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# National Intelligence Memo

Agroterrorism

The Department of Homeland Security  
The U.S. Department of Agriculture

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## Key Judgements

We recommend that the Department of Homeland Security and the U.S. Department of Agriculture address the matter of agroterrorism as a current and ongoing serious threat to our national security. There is a growing danger of unprotected and vulnerable agriculture technology systems that, if attacked, would result in global economic instability, nutrition insecurities, and political instability.

While the dependence on technology to assist in agriculture tactics has immense benefits, there are multiple areas of susceptibility that are weakly protected, which could allow for hacking, altering, or destroying. These attacks can take many forms and mediums that are physical and/or digital and can include computer malware that alters data, crop dusting (by plane or automated drones), digital viruses that affect the spreading of seeds or chemicals. Crop and livestock infections can also spread through the importation of infected vegetation and livestock, especially exotic species.

While an attack on the U.S. agriculture industry could arise from anywhere, we predict that an attack could happen from one of four main groups:

- A transnational group or foreign terrorist organization focussed on gaining control through economic/political means
- A domestic or international economic opportunist group (corporation) or nation trying to affect the market for profitability
- A domestic terrorist organization
- A domestic activism group <sup>1</sup>

Generally, there are two types of attack outcomes that an entity would try to achieve in an agroterrorism attack. We suspect that these would be economically and politically motivated actions.

- An attack on a group of livestock or crop wherein an agent, chemical, or disease is introduced to infect livestock or crop or infect consumers through consumption
- An attack aimed at completely destroying a group of livestock or crop so that no harvest is made

As the world is increasingly being affected by Russian military operations in Ukraine, we recommend that the threat level of agroterrorism on the American agriculture industry be raised. By doing so, the agriculture community will be better prepared and equipped with defense information and capabilities in the event of an attack. This information is best distributed to the agriculture community through agriculture corporations (especially those that store farmers' data), local agriculture co-ops, agriculture insurance companies, and state extension offices.

Due to their being the direct overseeing of crops and livestock, farmers could be educated on the following:

1. Deterrence and Prevention
2. Detection and response
3. Recovery and management<sup>2</sup>

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<sup>1</sup> Olson, Dean. "Agroterrorism: Threats to America's Economy and Food Supply." *FBI*, FBI, 1 Feb. 2012, <https://leb.fbi.gov/articles/featured-articles/agroterrorism-threats-to-americas-economy-and-food-supply>.

<sup>2</sup> Monke, Jim. (2004). *Agroterrorisms: Threats and Preparedness*. (CRS Report No. RL32521). Retrieved from Congressional Research Service website: <https://irp.fas.org/crs/RL32521.pdf>

## Introduction

America stands as one of the largest food and beverage producers in the world, and the threat of agroterrorism is ever so increasing as a form of terrorism, especially as we continue in our advancements in the digital age. In order for the projected population of 2050 to be fed, it is estimated that world food production will need to increase by 70%, making food production a viable target for any entity to attack for malicious reasons.<sup>3</sup>

The United States agriculture industry still stands to be one of our nation's strongest assets and plays a key role in our economic, political, and food security stability. In 2020, the U.S. agriculture industry was responsible for a \$1.055 trillion contribution to the U.S. GDP (5%), 10.3% of American employment, and over \$146 billion in exports.<sup>4</sup> Additionally, 87.3% of food and beverages consumed by Americans in 2016 were domestically produced and processed.<sup>5</sup>

Prior to the terrorist attacks on September 11<sup>th</sup>, it was never assumed that agroterrorism was a possibility. However, after records were produced that showcased Usama bin Laden's capability and threat to perform an agroterrorism attack in the 9/11 Commission Report, the DHS to designated the U.S. agriculture industry as one of the 17 most vulnerable infrastructures to attacks and terrorism.<sup>6</sup> These findings showed that al Qaeda had collected thousands of documents on American agriculture information, data, and technology, and that they were in the process of creating an agroterrorism strategy.

We find that that the American agriculture is most susceptible to an attack by any of the following (but are not limited to):

- A transnational group or foreign terrorist organization.
- Domestic or international economic opportunist trying to affect the market for profitability.
- A domestic terrorist organization.
- A domestic activism group, such as an animal rights or environmental group, trying to negatively harm the industry as a statement for their cause.<sup>7</sup>

These attacks could occur through the importation of infected vegetation and livestock (especially exotic species), crop dusting, hacking of vulnerable agriculture data systems, altering of agriculture data, etc.

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<sup>3</sup> Fleischmann, Maria. "World Must Sustainably Produce 70 per Cent More Food by Mid-Century ." *UN News*, United Nations, <https://news.un.org/en/story/2013/12/456912>.

