative State Research, Education, and Extension Service (CSREES)
- Food Safety and Inspection Service (FSIS)
- Economic Research Service (ERS)
- Departmental Administration and Executive Operations (including Office of the Secretary, Homeland Security Staff (HSS), and Office of Chief Information Officer (OCIO)).

In the DHS, two directorates receive funding related to agroterrorism:

- Customs and Border Protection
- Science and Technology

Classifying spending on agroterrorism and homeland security requires judgements about which programs are relevant, especially when some have dual purposes.⁷⁰ This subjectivity introduces discrepancies when agencies refine criteria or definitions, or change the way activities are characterized in their homeland security mission. In such cases, the most recently available data are used to update prior year data.

Examples of dual-use programs for agricultural homeland security are animal and plant health programs. These programs, such as border inspection and disease surveillance existed before September 11, 2001, and would be needed at some level due to natural and accidental disease outbreaks. However, the scale and scope of these programs have been expanded primarily due to agroterrorism.

For budget and accounting purposes, all or part of dual-use activities may be counted as homeland security spending, depending on each agency's criteria. For example, GAO reports that the Animal and Plant Health Inspection Service (APHIS) attributes 100% of an activity's budget authority to homeland security if any of the following questions apply:⁷¹

- Is this a new activity or program focus as a result of 9/11?
- Has the bulk of the program activity changed as a result of 9/11?
- Does the activity address international pest or disease outbreaks or other acts of agro-bioterrorism?
- Was the activity initiated with homeland security supplemental funds?
- Did APHIS receive enhanced homeland security funds for the activity?

⁷⁰ Congressional Budget Office (CBO), *Federal Funding for Homeland Security*, July 20, 2005, at [<http://www.cbo.gov/ftpdocs/65xx/doc6566/7-20-HomelandSecurity.pdf>].

⁷¹ GAO, *Combating Terrorism: Determining and Reporting Federal Funding Data*, GAO-06-161, January 17, 2006, p. 15-16 [<http://www.gao.gov/new.items/d06161.pdf>].

- Is the activity needed in order to comply with one or more Homeland Security Presidential Directives or the Bioterrorism Act of 2002?

By Year and Source

Prior to September 11, 2001, USDA spent between \$45-60 million in regular annual **appropriations** to combat terrorism, primarily through border inspections and research. **User fees** for border inspection added about \$180 million in FY2002, bringing the total **funding** (regular appropriations plus user fees) to about \$225-240 million in FY2002. This range can be considered the starting baseline for homeland security funding for agriculture (the regular FY2002 agriculture appropriations bill was outlined prior to September 11, 2001, even though it was enacted about two months later.)

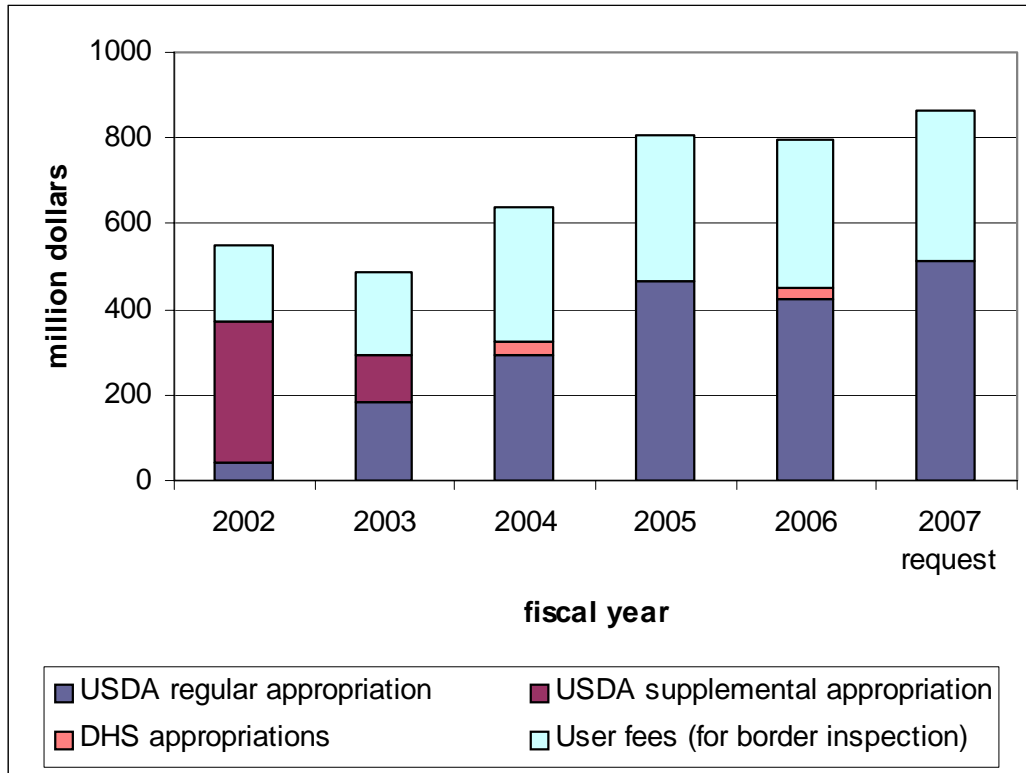
Appropriations and user fees for agriculture-related homeland security activities in USDA and DHS have more than tripled from the \$225 million “pre-September 11” baseline to \$797 million in FY2006.

Counting the supplemental appropriations in FY2002-03, and regular annual appropriations and user fees for both USDA and DHS, homeland security funding for agriculture has grown by 44% over four years, from \$552 million in FY2002 to \$797 million in FY2006. As a percentage of non-defense budget authority for homeland security, agriculture receives about 2% of the total. In FY2002, the ratio was 2%, which fell to 1.4% in 2003, and has since risen to 2.1% in FY2006 (**Table 1**).

Table 1. Percent of Homeland Security Funding for Agriculture
(budget authority in millions of dollars)

	Fiscal year					
	2002 actual	2003 actual	2004 actual	2005 actual	2006 est.	2007 request
Non-defense Homeland Security Budget Authority	27,724	34,005	33,810	37,195	38,606	41,585
Homeland Security Funding for Agriculture (Table 2)	552	485	639	807	797	867
Percent	2.0%	1.4%	1.9%	2.2%	2.1%	2.1%

Source: CRS. Amounts for agriculture compiled by CRS; Non-defense total from *Budget of the United States Government: Analytical Perspectives*, “3. Homeland Security Funding Analysis,” FY2005-FY2007, [<http://www.whitehouse.gov/omb/budget/fy2007/pdf/spec.pdf>], and GAO, *Combating Terrorism: Determining and Reporting Federal Funding Data*, GAO-06-161, January 17, 2006, pp. 56-62, [<http://www.gao.gov/new.items/d06161.pdf>].

Figure 6. Homeland Security Funding for Agriculture, by Source

Source: CRS.

The regular appropriation devoted to preparing for agroterrorism has grown significantly since FY2002, and supplanted the need for further supplemental funding (**Figure 6**). Regular annual appropriations for homeland security in USDA increased more than three-fold from FY2002 to FY2003, and by 60% in each of FY2004 and FY2005. In FY2006, the regular appropriation to USDA for homeland security dropped by about 8%, but the Administration's request for FY2007 calls for a 20% increase. Regular annual appropriations for agriculture in DHS are irregular and tied to particular initiatives, such as university research grants or facility construction.

Supplemental appropriations acts in 2002 and 2003, (P.L. 107-117 and P.L. 108-11) augmented the regular appropriations acts, providing significant additional funds to rapidly increase the response to agroterrorism vulnerabilities (\$328 million and \$100 million, respectively).

User fees to support agricultural border inspection have grown with passenger and cargo volume, particularly in the immediate years following September 11, 2001, when passenger volume dropped due to public concerns. In FY2002, user fees for agricultural border inspections totaled \$181 million. By FY2004, that amount grew by 73% to \$313 million, and another 11% into FY2006. User fees fund about 44% of the total amount available in FY2006 for homeland security in agriculture.

Table 2. Homeland Security Funding for Agriculture, by Agency
(budget authority in millions of dollars)

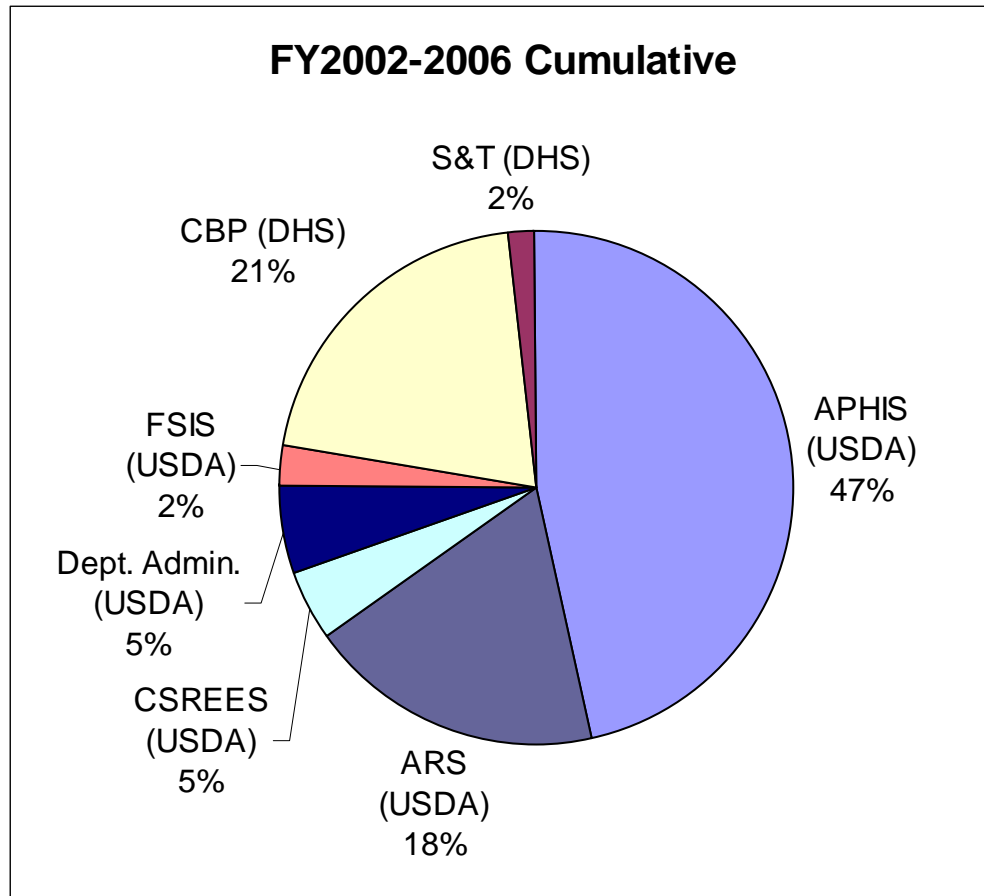
Department Agency	Fiscal year					
	2002 actual	2003 actual	2004 actual	2005 actual	2006 est.	2007 request
U.S. Department of Agriculture (USDA)						
APHIS:						
User fees for inspections	181.2	194.0	313.5	338.7	348.1	353.4
- less transfers to DHS		-69.0	-194.0	-208.0	-211.1	-214.3
= AQI user fees retained	181.2	125.0	119.5	130.7	137.0	139.1
Appropriation	88.8	77.5	183.6	232.5	243.7	313.9
Subtotal APHIS	270.0	202.5	303.1	363.2	380.7	453.0
ARS	175.0	154.6	31.3	151.2	93.8	81.5
CSREES		31.6	39.2	39.7	40.6	48.0
FSIS	15.0	8.7	13.1	19.5	23.3	39.1
Dept. Administration	92.0	18.5	23.8	21.0	23.7	27.7
ERS			1.0	1.0	1.0	1.0
Subtotal USDA						
Regular appropriation	42.8	180.9	292.0	464.9	426.1	511.2
Supplementals	328.0	110.0				
User fees	181.2	125.0	119.5	130.7	137.0	139.1
Subtotal USDA	552.0	415.9	411.5	595.6	563.1	650.3
Department of Homeland Security (DHS) - selected activities in agriculture						
CBP: AQI user fees received		69.0	194.0	208.0	211.1	214.3
S&T: Research centers, new facilities			33.0	3.0	23.0	2.0
Subtotal DHS (selected items)		69.0	227.0	211.0	234.1	216.3
Total of above						
User fees (AQI)	181.2	194.0	313.5	338.7	348.1	353.4
Appropriations	370.8	290.9	325.0	467.9	449.1	513.2
Total of above	552.0	484.9	638.5	806.6	797.2	866.6

