

June 15, 2009

## Unconventional Terrorism in the Age of Globalization: Threats, Risks and Vulnerabilities in Food and Agriculture, Water and Public Health

*The May 2009 arrest and indictment of a small group of “aspirational” terrorists who planned to wreak havoc in and around New York is clearly another wake-up call warning against complacency. Available information regarding this group of homegrown fanatics indicates that these actors lacked sophisticated training, adequate resources and organizational awareness to carry out an effective plan to attack multiple targets. In this case, the perpetrators were simply a group of amateurs, reminiscent of the many disparate and largely ineffective nationalist movements involved in terrorist activities in the United States during the 1980s and 1990s. Unfortunately, however, not all groups plotting acts of terrorism are this disorganized. Al Qaeda — alone or with its horizontal affiliates — is a formidable terrorist organization that has a long list of successful operations carried out in Africa, Asia, Europe and North America. Far from amateurs, al Qaeda militants have attacked their perceived enemies with suicide bombers using planes, buses, automobiles, trucks and boats, while recent intelligence confirms they have been attempting to obtain weapons of mass destruction. In this day and age, however, not all terrorist threats involve such conventional weapons as bombs and artillery. Current fears that the swine flu outbreak may have terrorist origins attest to a rising belief that attacks on natural resources and health are very much a part of the terrorist arsenal, and should be great cause for concern. This issue of The Lipman Report® will examine some of the logical “natural” targets that terrorists would consider — including food, agriculture, water and public health — assess their vulnerability and suggest strategies to minimize these risks.*

### **Bioterrorism**

Although there is no concrete evidence at this time to support the allegation that al Qaeda is behind the swine flu pandemic, there is intelligence that al Qaeda may be developing and employing bioterrorist weapons. In fact, United States officials recently authenticated a video by an al Qaeda recruiter that threatened to smuggle a biological weapon into the United States via tunnels under the Mexican border. In modern United States history, the incident of bioterrorism involving the most casualties occurred in Oregon in 1984, when a cult led by Bhagwan Shree Rajneesh attacked 10 salad bars with salmonella, which it had acquired legally from a commercial supplier. Seven hundred and fifty-one people became ill and 45 were hospitalized. This attack and the post-9/11 anthrax letters of 2001 were the only

major publicly documented incidents of bioterrorism in the United States, although there have been some anthrax hoaxes and small-scale use of ricin toxin since the 1990s. Aum Shinrikyo, a doomsday cult based in Japan, released a nerve gas — sarin — in the subway in Tokyo. This was a chemical attack, but the cult was found to have developed a bioweapons program as well, and to have experimented with anthrax and botulism toxin.

There is currently a perception among policymakers that the threat of bioterrorism is increasing. The motives for terrorism are changing from primarily economic and territorial to ideological and religious. This change has serious implications, because whereas economic and territorial grievances can often be redressed, ideologically motivated groups such as al Qaeda may be implacable and thus willing to kill civilians indiscriminately, as happens with biological attacks. The biological methods available to terrorists have also become more diverse and now include vehicles such as the smallpox virus, pneumonic plague and as a worst case, genetically engineered, incurable “Ebola-pox” hybrid — a vicious bug that is as transferable as smallpox and as quickly lethal as Ebola hemorrhagic fever. Delivery of a bioagent might be accomplished with a missile or an aircraft emitting clouds of a bioagent in its wake, a method widely publicized when some of the 9/11 terrorists expressed an interest in crop-duster planes. It may also be as simple as mailing a letter, as in the anthrax attacks of 2001.

### **Agroterrorism: Threats and Preparedness**

Biological weapons need not only be a disease, but also an agent or pathogen — such as a virus, bacteria or fungus — that attacks our food and water supply. Both agriculture and the food industry are very important to the social, economic and even political stability of the United States. Although farming employs less than two percent of the country’s workforce, 16 percent of the workforce is involved in the food and fiber sector, ranging from farmers and input suppliers to processors, shippers, grocers and restaurateurs. The food and fiber sector contributes more than \$1.2 trillion, or more than 11 percent, to the Gross Domestic Product (GDP). Subsequent to 9/11, former Secretary of Health and Human Services Tommy Thompson said, “For the life of me, I cannot understand why the terrorists have not attacked our food supply because it is so easy to do.”

The potential for terrorist attacks against agricultural targets — agroterrorism — is increasingly recognized as

---

## Unconventional Terrorism in the Age of Globalization: Threats, Risks and Vulnerabilities in Food and Agriculture, Water and Public Health

a national security threat, especially after the events of 9/11. Agroterrorism is a subset of bioterrorism and is defined as the deliberate introduction of animal or plant disease with the goal of generating fear, causing economic losses and undermining social stability. Evidence that agriculture and food are potential al Qaeda targets came in 2002 when terrorist hideouts in Afghanistan were found containing documents describing ways to make animal and plant poisons. Al Qaeda has also shown interest in insecticides and pest-control products, which is cause for great concern.