<sup>4</sup> Good, Keith. "2020 U.S. AG Exports Second Highest on Record, Led by Soybeans, Corn and Pork to China ." *Farm Policy News*, 7 Apr. 2021, <https://farmpolicynews.illinois.edu/2021/04/2020-u-s-ag-exports-second-highest-on-record-led-by-soybeans-corn-and-pork-to-china/>.

<sup>5</sup>USDA Economic Research Service. "Americans Consume Mostly U.s.-Made Food, Produce." *Western Livestock Journal*, 21 Dec. 2020, [https://www.wlj.net/top\\_headlines/americans-consume-mostly-u-s--made-food-produce/article\\_a76f95fo-5857-11e8-8922-47f84163101f.html#:~:text=In%202016%2C%2087.3%20percent%20of,Chile%20or%20wines%20from%20France](https://www.wlj.net/top_headlines/americans-consume-mostly-u-s--made-food-produce/article_a76f95fo-5857-11e8-8922-47f84163101f.html#:~:text=In%202016%2C%2087.3%20percent%20of,Chile%20or%20wines%20from%20France).

<sup>6</sup> Mauroni, Albert, and Robert Norton. *Agroterrorism: National Defense Assessment, Strategies, and Capabilities*. United States Air Force Center for Strategic Deterrence Studies, 2020.

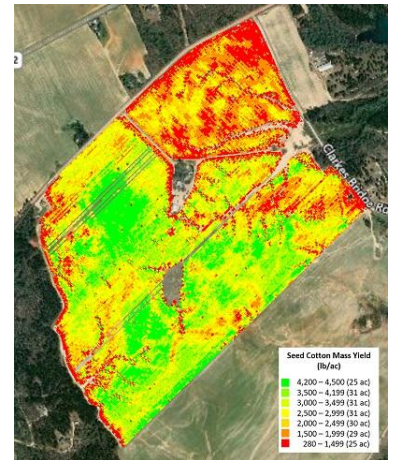
<sup>7</sup> Olson, Dean. "Agroterrorism: Threats to America's Economy and Food Supply." *FBI*, FBI, 1 Feb. 2012, <https://leb.fbi.gov/articles/featured-articles/agroterrorism-threats-to-americas-economy-and-food-supply>.

## Precision Agriculture Technology

The birth of precision agriculture technology came in the 1980's in an effort to help transform the agriculture industry from that of a high labor and low technology industry into one that was a low labor and high technology industry<sup>8</sup>. Precision agriculture refers to any technology that utilizes Geographic Information Systems (GIS), Global Positioning Systems (GPS), remote sensing, automated tractor navigation, etc. technologies. These technologies can help agriculture workers perform soil sampling tests, yield mapping, proximal sensing of soils and crops, determining amounts of fertilizers and other chemicals and the distribution of it, irrigation, harvesting, etc.

In the livestock industry, farmers are able to use devices such as automated wearable technology that will provide pertinent information on the animal's health such as body heat, hormone levels, rut, etc.<sup>9</sup>

The data collected through precision agriculture technology is variously stored among different corporations. Many of the leading agriculture corporations have secured and private data storing capabilities. However, many smaller agriculture companies store farmers' data on less secure servers, which allows them to offer their services at a lower cost, causing more farmers to be attracted to their services. Another weakness in the U.S. agriculture community is that an overwhelming majority of farmers are unaware of security measures they can take when collecting and storing pertinent data. Additionally, it has been found that a majority of U.S. farmers are unaware of the protocols to follow when a data breach is suspected and are hesitant to share data and information with other sources including the government, other farmers, and agriculture companies.<sup>10</sup>



An image of the visuals provided by precision agriculture technology.

## Susceptibility of Precision Agriculture Technology Systems Diseases and Infections Spread

Among the hundreds of infections and diseases that can be spread from livestock to humans, below is a list of some of the most common threats to our current food chain. The majority of these diseases can be quickly spread across state borders within days, due to their ability to spread through the air.

- *E. coli* infection
- Ringworm
- *Salmonella* infection
- Foot and mouth disease (FMD)<sup>11</sup>

<sup>8</sup> Mulla, David, and Raj Khosla. "Historical Evolution and Recent Advances in Precision Farming." *Advances in Soil Science*, 2015, pp. 1-36., <https://doi.org/10.1201/b18759-2>.

<sup>9</sup> Lewis Baida, Bobbie E., et al. "Technologies for the Automated Collection of Heat Stress Data in Sheep." *Animal Biotelemetry*, vol. 9, no. 1, 2021, <https://doi.org/10.1186/s40317-020-00225-9>.

<sup>10</sup> Briere, Karen. "Farmers Favour Sharing Data with Universities." *The Western Producer*, 26 July 2018, <https://www.producer.com/news/farmers-favour-sharing-data-with-universities/>.