Source: CRS. USDA figures for FY2003-07 are from *Budget of the United States Government: Analytical Perspectives*, "Appendix: Homeland Security Mission Funding by Agency and Budget Account," FY2005-07 [http://www.whitehouse.gov/omb/budget/fy2007/pdf/ap_cd_rom/homeland.pdf]; figures for FY2002 are from GAO, *Combating Terrorism: Determining and Reporting Federal Funding Data*, GAO-06-161, Jan. 2006, p. 44-45 [<http://www.gao.gov/new.items/d06161.pdf>]. AQI user fees from USDA "Explanatory Notes for Committee on Appropriations," various years. DHS figures were identified by CRS from DHS "Congressional Budget Justification," FY2006-07.

By Agency

Figure 7 presents homeland security funding for agriculture by agencies in USDA and DHS. APHIS and ARS in USDA conduct most of the activities related to homeland security in agriculture, together with CBP in DHS. APHIS and ARS account for about 64% of cumulative FY2002-06 funding, and CBP another 21%.

Figure 7. Homeland Security Funding for Agriculture, by Agency



Source: CRS. Includes USDA and selected DHS projects.

Much of the APHIS activity (about 43%), and all of the CBP activity, in the homeland security area has been for border inspections, predominantly funded through user fees rather than appropriations. APHIS retains about 39% of the total user fees collected each year, and transfers the rest to DHS for its Customs and Border Patrol agency (**Table 2**). Most of ARS's funding has gone for construction of a research and diagnostic laboratory in Ames, Iowa, that ARS operates jointly with APHIS.

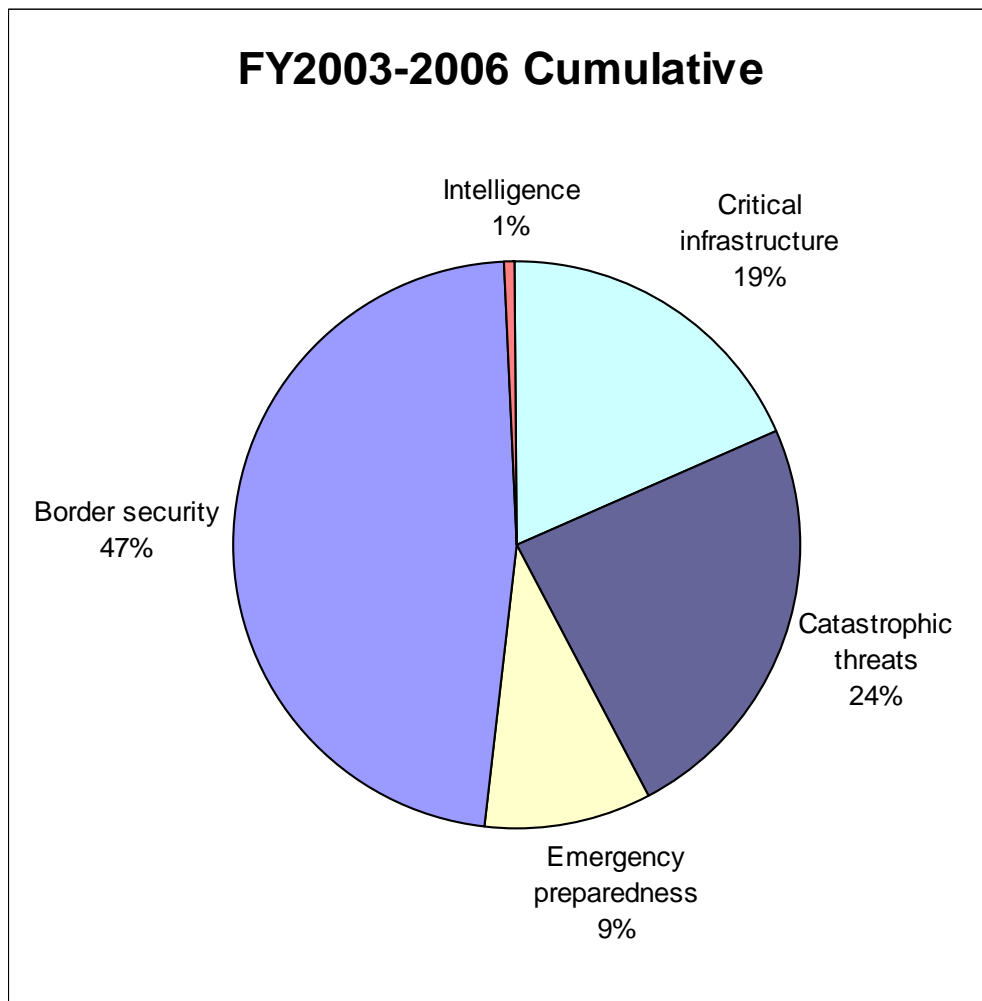
By Function for Homeland Security

For the President's annual budget request, agencies throughout the federal government categorize their funding based on six mission areas (functions), as defined in the National Strategy for Homeland Security:

- Intelligence and warning
- Border and transportation security
- Domestic counterterrorism
- Protecting critical infrastructure and key assets
- Defending against catastrophic threats
- Emergency preparedness and response

Figure 8 and **Table 3** present the funding information by homeland security function. Over the multi-year period FY2003-06, border inspections were the largest homeland security activity for agriculture, conducted jointly by USDA-APHIS and DHS-CBP. Defending against catastrophic threats is the next largest activity, particularly in APHIS, which includes monitoring, surveillance and laboratory response capacity. Protecting critical infrastructure has been another large activity, primarily because of the costs to construct a new ARS laboratory in Ames, IA.

Figure 8. Homeland Security Funding for Agriculture, by Function



Source: CRS. Includes USDA and selected DHS projects.

Emergency preparedness and intelligence have received relatively less funding. Primary intelligence gathering is viewed more appropriately as the responsibility of other federal agencies such as the FBI and CIA. These agencies track and act upon

bioterrorism information, sharing relevant information with USDA, DHS, and other agencies.

Table 3. Homeland Security Funding for Agriculture, by Function
(budget authority in millions of dollars, including user fees)

Homeland Security Mission Area	Fiscal year				
	2003 actual	2004 actual	2005 actual	2006 est.	2007 request
Border and transportation security					
USDA	149.2	148.4	158.8	165.2	164.9
DHS	69.0	194.0	208.0	211.1	214.3
Subtotal	218.2	342.4	366.8	376.3	379.2
Protecting critical infrastructure					
USDA	203.3	36.8	150.6	93.2	46.0
DHS			3.0	23.0	
Subtotal	203.3	36.8	153.6	116.2	46.0
Defending against catastrophic threats					
USDA	11.8	168.2	222.7	238.3	342.6
Emergency preparedness and response					
USDA	50.8	57.3	57.2	59.7	74.5
DHS		33.0			2.0
Subtotal	50.8	90.3	57.2	59.7	76.5
Intelligence and warning					
USDA	0.8	0.8	6.3	6.7	22.3
Total	484.9	638.5	806.6	797.2	866.6

Source: CRS. USDA figures from *Budget of the United States Government: Analytical Perspectives*, "Appendix: Homeland Security Mission Funding by Agency and Budget Account," FY2005-07 [http://www.whitehouse.gov/omb/budget/fy2007/pdf/ap_cd_rom/homeland.pdf] and USDA Office of Budget and Policy Analysis spreadsheets for FY2002. Border inspection user fees from USDA "Explanatory Notes for Committee on Appropriations," various years. DHS figures identified by CRS from DHS "Congressional Budget Justification," FY2006-07, and categorized by CRS to be consistent with functions as in USDA.

Note: Does not include amounts which are not exclusive to agriculture, such as such as general intelligence and warning functions in DHS or other agencies, or appropriations for border security in DHS (other than user fees) which are not allocated by industry.

Chronology of Appropriations

The following list outlines appropriations acts that have provided funds for homeland security related to agriculture and food since September 11, 2001.

- **Emergency Supplemental Appropriations for FY2001** (P.L. 107-38; September 18, 2001). Within days of September 11, Congress approved \$40 billion in emergency supplemental appropriations partitioned over three time periods. USDA received

no money for domestic homeland security programs in the first two installments, but did receive an allocation in the final installment for FY2002 (see FY2002 Emergency Supplemental Act below).