The goals of agroterrorism are to cause economic crises in the agriculture and food industries, widespread panic and social unrest, along with a marked loss of confidence in government. It does not need to be added that human health would be directly at risk, both through ingesting contaminated food or if an animal pathogen becomes transmissible to humans — as exhibited in the current fears associated with the swine flu. 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 — particularly because of its relatively low cost. Agroterrorism could present an inexpensive but highly effective means toward an al Qaeda mission of destroying the United States economy.

Attacks against agricultural production are not new and have been conducted by both nation-states and substate organizations throughout history. At least nine countries had documented agricultural bioweapons programs during some part of the 20th century: Canada, France, Germany, Iraq, Japan, South Africa, the United Kingdom, the United States and the former Soviet Union. Four other countries are believed to have or have had agricultural weapons programs: Egypt, North Korea, Rhodesia (now Zimbabwe) and Syria. Historically, state actors have rarely used biological weapons against crops or livestock; however, Germany used them in World War I, Japan in World War II and the Soviet Union in Afghanistan.

Unfortunately, the technologies supporting bioterrorism have exploded recently and become more affordable. The cost of genomic sequencing, as an example of a supporting technology, has fallen dramatically. Genetic engineering of viruses is much less complex and far less expensive than sequencing human DNA. In short, bioterrorism weapons are cheap, do not need huge labs or government support and might be tempting to terrorists who want to create a maximum impact at minimal cost.

Moreover, the number of lethal and contagious agents is far greater for plants and animals than for humans. Most of these pathogens are environmentally resilient, endemic to foreign countries and not harmful to humans, making them easier for terrorists to acquire, handle and deploy. 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 such political objectives as undermining confidence in the government or giving the terrorists an improved bargaining position.

In addition, significant threats to the currently held notion of food security would most definitely affect our social order. Fear of food shortages has moved to a "safe" distance from the American psyche as the United States has evolved from an agrarian society to the industrial and information age. Nevertheless, it is difficult to predict the psychological consequences of fearing a massive food shortage in our urban, modernized environment, but it would undeniably shock and generate tremendous unrest. Furthermore, economic losses from an agroterrorist incident could be large and widespread. 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. The potential for economic damage depends on a number of factors, such as the disease agent, location of the attack, rate of transmission, geographic dispersion, how long it remains undetected, availability of countermeasures or quarantines and the sophistication and workability of incident-response plans.

Hundreds of animal and plant pathogens and pests are available to an agroterrorist, but perhaps less than two dozen represent significant economic threats. A widely accepted view among scientists is that livestock are more susceptible to agroterrorism than cultivated plants, as witnessed by the sizable damage caused by the hoof and mouth disease in the United Kingdom a few years ago and the scare from mad cow disease in Europe. Moreover, certain animal diseases may be more attractive to terrorists because they can be zoonotic, or transmissible to humans. However, some viruses, bacteria and fungi can pose a severe threat to many important crops, including potatoes, rice, corn and citrus fruits. Because these pathogens — diseases, toxins and pests — can easily cause widespread crop losses and economic damage, it is likely that terrorist groups would use them to achieve their aims.

---

### **Countering the Threat**

In the past several years, “food defense” has received increasing attention in the counterterrorism community. The primary goal of agrosecurity is to develop a system 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, occurring through natural migration across borders or accidental movement by international commerce. However, a system designed to protect against accidental or natural outbreaks is clearly insufficient for defending against intentional attack. A successful agroterrorism defense system must include a three-pronged strategy for countering the threat: deterrence and prevention, detection and response, and recovery and management. The federal government has done a commendable job since 9/11 in upgrading agrosecurity, but since this industry is almost entirely in private hands — much like the infrastructure of the United States — biosecurity should be a key consideration among food manufacturers, merchandisers, retailers and commercial farmers.

Those establishing security plans should take certain facts into account. Terrorists may have unmonitored access to geographically remote crop fields and livestock feedlots. Diseases may infect herds more rapidly in modern concentrated livestock operations than in open pastures. An undetected disease may spread rapidly because livestock are transported more frequently and over longer distances between farms and processing plants than at any time in history. Perhaps most importantly of all, agribusinesses are especially vulnerable to biological attacks on crops and livestock because the attacks may not be immediately apparent — it may take days or even weeks or months for pathogens to create health issues and for experts to trace the problem, and by then the contamination could be widespread. Since every link in the agricultural chain is susceptible to an attack with a biological weapon, agribusinesses should prepare response plans or add security measures to protect their product and brand at every step along the way, ranging from farms to processing to retail distribution. It is clear that the existing framework for detecting, identifying, reporting, tracking and managing natural and accidental disease outbreaks needs to be upgraded to combat the potential dangers of agroterrorist acts.