<sup>11</sup> Jayarao, Bhushan M. "Agroterrorism: A Threat to Us Animal Agriculture." *Penn State Extension*, 26 Mar. 2022, <https://extension.psu.edu/agroterrorism-a-threat-to-us-animal-agriculture>.

Below is a list of possible plant diseases that could be deployed in an attack:

- Citrus greening
- Philippine downy mildew (of corn)
- Bacterial wilt, brown rot (of potato)
- Brown stripe downy mildew (of corn)
- Potato wart or potato canker
- Bacterial leaf streak (of rice)
- Citrus variegated chlorosis <sup>12</sup>

### Federal Authorizations

In the event of an outbreak of a disease among livestock, there are several measures and authorities that the Agriculture Secretary has at their disposal to help slow the spread of said diseases and infections, which include the following:

- Stop imports of animals and animal products into the U.S. from suspected countries;<sup>13</sup>
- Stop animal exports and interstate transport of diseased or suspected animals;<sup>14,15</sup>
- Seize, quarantine, and dispose of infected livestock to prevent dissemination of the disease;<sup>16</sup>
- Compensate owners for the fair market value of animals destroyed by the Secretary's orders;<sup>17</sup> and
- Transfer the necessary funding from USDA's Commodity Credit Corporation (CCC) to cover costs of eradication, quarantine, and compensation programs. <sup>18</sup>

Additionally, the Agriculture Secretary has the responsibility to oversee the National Veterinary Stockpile (NVS). This is a federally run stockpile of various emergency veterinary medicines used to treat highly infectious diseases among livestock. U.S. farmers have access to this stockpile. In the event of an attack of infection, farmers are able to contact the NVS and have emergency medications for livestock deployed to them within 24 hours.<sup>19</sup> Recent calls have been made by Congress to increase the funding to \$75 million.<sup>20</sup>

### Projections

We have found that, in the event of an agroterrorism attack, there would be damage ranging from small/local to catastrophic/expansive caused in the American food supply chain system, which would depend on the extent and severity of the attack.

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<sup>12</sup> Cook, Alethia H. *Terrorist Organizations and Weapons of Mass Destruction: U.S. Threats, Responses, and Policies*. Rowman Et Littlefield, 2017.

<sup>13</sup> 7 U.S.C 8303

<sup>14</sup> 7 U.S.C 8304

<sup>15</sup> 7 U.S.C 8305

<sup>16</sup> 7 U.S.C 8306

<sup>17</sup> 7 U.S.C 8306

<sup>18</sup> 7 U.S.C 8316

<sup>19</sup> "National Veterinary Stockpile (NVS)." *USDA APHIS | National Veterinary Stockpile (NVS)*, [https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/nvs/CT\\_Nvs](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/nvs/CT_Nvs).

<sup>20</sup> Fatka, Jacqui. "Congressional Members Push for More ASF Funding." *Farm Progress*, 20 Sept. 2021, <https://www.farmprogress.com/farm-policy/congressional-members-push-more-asf-funding>.

Below is the general order in which an attack would take effect on the U.S. The structure will also depend on the severity and reach of the attack.

- 1) The stealing or alternation of U.S. agriculture data and information; or, infection of crops and/or livestock.
- 2) Direct loss of livestock and/or crop; or, the spread of the infection/disease.
- 3) Infection of humans.
- 4) Economic loss and market consequences.
- 5) Political/social unrest.

As stated above, the spread of livestock diseases such as FMD require a small amount of effort due to their ability to spread through the air, and are fairly inexpensive for an entity to introduce. However, the spreading of diseases among various crops requires a more cohesive and strategic plan because crop diseases travel through the air at much slower speeds and cannot reach the distances that livestock diseases can. For example, if one were to conduct an attack through plant spores, they must ensure that the spore was protected from ultraviolet light.<sup>21</sup>

Therefore, we predict that it would be more likely for an agroterrorism attack to take the form through the targeting of livestock rather than crops. This does not eliminate the possibility of an attack to occur through crops though.

### ***Economic Impact***

Because the American agriculture sector is so multifaceted, the projected economic impact will vary among geographic locations, as well as the particular infected crop or livestock. It is estimated that an FMD attack on a state like California alone would cause an economic loss of between \$9 and \$19 billion just within the first few weeks of an attack. Additionally, it is projected that the deployment of more than 700,000 people would be required in a state like California in order to aid in the recovery of the attack. This deployment of personnel would directly cost around \$6 billion.<sup>22</sup>

Within five days of the first introduction of a disease like FMD in one state, it is predicted that the disease would reach 23 states.<sup>23</sup>

Alabama, one of the largest producers of peanuts, produces over \$200 million worth of peanuts a year. An attack infecting the Alabama peanut industry would be detrimental, as there is one predominant variety of peanuts grown in the state, allowing an attacker to have a consistent target. Not only would there be a direct financial loss from the peanuts, but there could be a cascading effect to the cattle industry, as peanuts are often used as a main source of nutrients for cattle. There would also be additional expenses to treat and rid of the crop infection in the event that it is curable.