- **FY2002 Agriculture Appropriations Act** (P.L. 107-76; November 28, 2001). This regular annual appropriations act was outlined prior to September 11, 2001, and provides the baseline amount for homeland security functions in agriculture, without any particular discussion of agroterrorism. The appropriation for homeland security was not clearly defined, but was approximately \$45-60 million. Together with user fees, the baseline for homeland security for agriculture was about \$225-240 million.
- **FY2002 Emergency Supplemental Act** (P.L. 107-117; January 10, 2002). Congress made the final \$20 billion installment from the FY2001 supplemental in Division B of the FY2002 Defense Department Appropriation (“Transfers from the Emergency Response Fund [ERF] Pursuant to P.L. 107-38”). USDA received \$328 million for homeland security programs. This supplemental appropriation, however, preceded the creation of the Department of Homeland Security, which resulted in some of the funds being moved to DHS when border inspections and the Plum Island Animal Disease Center were transferred DHS. USDA documents suggest about \$220 million were for functions transferred to DHS.
- **FY2002 Supplemental Appropriations Act for Further Recovery** (P.L. 107-206; August 2, 2002). In this \$28 billion supplemental appropriation, Congress included about \$123 million for USDA programs related to homeland security. These amounts, however, were designated among \$5.1 billion of “contingent emergency spending” that President Bush chose not to use, and thus the funds were not available to USDA and other departments (see CRS Report RL31406, *Supplemental Appropriations for FY2002*).
- **FY2003 Omnibus Appropriations Act** (P.L. 108-7; February 20, 2003). This regular annual appropriations act provided \$181 million to USDA for homeland security activities.
- **FY2003 Emergency Wartime Supplemental Appropriations Act** (P.L. 108-11; April 16, 2003). Congress appropriated \$110 million to the Agricultural Research Service “for continued modernization of facilities in Ames, Iowa, which will provide a laboratory building, fixed equipment, and associated infrastructure” (H.Rept. 108-076).
- **FY2004 Consolidated Appropriations Act** (P.L. 108-199; January 23, 2004). This regular annual appropriations act provided \$292 million for homeland security activities in USDA and \$33 million in university grants for agriculture biosecurity from DHS. Conferees made the following statement about USDA’s homeland security activities:

“[A]s of September 30, 2003, \$80,000,000 remains available to the Department from funds provided through the Emergency Response Fund (ERF) [see discussion of P.L. 107-38 and P.L. 107-117 above], of which nearly \$9,000,000 is available to the Secretary. Since these funds were provided, USDA has been one of the slowest Federal agencies to obligate its ERF funds. The conferees are aware of concerns about security, [and] urge the Secretary to act promptly to address identified security needs and to advise the Committees on Appropriations of needs for which additional funds may be necessary” (H.Rept. 108-401).

- **FY2005 Consolidated Appropriations Act** (P.L. 108-447, December 8, 2004). This regular annual appropriations act provided \$465 million for homeland security activities in USDA.
- **FY2006 Homeland Security Appropriations Act** (P.L. 109-90, October 18, 2005). This regular annual appropriations act for DHS (1) provides \$23 million within Science and Technology directorate: “to select a site for the National Bio and Agrodefense Facility [NBAF] and perform other pre-construction activities...to protect animal and public health from high consequence animal and zoonotic diseases.” (2) Conferees also encourage the DHS: “to work in conjunction with USDA and HHS and other organizations on agroterrorism and animal-based bioterrorism, including the development and stockpiling of veterinary vaccines ... [and with] one or more states to develop a model integrated agricultural response system, utilizing geographic information systems that identify critical agricultural infrastructure.” (3) Conferees also directed that DHS coordinate with USDA to submit a report “which details the specific actions each agency will take, or has already taken, to address the apparent 32% reduction in agriculture inspections and the lack of coordination between [DHS and USDA]” (H.Rept 109-241).
- **FY2006 Agriculture Appropriations Act** (P.L. 109-97, November 10, 2005). This regular annual appropriations act provided \$426 million for homeland security activities in USDA.
- **FY2007 Homeland Security Appropriations Act** (P.L. 109-295, October 4, 2006). This regular annual appropriations act for DHS (1) provided a second installment of \$23 million for the National Bio and Agro-defense Facility, (2) instructed DHS to prepare a report describing improvements in the targeting of agricultural inspections and coordination for inspections with the Department of Agriculture. (H.Rept. 109-699).

FY2007 Budget Request

FY2007 USDA “Food and Agriculture Defense Initiative”. In its annual budget request, USDA highlights several programs in a “Food and Agriculture

Defense Initiative.” The initiative does not include all homeland security programs for agriculture, but is rather a list of priority programs that USDA wishes to highlight during the appropriations process. The initiative was first mentioned in the FY2005 budget request. For example, border security activities have not been included in the initiative, even though they are included in the broader measure of homeland security funding presented on previous pages. For FY2006, appropriations for the Food and Agriculture Defense Initiative totaled \$253 million, but total USDA homeland security funding as reported by OMB was \$426 million (excluding user fees).

USDA’s budget for FY2007 calls for significantly increased spending on several agroterrorism preparedness programs. The Food and Agriculture Defense Initiative requests an FY2007 appropriation of \$322 million, up 27% from the \$253 million appropriated for items in the initiative for FY2006 (**Table 4**). However, using OMB’s more comprehensive analysis of homeland security funding for agriculture cited on previous pages, the requested FY2007 increase in homeland security funding for agriculture is 8.7%, up from \$426 million in FY2006 to \$511 million requested for FY2007 (**Table 2**).

The largest item in the initiative for FY2007 is enhanced surveillance by APHIS of animal and plant health. Unlike prior years, the initiative does not include any funds for construction of the new ARS laboratory in Ames, Iowa, which received its full funding in FY2006.

Many of the initiative’s programs would improve the Federal government’s ability to more quickly identify and characterize an agroterrorist attack through surveillance and monitoring. In its justification for the initiative, USDA says these activities will promote data sharing and joint analysis among federal, state and local levels. An example of such coordination is the Food Emergency Response Network (FERN) of laboratories. These computer networks allow labs to improve information sharing, rapid identification, and consistent diagnostic methods for contaminated foods. Another preparedness effort in the initiative is the National Veterinary Vaccine Bank and the National Plant Disease Recovery System (both of which are mentioned in HSPD-9).

Because the FY2007 fiscal year began before most of the appropriations bills were enacted, including the agriculture appropriations bill, Congress has passed continuing resolutions to continue funding the government. The continuing resolutions are funding federal agencies at the lower of the House-passed, Senate-passed, or FY2006 levels. However, since the Senate did not pass the agriculture appropriations bill, agriculture-related agencies are being funded at the lower of the House-passed or FY2006 levels. Thus, increases for agroterrorism preparedness in the President’s budget request, and the House-passed or Senate reported agriculture appropriations bill in the 109th Congress, are not available.

Table 4. USDA Food and Agriculture Defense Initiative
(million dollars)

	Agency	FY2005 actual	FY2006 est.	FY2007 request
Food Defense:				
Food Emergency Response Network	FSIS	3	3	19
Surveillance and monitoring	FSIS	3	3	3
FSIS enhanced inspections	FSIS	2	2	2
Lab upgrades, physical security	FSIS	3	6	6
Education, training, other	FSIS	3	4	4
Other FSIS activities	FSIS	5	5	5
Research	ARS	8	9	23
Subtotal food defense		27	32	62
Agriculture Defense:				
Research	ARS	21	25	49
National Plant Disease Recovery	ARS	2	2	6
Regional Diagnostic Network	CSREES	9	10	12
Higher educ. agrosecurity program	CSREES	0	0	5
Enhanced surveillance	APHIS	80	87	130
Bio-surveillance	APHIS	2	2	3
Plant safeguarding activities	APHIS	17	17	23
Select agents	APHIS	3	3	5
National Veterinary Stockpile	APHIS	3	3	8
Other APHIS activities	APHIS	13	14	19
Subtotal agriculture defense		150	163	260
Subtotal, ongoing programs		177	195	322
Ames , Iowa BSL-3 facility	ARS	121	58	0
Total, Food and Agriculture Defense Initiative		298	253	322
Total USDA homeland security appropriation (Table 2)		465	426	511
Food and Agriculture Defense Initiative as % of Total USDA homeland security appropriation		64%	59%	63%

Source: USDA, *Budget Summary and Annual Performance Plan: FY2007*, p. 16-18 [http://www.usda.gov/agency/obpa/Budget-Summary/2007/FY07budsum.pdf].

FY2007 DHS Budget Initiative. The FY2007 DHS budget request includes \$2 million to create a “Joint Agro-terror Defense Office” (JADO) in the Science and Technology (S&T) directorate. DHS says the new office will enhance inter-agency coordination of advanced development of countermeasures for agroterrorism. HSPD-9 instructs DHS to coordinate Federal activities to “accelerate and expand development of current and new countermeasures against intentional introduction or natural occurrence of catastrophic animal, plant, or zoonotic diseases.”

The budget plan calls for JADO to be established in the Office of the Under Secretary of S&T to “provide continuity and functional linkages for these inter-agency interactions, including issues concerning policy, research coordination,

and strategic planning.”⁷² A senior advisory group, chaired by the S&T Under Secretary and vice-chaired by USDA, would include representatives from government research and regulatory agencies and the USDA Homeland Security Staff. The \$2 million proposed FY2007 funding for JADO would allow an executive officer plus up to 5 staff from DHS and USDA.

Although the FY2007 DHS appropriations act (P.L. 109-295) does not address the JADO proposal, DHS may implement the plan under its administrative discretion. The act did make a \$23 million second installment for the construction of the National Bio and Agro-Defense Facility (NBAF) discussed elsewhere in this report.

Possible Pathogens in an Agroterrorist Attack

Of the hundreds of animal and plant pathogens and pests available to an agroterrorist, perhaps fewer than a couple of 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).⁷³

A widely accepted view among scientists is that livestock are more susceptible to agroterrorism than cultivated 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.⁷⁴

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 generally are more difficult to manipulate from a technical perspective. Some plant pathogens require particular environmental conditions of humidity, temperature, or wind to take hold or spread.

⁷² DHS “Congressional Budget Justification,” FY2006-07, pp. S&T 105-106.

⁷³ The OIE is an international organization created in 1924 with 166 member countries. It is a well-respected information clearinghouse for animal diseases and health. Member countries report diseases that occur on their territory, and the OIE disseminates the information, allowing other countries to take preventive action. The OIE also analyses scientific information on animal disease control, provides technical support, and develops normative documents that are recognized by the World Trade Organization for international trade and sanitary rules; see [<http://www.oie.int>].

⁷⁴ Some of the biological pathogens of concern to agriculture are discussed in CRS Report RL32391, *Small-scale Terrorist Attacks Using Chemical and Biological Agents: An Assessment Framework and Preliminary Comparisons*, by Dana Shea and Frank Gottron.

Other plant diseases may take a longer time than an animal disease to become established or achieve a level of destruction that a terrorist may desire.

Animal Pathogens

The Agricultural Bioterrorism Protection Act of 2002 (Subtitle B of P.L. 107-188, the Public Health Security and Bioterrorism Preparedness and Response Act) created the current, official list of animal pathogens that are of greatest concern for agroterrorism. The list is specified in the select agent rules implemented by USDA-APHIS and the Centers for Disease Control and Prevention (CDC) of the Department of Health and Human Services (HHS). The act requires that these lists (**Table 5**) be reviewed at least every two years.