Moreover, consumers are the final judges of the safety of the food they buy and eat and should take their own safety measures when purchasing and preparing food. The essential step for their protection is to check whether the food package, can or bottle is intact before opening it, and that all seals are unbroken, as underscored by the Tylenol® scare of 1982. Consumers need to be alert to abnormal odor, taste and appearance of a food item, and to immediately discard food that seems “off” in any way. They can help arm themselves against the spread of pathogens by following basic safe food handling practices. These include: washing all raw food products such as fruits and vegetables before eating them to help eliminate any pathogens or foreign substances; cooking foods thoroughly to kill any harmful pathogens; washing hands, cutting boards, knives and utensils in hot, soapy water before and after handling food; separating raw foods such as meat, poultry and seafood from foods that are ready to eat; and refrigerating foods promptly — cold temperatures keep most harmful pathogens from growing and multiplying.

### **Water and Terrorism**

Another area of heightened concern since 9/11 is the security of the nation’s water resources. Americans take the safety of their drinking water for granted; cholera, dysentery and other deadly waterborne epidemics are nightmares of the past, but ordinary tap water could become deadly within minutes. In addition to these public health concerns, the importance of freshwater, water infrastructure and ecosystem health to a smooth functioning of a commercial and industrial economy makes water and water systems natural targets for terrorism. A few years ago, the FBI indicated that members of al Qaeda were scouring the Web in search of methods for gaining control of water supply facilities and waste water treatment plants through the computer networks used by United States public and private utilities. Additionally, United States authorities discovered a computer belonging to a person with direct ties to Osama bin Laden that contained engineering software related to dams and other water-retaining structures.

The chance that terrorists will strike at water systems is very real; indeed there is a long history of such attacks. These attacks can take one of two angles: Water infrastructure can be targeted directly or water can be contaminated through the introduction of poison or disease-causing agents. The primary threats to the

## Unconventional Terrorism in the Age of Globalization: Threats, Risks and Vulnerabilities in Food and Agriculture, Water and Public Health

nation's drinking water supplies are contamination by chemical, biological or radiological agents; damage, destruction, or sabotage of physical infrastructure; and disruption to computer systems. The distribution component of the water supply is the most vulnerable; pipelines wander for thousands of unprotected miles and aqueducts snake through largely unpopulated areas. A person with a crude knowledge of hydraulics, a bicycle tire pump and access to a kitchen faucet could introduce toxins into any local water distribution system, endangering thousands.

The water system depends on other critical infrastructures as well — such as the electrical grid — to pump water through the system. Disabling the electrical grid would be a disaster for the water supply, effectively shutting down its movement and delivery to the population. The nation's water system is a complex one, composed of interlocking components that include water supply systems (dams, natural lakes, reservoirs and wells); water treatment and filtration systems; water distribution systems (pipes, valves and storage tanks); and of course control systems, which are often run by computers. It is this type of interlocking design that makes safeguarding the water supply both highly complicated and extremely costly.

Dilution, filtration and disinfection can mitigate contamination of water. However, if the point of contamination is located after a treatment facility — where filters, chlorination and other preventive measures would no longer be effective — the likelihood of success of an attack against water is much greater. Water that has been contaminated after it has passed the point of filtration can still be somewhat salvaged though dilution, but just how effective dilution may be can vary greatly.

Cyber-terrorism is another potential threat to disrupt service. Computer networks and digital monitoring technology play key roles in the management of our nation's water supplies. In theory, a skilled hacker could create all kinds of havoc either from within or beyond our borders. Terrorist attacks, such as hacking, that are designed to confuse rather than kill or injure may still have important political repercussions by affecting public perception, reducing confidence in institutions and forcing inappropriate political responses. The best defenses against such threats are

public confidence in water management systems, rapid and effective water-quality monitoring and effective information dissemination.

Perhaps the most effective action that can be taken to protect water systems is to deny or limit physical access to vulnerable points. Sometimes this may be as easy as locking gates or buildings, reducing public access to sensitive locations, closing roads and stationing security officers at critical sites. Access to water distribution maps and facility plans should be controlled, and lighting, surveillance cameras and motion detectors should be installed in appropriate places. To prevent hacking, Internet security such as electronic security firewalls and passwords should be strictly implemented. And as a preventive measure, on-site water treatment chemicals should be kept in secure facilities and inventoried on a regular basis. It is vital that sensitive water systems be protected through a combination of improved physical barriers, more extensive real-time chemical and biological monitoring and treatment, and development of smart and integrated response strategies at all levels.

*Protections against attacks on our food and water supply must be strengthened in areas where risk assessments indicate high vulnerability, especially where critical infrastructure is exposed or where active monitoring can provide time for effective response. Damage and destruction of the nation's food and water supply, or impact on its quality, due to terrorist attack would create virtual chaos, disrupting the delivery of vital human services and threatening health and safety, as well as the environment and the economy. It can cause loss of life, perhaps on a massive scale if the contaminants are sufficiently potent and not detected early on. Particularly in these times of economic stress, attacks against food and water can provide terrorists with an effective and inexpensive alternative to conventional weapons. Terrorist actions need not just come from bombs, but can impact us through the food we eat and the water we drink, and the effect can be just as deadly. **The time for urgency is now®.***



The Lipman Report Editors