As a prediction model of the severity of an FMD attack, we look to the FMD attack on the U.K. in 2001. With only 2,027 cases of FMD, which had spread very quickly, the British economy lost over \$6 billion in their efforts to rid of the disease.<sup>24</sup>

<sup>21</sup> Kohen, Anne. "Responding to the Threat of Agroterrorism: Specific Recommendations for the United States Department of Agriculture." BCSIA Discussion Paper 2000-29, ESDP Discussion Paper ESDP-2000-04, John F. Kennedy School of Government, Harvard University, October 2000.

<sup>22</sup> Polyak, Mark. "The Threat of Agroterrorism." *Georgetown Journal of International Affairs*, vol. 5, no. 2, 2004.

<sup>23</sup> [22] *ibid*

<sup>24</sup> Koda, Erik. "Could Foot and Mouth Disease Be a Biological Warfare Incident?" *Military Medicine*, vol. 167, no. 2, 2002.

This was an expansive effort to rid of the diseases, and the expense/loss includes things such as the slaughtering of infected animals, quarantining of infected animals, loss from tourism, etc.

## Recommendations

### *For the Federal Government*

In the event of an attack, the federal and state governments would collaborate in an effort to quarantine and rid of the infection. Many scholars have agreed on the general solution process which is listed below.

- 1) Identify and confirm the agent.
- 2) Develop a case definition.
- 3) Identify exposed or potentially exposed herds.
- 4) Control movement of animals and vehicles out of affected area.
- 5) Isolate, slaughter, and dispose of (or vaccinate) exposed herds.
- 6) Vaccinate around the outbreak, if possible.
- 7) Throughout the crisis, inform and educate the public.<sup>25</sup>

Additionally, many of the technology oversights created in the protection acts of 2001 and 2003, are outdated according to today's technology standards. In order for the government to have pertinent oversight of the agriculture industry, for the purpose of protection, additions can be made to these protection acts to ensure that they are relevant to the current threats we face today.

Some suggest that the USDA should increase funding for disease detection and surveillance technologies, such as linked human and animal disease databases and satellite surveillance.<sup>26</sup> This technology would allow satellite systems to track crop crop and distress.

### *Recovery For Farmers*

While highly debated among industry leaders and professionals, one of the most highly recommended solutions to defending against cyber threats through precision agriculture technology is for farmers to invest their data in large networks. Oftentimes, farmers store their farms' data on their own personal devices. It is suspected that by doing so, these pieces of data are among the most susceptible because these storage systems are virtually unprotected, and a farmer, in the case of a cyber attack, will not be able to protect the data they have stored on their personal devices the way a skilled data technician may be able to. As a solution to this, many data storing networks provide safe and secure networks for farmers to store their data in.

It could be recommended that farmers store their farm data, and data pertaining to any farm related material, be stored on private and secure data networks. This will allow for closer monitoring of data. Farmers will also be provided a stronger defense mechanism against potential attacks if their data is stored on a secured network.

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<sup>25</sup>Franz, David R. *Foreign Animal Disease Agents as Weapons in Biological Warfare*, National Emergency Training Center, Emmitsburg, MD, 1999, p. 103.

<sup>26</sup>[21] *ibid*



It could also be recommended that farmers be educated on the potential threats of agroterrorism, how to prevent it on their farms, and what to do in a situation of an attack. This information can be communicated to farmers through agriculture corporations (especially those that store farmers' data), local agriculture co-ops, agriculture insurance companies, and state extension offices.

1. Deterrence and prevention
2. Detection and Response
3. Recovery and Management<sup>27</sup>

Additionally, farmers can be educated on the operations of the NVS so that they will be able to deploy defense mechanisms in a timely fashion in the event of an attack to slow the spread of diseases in livestock. The materials provided by the NVS can be distributed within 24 hours of a request, so it is important that farmers are aware of the importance of a timely notification to the NVS.

Through our findings, we expect that there are improbable to roughly even odds that an agroterrorism attack could occur in the U.S. Much legislation has been passed and additional security measures have been placed following the September 11 attacks. However, there are still many areas in the agriculture industry that operate virtually unsecured. While there have been no recent agroterrorism attacks in the U.S., the recent events of supply chain disruptions, country invasions, and trade wars have raised the probability of an attack on our agriculture industry, especially by the Chinese and Russian governments. Additionally, the expansion and dependency on precision agriculture technology increases risks for potential threats.

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<sup>27</sup> [2] *ibid*