The select agent list for animal pathogens draws heavily from the enduring and highly respected OIE lists of high-concern pathogens. The select agent list is comprised of an APHIS-only list (of concern to animals) and an overlap list of agents selected both by APHIS and CDC (of concern to both animals and humans).⁷⁵

OIE List. Prior to the Agricultural Bioterrorism Protection Act, the commonly accepted animal diseases of concern were all of the OIE's "List A" diseases and some of the "List B" diseases. In 2004, the OIE replaced its Lists A and B with a single list⁷⁶ that is more compatible with the Sanitary and Phytosanitary Agreement (SPS) of the World Trade Organization (WTO). The new OIE list classifies diseases equally, giving each the same degree of importance in international trade.⁷⁷ Many of these OIE-listed diseases are included in the select agent list (**Table 5**).

The OIE's List A diseases were transmissible animal diseases that had the potential for very serious and rapid spread, irrespective of national borders. List A diseases had serious socioeconomic or public health consequences and were of major importance in international trade. List B diseases were transmissible diseases considered to be of socioeconomic or public health importance within countries and significant in international trade. In creating the new list, OIE reviewed its criteria for including a disease, and the disease or epidemiological events that require member countries to file reports. Nearly all of the former List A and List B diseases are included in the new single OIE list.

Select Agents List. The regulations establishing the select agent list for animals (9 CFR 121) set forth the requirements for possession, use and transfer of

⁷⁵ For descriptions of the diseases listed in **Table 5**, see the United States Animal Health Association's "Gray Book," at [http://www.vet.uga.edu/vpp/gray_book/FAD/index.htm], and the OIE's "Technical Disease Cards," at [http://www.oie.int/eng/maladies/en_mal.htm]. Overlap diseases and agents are described by the Centers for Disease Control and Prevention (CDC) at [<http://www.bt.cdc.gov/agent/agentlist-category.asp>].

⁷⁶ OIE, *Terrestrial Animal Health Code*, 13th edition, May 2004, at [http://www.oie.int/eng/normes/mcode/en_sommaire.htm].

⁷⁷ Bernard Vallat, "The OIE paves the way for a new animal disease notification system," Editorials from the (OIE) Director General, April 2004, at [http://www.oie.int/eng/Edito/en_edito_apr04.htm].

these biological agents or toxins. They are intended to ensure safe handling and for security to protect the agents from use in domestic or international terrorism. APHIS and CDC determined that the biological agents and toxins on the list have the potential to pose a severe threat to agricultural production or food products.

The 23 animal diseases listed exclusively by APHIS in 9 CFR 121.3 — the left column of **Table 5** — include 20 of the OIE-listed diseases and three other disease agents (Akabane, Camel pox, and Menangle) considered to be emerging animal health risks for terrorism. The much larger OIE list includes other diseases that are not listed as “select agents.” However, the select agent list was created to account for the additional risks perceived to be posed by terrorism.

Table 5. Livestock Diseases in the Select Agent List

Animal diseases and agents/toxins listed exclusively by APHIS 9 CFR 121.3	OIE class	Overlap diseases and agents/toxins listed by both APHIS and CDC 9 CFR 121.4	OIE class
African horse sickness	E	Anthrax (<i>Bacillus anthracis</i>)	M
African swine fever	S	Botulinum neurotoxins	
Akabane		Botulinum neurotoxin-producing species of <i>Clostridium</i>	
Avian influenza (highly pathogenic)	A		
Bluetongue (exotic)	M	Brucellosis of cattle (<i>Brucella abortus</i>)	B
Bovine spongiform encephalopathy	B	Brucellosis of sheep (<i>Brucella melitensis</i>)	C
Camel pox		Brucellosis of swine (<i>Brucella suis</i>)	S
Classical swine fever	S	Glanders (<i>Burkholderia mallei</i>)	E
Contagious caprine pleuropneumonia	C	Melioidosis (<i>Burkholderia pseudomallei</i>)	
Contagious bovine pleuropneumonia	B	<i>Clostridium perfringens</i> epsilon toxin	
Foot-and-mouth disease (FMD)	M	(Valley fever) <i>Coccidioides immitis</i>	
Goat pox	C	Q fever (<i>Coxiella burnetii</i>)	M
Heartwater (<i>Cowdria ruminantium</i>)	M	Eastern equine encephalitis	E
Japanese encephalitis	E	Tularemia (<i>Francisella tularensis</i>)	L
Lumpy skin disease	M	Hendra virus (of horses)	
Malignant catarrhal fever	B	Nipah virus (of pigs)	
Menangle virus		Rift Valley fever	M
Newcastle disease (exotic)	A	Shigatoxin	
Peste des petits ruminants	C	Staphylococcal enterotoxins	
Rinderpest	B	T-2 toxin	
Sheep pox	C	Venezuelan equine encephalitis	E
Swine vesicular disease	S		
Vesicular stomatitis	M		

Source: 9 CFR 121.3(b) and (d), supplemented with common disease names as appropriate. OIE classes include diseases affecting multiple species (M), cattle/bovine (B), sheep and goats/caprine (C), horses/equine (E), pigs/swine (S), birds/avian (A), and rabbits/lagomorphs (L).

The 20 diseases and overlap agents/toxins included by both APHIS and CDC in 9 CFR 121.4 — the right column of **Table 5** — pose a risk to both human and animal health. The overlap list includes ten OIE-listed diseases, including anthrax, brucellosis of cattle, brucellosis of sheep, brucellosis of swine, glanders, Rift Valley fever, Q fever, Eastern equine encephalitis, tularemia, and Venezuelan equine encephalitis.

Analysis. The select agent list designates and regulates pathogens, not diseases, by regulating access to and handling of high-consequence pathogens. The overlap list is more comprehensive than a disease-only list, because certain pathogens may not cause a disease, *per se*, but may cause symptoms such as food poisoning or central nervous systems responses.

Some of select agent pathogens receive more attention than others. For example, foot and mouth disease (FMD) is probably the most frequently mentioned disease when agroterrorism is discussed, due to its ease of use, ability to spread rapidly, and potential for great economic damage. In testimony before the Senate Governmental Affairs Committee on November 19, 2003, Dr. Thomas McGinn of the North Carolina Department of Agriculture described a simulation of an FMD attack by a terrorist at a single location. Only after the 5th day of the attack would the disease be detected, by which time it may have spread to 23 states. By the 8th day, 23 million animals may need to be destroyed in 29 states.⁷⁸

On the other hand, the causative agent of bovine spongiform encephalopathy (BSE, or “mad cow disease”) is considered dangerous enough to be a select agent, even though mad cow disease is less likely to be a terrorist’s choice than other diseases. With BSE, infection is not certain, symptoms take years to manifest, and the disease may not be detected — all making credit for an attack more doubtful.

Widespread animal diseases like brucellosis, influenza, or tuberculosis receive relatively less attention than FMD, hog cholera, or Newcastle disease. However, emerging diseases such as Nipah virus, Hendra virus, and the H5N1 strain of avian influenza (zoonotic diseases that have infected people, mostly in Asia) can be lethal since vaccines are elusive or have not been developed.

Plant Pathogens

The Agricultural Bioterrorism Protection Act of 2002 (Subtitle B of P.L. 107-188) also instructed APHIS and CDC to create the current official list of potential plant pathogens. The Federal government lists biological agents and toxins for plants in 7 CFR 331.3 (**Table 6**). The act requires that these lists be reviewed at least every two years, and revised as necessary.⁷⁹

⁷⁸ S.Hrg. 108-491, *Agroterrorism: The Threat to America’s Breadbasket*, Senate Committee on Governmental Affairs, November 19, 2003, pp. 10 and 65 [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_senate_hearings&docid=f:91045.wais.pdf].

⁷⁹ The list originally included soybean rust (*Phakopsora pachyrhizi*) and Plum pox (Plum (continued...))

Table 6. Plant Diseases in the Select Agent List

Plant diseases caused by...	the select agents listed in 7 CFR 331.3
Citrus greening	<i>Liberobacter africanus, L. asiaticus</i>
Philippine downy mildew (of corn)	<i>Peronosclerospora philippinensis</i>
Bacterial wilt, brown rot (of potato)	<i>Ralstonia solanacearum</i> , race 3, biovar 2
Brown stripe downy mildew (of corn)	<i>Sclerophthora rayssiae</i> var. <i>zeae</i>
Potato wart or potato canker	<i>Synchytrium endobioticum</i>
Bacterial leaf streak (of rice)	<i>Xanthomonas oryzae</i> pv. <i>oryzicola</i>
Citrus variegated chlorosis	<i>Xylella fastidiosa</i>

Source: 7 CFR 331.3(a), supplemented with common disease names as appropriate.

Prior to the act, there was not a commonly recognized list of the most dangerous plant pathogens, although several diseases were usually mentioned and are now included in the APHIS select agent list.

The list of seven biological agents and toxins in 7 CFR 331.3 was compiled by the Plant Protection and Quarantine (PPQ) program in APHIS, in consultation with USDA’s Agricultural Research Service; Forest Service; Cooperative State Research, Education, and Extension Service; and the American Phytopathological Society. The listed agents and toxins are viruses, bacteria, or fungi that can pose a severe threat to a number of important crops, including potatoes, rice, corn, and citrus. Because the pathogens can cause widespread crop losses and economic damage, they could potentially be used by terrorists.

Other plant pathogens not included in the select agent list possibly could be used against certain crops or geographic regions. Examples include Karnal bunt, citrus canker, and soybean rust, all of which currently exist in the U.S. in regions quarantined or under surveillance by USDA. As with other agents, the effectiveness of an attack to spread such a disease may be dependent on environmental conditions and difficult to achieve.

Countering the Threat

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

⁷⁹ (...continued)

pox potyvirus), which were later removed. For example, when soybean rust became endemic in the southern United States, access as a “select agent” became less important.

natural outbreaks is not sufficient for defending against intentional attack. Consequently, the U.S. system is being upgraded to address the reality of agroterrorism.

Different analysts and agencies have various ways to outline a response for agroterrorism. The National Research Council outlines a three-pronged strategy for countering the threat of agroterrorism:⁸⁰

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

Even though no foreign terrorist attacks on crops or livestock have occurred in the United States, government agencies and private businesses have not taken the threat lightly. Biosecurity is an increasingly prominent among food manufacturers, merchandisers, retailers, and commercial farmers. Many agribusinesses have prepared response plans or added security measures to protect their product and brand names, ranging from input sources to processing and retail distribution networks.

Deterrence and Prevention

Primary prevention and deterrence interventions for foreign pests and diseases include international treaties and standards (such as the International Plant Protection Convention, and those of the OIE/World Organization for Animal Health), bilateral and multilateral cooperative efforts, off-shore activities in host countries, port-of-entry inspections, quarantine, treatment, and post-import tracking of plants, animals and their products.

Every link in the agricultural production chain is susceptible to attack with a biological weapon. Traditionally the first defense against a foreign animal or plant disease has been to try to keep it out of the country. Agricultural inspectors at foreign pre-clearance inspections and at the U.S. borders are the first line of defense.⁸¹ Smuggling interdiction efforts can act as deterrents before biological agents reach their target.

DHS and USDA already conduct such inspection and quarantine practices, but continued oversight is necessary to determine which preparedness activities and threats need more attention. Off-shore activities include pre-clearance inspection by APHIS of U.S. imports before products leave their port of origin. APHIS has personnel in at least 27 host countries. Although many of these inspections programs were built to target unintentional threats, they are being augmented with personnel and technology to look for intentional threats.

⁸⁰ National Research Council (2003), p. 41-59.

⁸¹ For more discussion of current border inspections practices and data on past agricultural and other inspections programs, see CRS Report RL32399, *Border Security: Inspections Practices, Policies, and Issues*, by Ruth Wasem et al.

Various U.S. intelligence and law enforcement agencies collect information about biological weapons that could be used against U.S. agriculture. Building and maintaining a climate of information sharing between USDA, DHS, and the intelligence community is necessary, especially so that agriculture is not overlooked compared to other infrastructure and human targets.

Once inside the U.S., many parts of the food production chain may be susceptible to attack with a biological weapon. For example, terrorists may have unmonitored access to geographically remote crop fields and livestock feedlots. Diseases may infect herds more rapidly in modern concentrated confinement livestock operations than in open pastures. An undetected disease may spread rapidly because livestock are transported more frequently and over greater distances between farms, and to processing plants. Processing plants and shipping containers need to be secured and/or tracked to prevent tampering.

An important line of defense is biosecurity — the use of preventive security measures against pathogens. On farms, biosecurity includes farm management practices that both protect animals and crops from the introduction of infectious agents and contain a disease to prevent its rapid spread within a herd or to other farms. Biosecurity practices include structural enclosures to limit outside exposure to people and wild animals, and the cleaning and disinfection of people, clothing, vehicles, equipment, and supplies entering the farm. USDA promotes such practices for poultry in a program called “Biosecurity for the Birds.”⁸²

Most farm specialists agree that livestock farmers are increasingly aware of the importance of biosecurity measures, particularly since the FMD outbreaks in European cattle and the avian flu and exotic Newcastle infections in U.S. poultry. More farm operators are restricting visitors or requiring them to wear boot covers or other protective clothing to guard against bringing in disease. Regardless of the reason for following biosecurity measures (terrorism or accidents), these precautions help prepare farms against diseases.

Detection and Response

In the FY2004 Consolidated Appropriations Act (P.L. 108-199), the conference committee made the following observation about agroterrorism preparedness:

“The conferees agree that emergency preparedness related to field crops, farm animals and food processing and distribution is of critical importance, and that the agriculture and food sectors are part of the critical infrastructure requiring heightened attention and protection. Given the integral roles of state and local governments and the private sector in detecting, deterring and responding to acts of agro-terrorism, the conferees expect the Department of Agriculture and the Department of Homeland Security to coordinate efforts in assisting states, particularly by providing financial and technical support to initiatives oriented toward interstate cooperation in joint preparedness initiatives. The conferees are particularly interested in those states that have developed or are currently

⁸² USDA-APHIS, “Biosecurity for the Birds: Biosecurity Tips: 6 Ways To Prevent Poultry Disease” [<http://www.aphis.usda.gov/vs/birdbiosecurity/tips.html>].

developing coordinated interstate initiatives” (H.Rept. 108-401 for P.L. 108-199).

Because biological attacks on crops and livestock may not be immediately apparent, existing frameworks for detecting, identifying, reporting, tracking, and managing natural and accidental disease outbreaks need to be upgraded to combat agroterrorism. Appropriate responses are being developed based on specific pathogens, targets, and other circumstances that may surround an attack.

The exact methods for control and eradication operations are difficult to predict. Past experience and simulations have shown that day-to-day decisions would be made using “decision trees” that include factors such as the geographical spread, rates of infestation, available personnel, public sentiment, and industry cooperation. Response procedures are outlined in the APHIS Plant Protection and Quarantine (PPQ) *Emergency Programs Manual*⁸³ and the APHIS Veterinary Services (VS) *Federal Emergency Response Plan for an Outbreak of Foot-and-Mouth Disease or Other Highly Contagious Diseases*.⁸⁴ The National Response Plan (NRP) also discusses USDA’s role in responding to terrorist attacks or other disasters.

In an outbreak, damage is proportional to the time it takes to first detect the disease. If a foreign disease is introduced, responsibility for recognizing initial symptoms rests with farmers, producers, veterinarians, plant pathologists and entomologists. But farmers sometimes are reluctant to voluntarily test crops or livestock for fear of economic loss or professional stature. Cooperative Extension Service agents at state universities are receiving additional training on recognizing the likely symptoms of an agroterrorism attack.

Effective detection depends on a heightened sense of awareness, and on the ability to rapidly determine the level of threat (e.g., developing and deploying rapid disease diagnostic tools). Lessons from disease outbreaks, including the 2001 FMD outbreaks in Europe and 2003-06 spread of H5N1 avian flu globally, show that the speed of detection, diagnosis, and control spell the difference between an isolated incident and an economic and public health disaster.

The capacity to respond, however, is not always as strong as desired. In recent years, the number of veterinarians with experience to recognize many foreign animal diseases has declined. Success in eradicating many animal diseases in the United States has reduced the “opportunity” for new veterinarians to see such diseases. Also, the number of large animal veterinarians in private practice and within APHIS has declined. The American Veterinary Medical Association predicts that 7% of USDA positions for large animal veterinarians may go unfilled, and 4-5% of such

⁸³ USDA-APHIS Plant Protection and Quarantine (2002), *Emergency Programs Manual*, at [http://www.aphis.usda.gov/ppq/manuals/emergency/pdf_files/EPM.pdf].

⁸⁴ A summary of the emergency response plan for animals is available from USDA-APHIS at [http://www.aphis.usda.gov/lpa/pubs/fsheet_fa_notice/fs_ahfmdres.html].

positions nationwide.⁸⁵ In light of this trend, APHIS has initiated efforts to increase training for foreign animal diseases and create registries of veterinarians with appropriate experience. The National Veterinary Medical Service Act, P.L. 108-161, provides new veterinarians with loan repayment assistance in exchange for practicing areas with veterinary shortages and for being tasked by the government in emergency situations.⁸⁶

DHS and USDA have worked to improve the coordination of their response plans to secure the food supply, particularly following the announcement of HSPD-9. The departments are cooperating on research funding, detection technology, surveillance, partnerships with private industry, and state and local response coordination.⁸⁷ Examples of the public-private partnerships for detection include the food and agriculture Information Sharing and Analysis Center (ISAC) and the food and agriculture Sector Coordinating Council (SCC) — both discussed earlier in this report.

Numerous simulation (“table top”) exercises have been conducted by both federal, state and local authorities to test the response and coordination efforts of a agroterrorism attack. Examples of such simulations include the Silent Prairie exercise in Washington (February 11, 2003), the Silent Farmland exercise in North Carolina (August 5, 2003), and Exercise High Stakes in Kansas (June 18, 2003).

The last line of defense, and the costliest, is the isolation, control, and eradication of an epidemic. The more geographically widespread a disease outbreak, the costlier and more drastic the control measures become. Officials gained valuable experience from recent agricultural disease outbreaks such as avian influenza in the U.S., Canada, and Asia;⁸⁸ FMD in the UK; and citrus canker in Florida. Each one of these epidemics has required the depopulation and destruction of livestock and crops in quarantine areas, indemnity payments to farmers, and immediate suspension of trade.

Of all lines of defense, mass eradication is the most politically sensitive and difficult. Actions taken in each of these outbreaks have met with varying degrees of resistance from groups opposed to mass slaughter of animals, citizens concerned about environmental impacts of destroying carcasses, or from farmers who fear the loss of their livelihood. During the 2001 outbreak of FMD in the United Kingdom, the public was clearly opposed to the large pyres of burning carcasses. The disposal

⁸⁵ Sterner, Keith E. “An invited perspective on the shortage of veterinarians in food supply veterinary medicine,” *Journal of the American Veterinary Medical Association*, vol.229, July 1, 2006, p. 30-32.

⁸⁶ The National Veterinary Medical Services Act received a \$500,000 appropriation in the FY2006 agriculture appropriations act (P.L. 109-97, H.Rept. 109-255). USDA regulations to implement the program are forthcoming.

⁸⁷ DHS Fact Sheet, “Strengthening the Security of Our Nation’s Food Supply,” July 6, 2004, at [http://www.dhs.gov/dhspublic/interapp/press_release/press_release_0453.xml].

⁸⁸ For more information on avian flu, see CRS Report RS21747, *Avian Influenza: Agricultural Issues*, by Jim Monke.

of millions of chicken carcasses in British Columbia, Canada, during 2004 also caused a significant public debate. Thus, scientific alternatives are needed for mass slaughter and carcass disposal.⁸⁹

Judicial roadblocks also can interfere with eradication and control efforts. For example, science-based measures (tree removal within certain perimeters) to eradicate citrus canker in Florida's residential neighborhoods were challenged and delayed in the courts. The disease continued to spread and, before it could be eradicated, was spread very widely by hurricanes in 2005.

Federal Authorities. When a foreign animal disease is discovered, whether accidentally or intentionally introduced, the Secretary of Agriculture has broad authority to eradicate it or prevent it from entering the country.⁹⁰ The use of these authorities is fairly common, as shown recently by the import restrictions placed on H5N1 avian flu-infected countries. Federal quarantines and restrictions on interstate movement within the U.S. are also common for certain pest and disease outbreaks, such as for sudden oak death in California and citrus canker in Florida.

In addition to federal authorities, most states have similar authorities, at least for quarantine and import restrictions. In fact, the initial response to many outbreaks is at the state or local level. If an outbreak spreads across state lines or if state and local efforts are inadequate, federal involvement quickly follows. State and local officials usually consult with federal authorities and often seek federal assistance.

If an animal disease outbreak is found in the United States, the Secretary of Agriculture is authorized, among other things, to:

- Stop imports of animals and animal products into the U.S. from suspected countries (7 U.S.C. 8303);
- Stop animal exports (7 U.S.C. 8304) and interstate transport of diseased or suspected animals (7 U.S.C. 8305);
- Seize, quarantine, and dispose of infected livestock to prevent dissemination of the disease (7 U.S.C. 8306);
- Compensate owners for the fair market value of animals destroyed by the Secretary's orders (7 U.S.C. 8306(d)); and

⁸⁹ National Agricultural Biosecurity Center (Kansas State), *Carcass Disposal: A Comprehensive Review*, August 2004 [<http://fss.k-state.edu/research/books/carcassdispfiles/Carcass%20Disposal.html>].

⁹⁰ The Plant Protection Act (P.L. 106-224, Title IV, Sec. 402, June 20, 2000) and the Animal Health Protection Act (P.L. 107-171, Title X, Sec. 10402, May 13, 2002) provide broad regulatory and eradication authorities to the Secretary and to APHIS. These acts replace a patchwork of similar laws dating back many decades by combining authorities into a unified framework.

- Transfer the necessary funding from USDA’s Commodity Credit Corporation (CCC) to cover costs of eradication, quarantine, and compensation programs (7 U.S.C. 8316).⁹¹

Similar authorities cover plant pests and diseases (7 U.S.C. 7701-7772).

However, the capacity of local law enforcement may be stretched too thin in a full-scale agroterrorist attack. A study by the U.S. Department of Justice says that agroterrorism events are more likely to be handled as a crime scene investigation with law enforcement having primary responsibility, rather than a public health response.⁹² Quarantines of a 6-mile radius, combined with statewide roadblocks to enforce stop-movement orders, would require many officers and much equipment to be redeployed from other assignments and coordinated among many jurisdictions of different levels.

National Veterinary Stockpiles (NVS). HSPD-9 calls for a National Veterinary Stockpile (NVS) “containing sufficient amounts of animal vaccine, antiviral, or therapeutic products to appropriately respond to the most damaging animal diseases affecting human health and the economy and that will be capable of deployment within 24 hours of an outbreak.”

At a Senate agriculture committee hearing in 2005, Dr. James Roth, veterinary professor at Iowa State University, highlighted Rift Valley fever, Nipah virus, and avian influenza as candidates for the stockpile because the agents are contagious and can cause serious illness or death in humans. “Safe and effective vaccines for these three diseases can be developed in a short time frame. This preventive measure would effectively reduce the serious threat these diseases pose to both public health and animal agriculture. Animal vaccines can be developed for a small fraction of the cost of developing human vaccines. Vaccinating animals for zoonotic diseases effectively protects the human population from infection, and reduces the need to vaccinate people.”⁹³

The NVS received \$3 million in FY2005 and \$3 million in FY2006. The Administration requests \$8 million for FY2007 as part of the Food and Agriculture Defense Initiative.

Recovery and Management

Some activities, such as confinement and eradication, start in the response phase but continue throughout the recovery and management phase. Long-term economic

⁹¹ For more information on CCC transfers for plant and animal health programs, see CRS Report RL32504, *Funding Plant and Animal Health Emergencies: Transfers from the Commodity Credit Corporation*, by Jim Monke.

⁹² U.S. Department of Justice, National Institute of Justice, *Agroterrorism — Why We’re Not Ready: A Look at the Role of Law Enforcement*. NCJ 214752, December 2006 [<http://www.ojp.usdoj.gov/nij/pubs-sum/214752.htm>].

⁹³ James A. Roth, DVM. Testimony before the Senate Committee Agriculture Committee, July 20, 2005 [<http://agriculture.senate.gov/Hearings/hearings.cfm?hearingId=1572>].

recovery includes resuming the husbandry of animals and plants in the affected areas, introducing new genetic traits that may be necessary in response to the pest or disease, rebuilding public confidence in domestic markets, and regaining international market share.

Confidence in food markets, by both domestic and international customers, depends on continuing surveillance after the threat is controlled or eradicated. Communication and education programs would need to inform growers directly affected by the outbreak, and inform consumers about the source and safety of their food. The social sciences and public health institutions play a complementary role to the agricultural sciences in responding to and recovering from agroterrorism.

If eradication of the pest or disease is not possible, an endemic infestation would result in a lower equilibrium level of production and/or product quality. Resources would be devoted to acquiring plant varieties with resistance characteristics and breeds of animals more suitable to the new environment. This is the goal of the National Plant Disease Recovery System (NPDRS) mentioned in HSPD-9 and being initiated by APHIS.

National Plant Disease Recovery System (NPDRS). HSPD-9 calls for a National Plant Disease Recovery System (NPDRS) “capable of responding to a high-consequence plant disease with pest control measures and the use of resistant seed varieties within a single growing season to sustain a reasonable level of production for economically important crops.”

The primary resources for this recovery system are the U.S. National Plant Germplasm System in conjunction with federal, state, university, extension, and industry scientists. Planning includes finding or developing seed varieties that resistant to certain diseases, and pesticide control measures that prevent, slow, or stop high-consequence plant diseases from spreading.

The NPDRS received \$2 million in FY2005 and \$2 million in FY2006. The Administration requests \$6 million for FY2007 as part of the Food and Agriculture Defense Initiative.

Issues for Congress

Appropriations

The annual appropriations process provides an opportunity for legislators to influence homeland security activities separate from writing authorizing legislation or conducting oversight hearings. In addition to the primary purpose of appropriations laws — providing or limiting funding — appropriators may also use committee report language to request reports from federal agencies or make statements and stipulations about future counterterrorism activities.

For FY2007 appropriations, USDA requested \$322 million for the “Food and Agriculture Defense Initiative,” which is a list of priority homeland security

programs that USDA wishes to highlight (**Table 4**). The initiative was not all-inclusive, and represented 63% of the total \$511 million requested appropriation for USDA homeland security activities.

The FY2007 agriculture appropriations bill (H.R. 5384, 109th Congress) was not enacted by the 109th Congress. Congress has passed continuing resolutions to continue funding the government. The continuing resolutions are funding federal agencies at the lower of the House-passed, Senate-passed, or FY2006 levels. However, since the Senate in the 109th Congress did not pass the FY2007 agriculture appropriations bill, agriculture-related agencies are being funded at the lower of the House-passed or FY2006 levels. Thus, increases for agroterrorism preparedness in the President's FY2007 budget request, and the House-passed or Senate-reported agriculture appropriations bill in the 109th Congress, are not available.

DHS requested \$2 million for FY2007 for a "Joint Agro-terror Defense Office" (JADO) in the Science and Technology directorate. Although the FY2007 DHS appropriations act (P.L. 109-295) did not address the JADO proposal, DHS may implement the plan under its administrative discretion. The act did make a \$23 million second installment for the construction of the National Bio and Agro-Defense Facility (NBAF) discussed elsewhere in this report.

These budget issues and past appropriations for agroterrorism are discussed earlier in this report under the heading "Federal Funding to Respond to Agroterrorism."

Legislation

Increasing the level of terrorism preparedness remains a concern, not only for agroterrorism, but also for other forms of terrorism. Several bills were introduced in the 109th Congress to authorize funding or otherwise improve the level of preparedness or coordination of response to an agroterrorist attack. These bills are listed in **Table 7** and discussed in the context of several issues below. The 110th Congress may consider similar bills regarding coordination and response activities.

Two complementary bills addressing agroterrorism preparedness were introduced by Senator Akaka: S. 572 (the Homeland Security Food and Agriculture Act, 109th Congress) and S. 573 (the Agricultural Security Assistance Act, 109th Congress). Versions of both bills were introduced in the 108th Congress. Both bills addressed different aspects of agroterrorism preparedness and coordination. S. 572 would have amended the Homeland Security Act of 2002 by giving additional responsibilities to the Department of Homeland Security for agroterrorism preparedness. S. 573 (which subsequently was incorporated into Project Bioshield II, S. 975, 109th Congress) would have tasked the Secretary of Agriculture with various studies and programs, and authorized funding for state and local preparedness, public awareness programs, and biosecurity grants for farmers. S. 573/S. 975 also would have established agriculture liaison position in the Department of Homeland Security and Department of Health and Human Services.

Another agroterrorism preparedness bill, S. 1532 (the Agroterrorism Prevention Act, 109th Congress) was introduced by Senator Specter. It would have authorized

funding for public awareness, on-farm biosecurity guidelines, and state and local preparedness assistance, and bolstered laboratory and other response capacity. S. 1532 also would have addressed criminal penalties for agroterrorism, and coordination for agricultural issues in the intelligence community.

S. 3898/H.R. 6086 (National Reportable Conditions Act, 109th Congress) would have directed DHS, in coordination with USDA and several other agencies, to develop a list of diseases, conditions, and events that represent a threat to humans, animals, food production, and the water supply. A commission of public health professionals, veterinarians, animal and food specialists, and environmental, and utility, and laboratory workers would have advised the Secretary. The bill would have created a coordinated notification system to a single government agency.

P.L. 109-374 (the Animal Enterprise Terrorism Act) was enacted in 2006 to enhance criminal penalties for terrorism against animal enterprises, not only for agroterrorism as discussed in this report, but also for what is sometimes called “eco-terrorism” against animal research facilities or types of livestock production. The law prescribes penalties and restitution in Title 18 of the U.S. Code for varying levels of economic damage and personal injury involving threats, acts of vandalism, property damage, criminal trespass, harassment, or intimidation.

Table 7. Bills in the 109th Congress Addressing Agroterrorism

Bill in 109 th Congress	Committee jurisdiction	Action
S. 572 (Akaka) Homeland Security Food and Agriculture Act	Homeland Security and Governmental Affairs	Reported by committee 12/15/2005 S.Rept. 109-209
S. 573 (Akaka) Agricultural Security Assistance Act	Agriculture	Referred to committee Incorporated into S. 975
S. 975 (Lieberman) Project BioShield II Act Title 27 (Countermeasures Against Agroterrorism)	Health, Education, Labor, and Pensions	Committee hearing held 7/21/2005 S.Hrg. 109-210
S. 1532 (Specter) Agroterrorism Prevention Act	Agriculture	Referred to committee
S. 3898 (Hagel) H.R. 6086 (Terry) National Reportable Conditions Act	Senate Homeland Security and Governmental Affairs; House Energy and Commerce	Referred to Senate committee; referred to House subcommittee on health
S. 3880 (Inhofe) S. 1926 (Inhofe) H.R. 4239 (Petri) Animal Enterprise Terrorism Act	Judiciary	Enacted P.L. 109-374 (Nov. 27, 2006)

Source: CRS.

In terms of preparedness and coordination, the bills from the 109th Congress sought to provide more concrete Congressional instructions and budget authorizations for agroterrorism preparedness. However, similar results could occur if the presidential directive HSPD-9 is implemented successfully. The presidential directives facilitating agroterrorism preparedness, and subsequent administrative actions, did not exist when Senator Akaka's bills were introduced in the 108th Congress.

While Congress certainly has oversight authority of federal agencies and may ask questions about implementation of HSPD-9, a public law outlining and directing the implementation of an agroterrorism preparedness plan would establish the statutory parameters for such a plan, and, as a practical matter, might result in enhanced oversight by specifically identifying executive branch entities responsible for carrying out particular components of such a plan.

USDA Programs to Bolster Preparedness. In the 109th Congress, S. 573 was referred to the Agriculture Committee, but the most of the text was incorporated subsequently into Title 27 of S. 975 (Project Bioshield II, 109th Congress) which is referred to the Health, Education, Labor, and Pensions Committee. The bills would have authorized such sums as necessary, subject to annual appropriations, for state and local vulnerability assessments, emergency response plans, geographic information systems, and grants to State and local agriculture health officials. The bills also would have created awareness programs and grants for farm-level producers to improve biosecurity measures. These farm-level activities would have included development and dissemination of on-farm biosecurity guidelines, and on-farm biosecurity improvement grants (up to \$10,000 per farm).

S. 1532 (the Agroterrorism Prevention Act, 109th Congress) would have authorized funding for USDA and DHS-FEMA to assist states in developing response plans. It also would have authorized funding for public awareness, the dissemination of farm-level biosecurity guidelines, and mandated further development of a National Veterinary Stockpile and a National Plant Disease Recovery System, largely as mentioned in HSPD-9.

Responsibilities of DHS. The Homeland Security Food and Agriculture Act (S. 572, S.Rept. 109-209, 109th Congress) would have amended the Homeland Security Act of 2002 (P.L. 107-296) by giving additional biosecurity responsibilities to the Department of Homeland Security. The bill was reported favorably by the Homeland Security and Governmental Affairs Committee in September 2005. It would have given a leadership role to DHS for agriculture security preparedness and disaster response.

S. 572 (109th Congress) would have authorized an agriculture security program in DHS that would advise and consult with federal, State, local, and other agriculture officials regarding agroterrorism preparedness. It would have given the Secretary of DHS authority to execute responsibilities mentioned in HSPD-7 and HSPD-9, and tasked DHS with coordinating much of an agroterrorism response by communicating, equipping, and otherwise facilitating emergency response providers. DHS also would have become the lead responder by coordinating with the Department of Transportation, the Environmental Protection Agency, Department of Agriculture,

and Department of State. DHS would have coordinated task forces to identify and recommend best practices for State response plans. The bill also would have created a grant program to help State and local agricultural specialists prepare for agroterrorism by funding conferences and agroterrorism response exercises.

The Congressional Budget Office estimated that implementing S. 572 would cost \$8 million in 2006 and \$53 million over a five-year period. Of this total, \$48 million would fund additional staff and expenses in the current DHS Directorate for Preparedness, and \$5 million would be for grants to State and local agriculture officials.

Inter-agency Coordination. Shortly following enactment of the Homeland Security Act and the 2003 transfer from USDA to DHS of agricultural border inspections and the Plum Island agricultural research facility, concerns over DHS dedication to these agricultural functions began rising. Moreover, concern over coordination between established agencies and DHS is not unique to agriculture. Nonetheless, the issue of improved coordination between federal agencies with various jurisdictions, which agency has primary responsibility, and encouraging agencies to seeking adequate consultation from other stakeholders has been raised in many venues and proposed legislation.

For example, the Agricultural Security Assistance Act (S. 573, 109th Congress) would have established agriculture liaison position in the Department of Homeland Security (specifically with the Federal Emergency Management Agency, FEMA), and in the Department of Health and Human Services. The bill, among other things, would have given leadership roles for preparedness and response, particularly with first responders, to DHS.

S. 1532 (the Agroterrorism Prevention Act, 109th Congress) would have instructed DHS, HHS, USDA, intelligence agencies, Interior, EPA, and other agencies to coordinate response plans, conduct vulnerability assessments, and expand monitoring and surveillance for agroterrorism. The bill also mentioned enhanced intelligence systems and cooperation, tracking systems for agricultural products, laboratory networks, and border inspection training. The bill would have directed DHS, in coordination with other agencies, to assess the need for modernizing or replacing BL-3 and BL-4 laboratories with agricultural capacity.

Project Bioshield II (S. 975, 109th Congress) would have established a working group spanning USDA, DHS, HHS, and FDA to identify and recommend specific actions, capacities, and limitations regarding agroterrorism preparedness.

Section 2708 of S. 975 (109th Congress) would have compelled DHS to cooperate with USDA and other intelligence agencies to improve the targeting of agricultural border inspections. While the agencies are working together already toward this goal, such legislation would further compel the coordination of the departments.

S. 3898/H.R. 6086 (National Reportable Conditions Act, 109th Congress) would have created a coordinated notification system to a single government agency for a

specific list of diseases, conditions, and events deemed to be a threat to human or animal health, or the safety of the food and water supply.

Border Inspections. Once agricultural border inspectors were transferred from USDA to DHS, some Members and industry groups expressed concerns that DHS would concentrate on more immediate or catastrophic homeland security issues such as immigration or radiological threats, and neglect agricultural functions. Some were also concerned that personnel and resources formerly devoted to agriculture would be shifted to other DHS areas (for more background, see the earlier section on the Homeland Security Act).

Coordination over agricultural border inspections was raised in the conference report for the FY2007 DHS appropriations act (P.L. 109-295). Appropriators directed DHS to report on activities to target agricultural inspections, adjust to new agricultural threats, improve training, generally coordinate with USDA and state governments regarding agricultural inspections.

The conferees are concerned with the steps the Department is taking to improve the targeting of agricultural inspections and direct the Secretary to submit a report consistent with section 541 of the Senate bill. (H.Rept. 109-699)

SEC. 541. The Secretary of Homeland Security shall submit a report to the Committees on Appropriations of the Senate and the House of Representatives, not later than February 8, 2007, that — (1) identifies activities being carried out by the Department of Homeland Security to improve — (A) the targeting of agricultural inspections; (B) the ability of United States Customs and Border Protection to adjust to new agricultural threats; and (C) the in-service training for interception of prohibited plant and animal products and agricultural pests under the agriculture quarantine inspection monitoring program of the Animal and Plant Health Inspection Service; and (2) describes the manner in which the Secretary of Homeland Security will coordinate with the Secretary of Agriculture and State and local governments in carrying out the activities described in paragraph (1). (H.R. 5441, 109th Congress)

The coordination issue was previously raised FY2005 Consolidated Appropriations Act (P.L. 108-447, H.Rept. 108-792). Conferrees expressed their concern over two agricultural functions transferred to DHS, and requested a GAO study of coordination between DHS and USDA.

The conferees are aware of ongoing concerns within the agriculture sector that the transfer of these responsibilities [border inspection and research] may shift the focus away from agriculture to other priority areas of DHS. In order to ensure that the interests of U.S. agriculture are protected and that the intent of the Homeland Security Act of 2002 is being fully met, including the proper allocation of AQI [Agricultural Quarantine Inspection] and other funds, the conferees request the Government Accountability Office to provide a report, no later than March 1, 2005, on the coordination between USDA and DHS in protecting the U.S. agriculture sector, including a description of the long-term objectives of joint activities at Plum Island and the effectiveness of AQI and other inspection activities (H.Rept. 108-792).

This was the impetus for the 2006 GAO study, *Management and Coordination Problems Increase the Vulnerability of U.S. Agriculture to Foreign Pests and Disease* (GAO-06-644), discussed earlier in this report, which identified several problems concerning inter-agency coordination and inspection performance.

Judicial Issues. Both S. 573 (109th Congress) and S. 975 (109th Congress) would have instructed the Attorney General to review State and local laws relating to agroterrorism to determine whether any such laws would facilitate (or impede) the implementation of agroterrorism response plans and whether a State court could delay the implementation of such federal response plans.

S. 1532 (109th Congress) would have criminalized acts of agroterrorism by amending Title 18 of the U.S. Code to define agroterrorist acts and prescribing penalties of fines, imprisonment, or death.

The Animal Enterprise Terrorism Act (P.L. 109-374) enhanced the authority of the Department of Justice to prosecute and convict individuals committing terrorism against animal enterprises. The act defines such acts and prescribes penalties. It applies not only to international actors committing agroterrorism in the United States, but also to acts commonly considered “eco-terrorism” that are conducted by parties within the United States against locations such as animal research facilities or confinement livestock operations.

Bibliography

- American Phytopathological Society. "Crop Biosecurity: Are We Prepared?" White Paper, May 2003, [<http://www.apsnet.org/members/ppb/PDFs/CropBiosecurityWhitePaper5-03.pdf>].
- Applebaum, R. "Terrorism and the Nation's Food Supply," *Journal of Food Science*. Vol. 69, No. 2, March 2004, [<http://bookstore.myift.org/orders/iftstore/ift-9984-2238-5934-8765-house/21259jfsv69n2pCRH0047-0054ms20031209.pdf>].
- Belasco, A., and L. Nowels, *Supplemental Appropriations for FY2002: Combating Terrorism and Other Issues*, CRS Report RL31406.
- Casagrande, R. "Biological Warfare Targeted at Livestock," *BioScience*, Vol. 52, No. 7 (July 2002), pp. 577-581, [<http://www.bioone.org/pdfserv/i0006-3568-052-07-0577.pdf>].
- Centers for Disease Control and Prevention. *Bioterrorism Agents and Diseases*, [<http://www.bt.cdc.gov/agent/agentlist-category.asp>].
- Chalk, Peter. "Hitting America's Soft Underbelly: The Potential Threat of Deliberate Biological Attacks Against U.S. Agricultural and Food Industry", RAND National Defense Research Institute, January 2004, [<http://www.rand.org/publications/MG/MG135/MG135.pdf>].
- Chalk, Peter. "Terrorism, Infrastructure Protection, and the U.S. Food and Agriculture Sector." Testimony for the Senate Governmental Affairs Subcommittee on Oversight of Government Management, Restructuring, and the District of Columbia hearing on "Federal Food Safety and Security," October 10, 2001, [<http://www.rand.org/publications/CT/CT184/CT184.pdf>].
- Congressional Budget Office. *Federal Terrorism Reinsurance: An Update*, January 2005, [<http://www.cbo.gov/ftpdocs/60xx/doc6049/01-05-Terrorism.pdf>].
- Congressional Budget Office. *Homeland Security and the Private Sector*, December 2004, [<http://www.cbo.gov/showdoc.cfm?index=6042&sequence=0&from=7>].
- Congressional Budget Office. *Federal Funding for Homeland Security*, April 30, 2004, [<http://www.cbo.gov/ftpdoc.cfm?index=5414&type=1>].
- Council of State Governments. *Agricultural Terrorism in the Midwest: Risks, Threats and State Responses*, December 2002, [<http://www.csgmidwest.org/MemberServices/Publications/ReportsNewsletters/AgTerrorism.pdf>].
- Cupp, O., D. Walker, and J. Hillison. "Agroterrorism in the U.S.: Key Security Challenge for the 21st Century, *Biosecurity and Bioterrorism*, Vol. 2, No. 2, 2004, [<http://www.biosecurityjournal.com/PDFs/V2n204/p97.pdf>].

- Food and Drug Administration, "The Bioterrorism Act of 2002: Plans for Implementing the Act," [<http://www.fda.gov/oc/bioterrorism/bioact.html>].
- Food Chemical News, "Food industry creates new Homeland Security liaison groups," July 12, 2004.
- Food Marketing Institute, "Food and Agriculture ISAC (Information Sharing and Analysis Center)," [<http://www.fmi.org/isac/>].
- Gilmore Commission. Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction (also known as the Gilmore Commission). First Annual Report to the President and Congress: *Assessing the Threat*. December 15, 1999, pp. 12-15, [<http://www.rand.org/nsrd/terrpanel>].
- Government Accountability Office. *Mad Cow Disease: Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts*, GAO-02-183, January 25, 2002.
- Government Accountability Office. *Foot and Mouth Disease: To Protect Livestock, USDA Must Remain Vigilant and Resolve Outstanding Issues*, GAO-02-808, July 26, 2002.
- Government Accountability Office. *Food-Processing Security: Voluntary Efforts Are Under Way, But Federal Agencies Cannot Fully Assess Their Implementation*, GAO-03-342, February 14, 2003.
- Government Accountability Office. *Combating Bioterrorism: Actions Needed to Improve Security at Plum Island Animal Disease Center*, GAO-03-847, September 19, 2003.
- Government Accountability Office. *Bioterrorism: A Threat to Agriculture and the Food Supply*, GAO-04-259T, November 19, 2003.
- Government Accountability Office. *Much is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain*, GAO-05-214, March 8, 2005.
- Government Accountability Office. *Management and Coordination Problems Increase the Vulnerability of U.S. Agriculture to Foreign Pests and Disease*, GAO-06-644, May 19, 2006.
- Halstead, T. J. *Executive Orders: Issuance and Revocation*, CRS Report RS20846.
- Hanrahan, Charles, and Geoffrey Becker. *Mad Cow Disease and U.S. Beef Trade*, CRS Report RS21709, August 4, 2004.
- Kohnen, A. "Responding to the Threat of Agroterrorism: Specific Recommendations for the United States Department of Agriculture." BCSIA Discussion Paper 2000-29, John F. Kennedy School of Government, Harvard University, October 2000, [http://bcsia.ksg.harvard.edu/publication.cfm?ctype=paper&item_id=78].

- Mathews, Kenneth H., and Janet Perry. "The Economic Consequences of Bovine Spongiform Encephalopathy and Food and Mouth Disease Outbreaks in the United States," Appendix 6 in *Animal Disease Risk Assessment, Prevention and Control Act of 2001 (P.L. 107-9): Final Report of the P.L. 107-9 Federal Inter-Agency Working Group*. January 2003.
- Meyerson, L., and J. Reaser. "Biosecurity: Moving Toward a Comprehensive Approach," *BioScience*, Vol. 52, No. 7 (July 2002), pp. 593-600, [<http://www.bioone.org/pdfserv/i0006-3568-052-07-0593.pdf>].
- Monke, Jim. *Avian Influenza: Multiple Strains Cause Different Effects Worldwide*, CRS Report RS21747.
- Monke, Jim. *Farm Commodity Policy: Programs and Issues for Congress*, CRS Report RS21999.
- Monke, Jim. *Funding Plant and Animal Health Emergencies: Transfers from the Commodity Credit Corporation*, CRS Report RL32504.
- Monterey Institute of International Studies, "Agro-terrorism," [<http://cns.miis.edu/research/cbw/agromain.htm>].
- National Commission on Terrorist Attacks Upon the United States. *The 9/11 Commission Report*, July 2004, [<http://www.9-11commission.gov/report/911Report.pdf>].
- National Institutes of Health. *Summary of Recommended Biosafety Levels for Infectious Agents*, [<http://bmb1.od.nih.gov/sect3tab1.htm>].
- National Research Council of the National Academies, *Countering Agricultural Bioterrorism*, 2003, [<http://www.nap.edu/catalog/10505.html>].
- Nipp, Terry. "Agrosecurity: The Role of the Agricultural Experiment Stations," *Journal of Food Science*. Vol. 69, No. 2, March 2004, [http://bookstore.myift.org/orders/iftstore/ift-9984-2238-5934-8765-house/21259jfsv69n2pCRH0047-0054_ms20031209.pdf].
- Office International des Epizooties (World Organization for Animal Health) "Technical Disease Cards," [http://www.oie.int/eng/maladies/en_fiches.htm].
- Office International des Epizooties (World Organization for Animal Health) *Terrestrial Animal Health Code*, 12th edition, May 2003, [http://www.oie.int/eng/normes/MCode/A_summry.htm].
- Parker, Henry S., *Agricultural Bioterrorism: A Federal Strategy to Meet the Threat*, McNair Paper 65, National Defense University, March 2002, [http://www.ndu.edu/inss/McNair/mcnair65/McN_65.pdf].
- Pate, J., and G. Cameron. "Covert Biological Weapons Attacks Against Agricultural Targets," BCSIA Discussion Paper 2001-9, John F. Kennedy School of

Government, Harvard University, August 2001, [http://bcsia.ksg.harvard.edu/publication.cfm?ctype=paper&item_id=114].

Renlemann and Spinelli, “An Economic Assessment of the Costs and Benefits of African Swine Fever Prevention,” *Animal Health Insight*, Spring/Summer 1994.

Rogers, P., S. Whitby, and M. Dando. “Biological Warfare Against Crops,” *Scientific American*, June 1999, p. 70-75.

Shea, Dana, and Frank Gottron. *Small-scale Terrorist Attacks Using Chemical and Biological Agents: An Assessment Framework and Preliminary Comparisons*, CRS Report RL32391.

Shea, Dana. *Terrorism: Background on Chemical, Biological, and Toxin Weapons and Options for Lessening Their Impact*, CRS Report RL31669.

University of Minnesota Center for Infectious Disease Research and Policy (CIDRAP), “Overview of Agricultural Biosecurity,” [<http://www.cidrap.umn.edu/cidrap/content/biosecurity/ag-biosec/biofacts/agbiooview.html>].

United States Animal Health Association “Gray Book” [of Animal Diseases], [http://www.vet.uga.edu/vpp/gray_book/FAD/index.htm].

U.S. Census Bureau, *Statistical Abstract of the United States: 2003 — Agriculture*, [<http://www.census.gov/prod/www/statistical-abstract-03.html>].

USDA Animal and Plant Health Inspection Service. *Explanatory Notes for the President’s FY2005 Budget Request*.

USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine. *Emergency Programs Manual*, 2002, [http://www.aphis.usda.gov/ppq/manuals/pdf_files/EPM.pdf].

USDA Economic Research Service, *Agricultural Outlook* tables, [<http://www.ers.usda.gov/publications/Agoutlook/AOTables>].

USDA Homeland Security Staff. “Homeland Security Efforts,” May 2004, [<http://www.usda.gov/homelandsecurity/factsheet0504.pdf>].

USDA National Agricultural Statistics Service, *2002 Census of Agriculture*, June 2004, [<http://www.nass.usda.gov/census>].

U.S. Department of Homeland Security. “Strengthening the Security of Our Nation’s Food Supply,” DHS Fact Sheet, July 6, 2004, [http://www.dhs.gov/dhspublic/interapp/press_release/press_release_0453.xml].

U.S. Department of Justice, National Institute of Justice, *Agroterrorism — Why We’re Not Ready: A Look at the Role of Law Enforcement*. NCJ 214752, Dec. 2006, [<http://www.ojp.usdoj.gov/nij/pubs-sum/214752.htm>].

- U.S. Food and Drug Administration, "The Bioterrorism Act of 2002: Plans for Implementing the Act," [<http://www.fda.gov/oc/bioterrorism/bioact.html>].
- U.S. Senate Committee on Governmental Affairs. "Agroterrorism: The Threat to America's Breadbasket," S.Hrg. 108-491, November 19, 2003, [<http://a257.g.akamaitech.net/7/257/2422/15jul20041200/www.access.gpo.gov/congress/senate/pdf/108hrg/91045.pdf>].
- U.S. Senate Committee on Armed Services, Subcommittee on Emerging Threats. "Agricultural Biological Weapons Threat to the United States." Hearing on October 27, 1999, [<http://armed-services.senate.gov/hearings/1999/e991027.htm>].
- Wasem, Lake, Seghetti, Monke, and Vina. *Border Security: Inspections Practices, Policies, and Issues*, CRS Report RL32399.
- Wheelis, M., R. Casagrande, and L. Madden. "Biological Attack on Agriculture: Low-Tech, High-Impact Bioterrorism," *BioScience*, Vol. 52, No. 7 (July 2002), pp. 569-576, [<http://www.bioone.org/pdfserv/i0006-3568-052-07-0569.pdf>].
- White House. *Budget of the United States Government for FY2005: Analytical Perspectives*, "Homeland Security Funding Analysis" (Chapter 3), pp. 25-39, [<http://www.gpoaccess.gov/usbudget/fy05/pdf/spec.pdf>].
- White House. Homeland Security Presidential Directive 7 (HSPD-7): "Critical Infrastructure Identification, Prioritization, and Protection," [<http://www.whitehouse.gov/news/releases/2003/12/20031217-5.html>].
- White House. Homeland Security Presidential Directive 9 (HSPD-9): "Defense of United States Agriculture and Food," [<http://www.whitehouse.gov/news/releases/2004/02/20040203-2.html>].
- White House Office of Science and Technology Policy. *Conference Proceedings of the Blue Ribbon Panel on The Threat of Biological Terrorism Directed Against Livestock*, Washington, DC, December 8-9, 2003, [<http://www.rand.org/scitech/stpi/Bioagpanel>].
- World Health Organization. *Terrorist Threats to Food: Guidance For Establishing And Strengthening Prevention And Response Systems*, 2002, [<http://www.who.int/foodsafety/publications/general/en/terrorist.pdf>].
- Vogt, Donna. *Food Safety Issues in the 108th Congress*, CRS Report RL31853.
- Zink, D. "Agroterrorism: Issues of Reality," *Journal of Food Science*. Vol. 69, No. 2, March 2004, [<http://bookstore.myift.org/orders/iftstore/ift-9984-2238-5934-8765-house/21259jfsv69n2pCRH0047-0054ms20031209.pdf>].